

DOCTORAL THESIS



INTERNATIONAL DOCTORAL SCHOOL

Doctoral Programme in Social Sciences

Conceptualizing and Designing Scalable Beyond Banking Ecosystems Using Machine Learning and Data Analytics Methodologies

Author:

Sebastian Voigt

Supervisors:

Prof. Dr. M^a Mercedes Carmona Martínez

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THESIS SUPERVISORS' AUTHORISATION FOR THESIS SUBMISSION

Prof. Dr. M^a Mercedes Carmona Martínez and Prof. Dr. Alexander Holland, as Supervisors⁽¹⁾ of the Doctoral Thesis 'Conceptualizing and Designing Scalable Beyond Banking Ecosystems Using Machine Learning and Data Analytics Methodologies' by Mr Sebastian Voigt in the Doctorate Programme de Doctorado en Ciencias Sociales, **authorise(s) its submission**, given that it meets the required conditions for its defence.

Which I hereby sign in compliance with Spanish Royal Decree 99/2011, of 28 January, in Murcia, on 10 September 2025.

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ABSTRACT

This thesis examines the concept of Beyond Banking, framing it as an intra-institutional (C2C) banking ecosystem approach. The literature review shows that most research on Beyond Banking focuses on the inter-institutional customer data matching (B2C) model involving third-party partners. There has been limited exploration of C2C at the bank level within Beyond Banking, where a bank acts as a marketplace facilitator connecting its own customers, who can serve as both providers and consumers within the ecosystem. This indicates that banks in German-speaking countries have a limited understanding of Beyond Banking in relation to ecosystem strategies. Furthermore, a lack of well-defined business cases and essential skills hinders the development of effective Beyond Banking services and the generation of targeted data insights through data analytics (DA) and AI/ML techniques. Leading the field are Asian big tech firms and banks, which develop banking ecosystems offering substantial value via scalable super apps with many participants on both supply and demand sides (B2B2C/B2C2C).

Based on the research gaps identified, this dissertation examines three central research questions:

RQ1: How can combining intra- and inter-institutional customer data matching improve the sizing and scaling of Beyond Banking Ecosystems in the financial sector?

RQ2: How can machine learning and data analytics methodologies be utilized to develop and implement effective Beyond Banking Sales Signals, and what are the specific use cases that demonstrate their impact on sales performance in the financial sector?

RQ3: What are the main influencing factors and evaluation criteria for successfully creating a scalable Beyond Banking Ecosystem, and how can these factors be incorporated into the development of the model?

The aim is to develop an evaluated design for creating scalable Beyond Banking Ecosystems (BBE) using machine learning (ML) and data analytics (DA) methodologies. The design will be created using the Design Science Research methodology, which will be developed through four evaluation cycles involving

experts from the financial services and technology sectors, with each cycle being assessed successively. Before evaluating the design, sufficient data will first be gathered from various studies, case studies, further expert interviews, and a survey to confirm the relevance and acceptance of Beyond Banking (Ecosystems) from the perspectives of banks and customers. This data will also help identify factors and criteria that will serve as artefacts and other elements for the design evaluation.

The results offer guidance and classify different BBE levels while identifying key factors for their development. Additionally, initial use cases for data recommenders were created using DA and AI/ML methodologies. Finally, an initial blueprint for BBE development was designed, evaluated, and accepted mainly in an artificial setting, serving as a foundation for future research in real-world applications. Banking decision-makers now have an expanded, compiled solution design for BBE 3.0, which informs and inspires, and can be used to improve decision-making on the implementation of BBE 3.0 initiatives.

KEY WORDS

Beyond Banking Ecosystem, C2C, Data Matching, Data Recommender, Design Science Research.

RESUMEN

Esta tesis aborda el fenómeno *Beyond Banking* y lo traslada a un enfoque de ecosistema bancario intrainstitucional (C2C). La revisión bibliográfica muestra que los estudios científicos sobre el tema se centran principalmente en el enfoque interinstitucional, es decir, en el intercambio de datos de clientes (B2C) con la mediación de un tercero. Sin embargo, hasta el momento, apenas se ha explorado el análisis a nivel C2C dentro de una misma entidad bancaria en el marco del *Beyond Banking*, en el que el banco asume el rol de coordinador del mercado y conecta a sus propios clientes, quienes pueden actuar tanto como proveedores como demandantes dentro del ecosistema bancario.

Se observa, además, que en los bancos de países de habla alemana el conocimiento sobre *Beyond Banking* en relación con enfoques de ecosistema es limitado o insuficiente. También faltan casos de negocio concretos y las competencias necesarias para diseñar servicios eficaces de *Beyond Banking*. A ello se suma la escasa aplicación de metodologías de análisis de datos (DA) y de inteligencia artificial/aprendizaje automático (IA/ML) para generar recomendaciones específicas y relevantes a partir de dichos servicios. En contraste, las grandes tecnológicas y algunos bancos asiáticos actúan como pioneros en este ámbito, al desarrollar ecosistemas bancarios que integran un valor añadido significativo en superaplicaciones escalables, con un elevado número de participantes tanto en el lado de la oferta como en el de la demanda (B2B2C/B2C2C).

Basándose en las lagunas de investigación encontradas, esta tesis doctoral plantea tres preguntas de investigación centrales:

RQ1: ¿De qué manera la combinación de datos de clientes intra e interinstitucionales puede mejorar el dimensionamiento y la escalabilidad de los ecosistemas de *Beyond Banking* en el sector financiero?

RQ2: ¿Cómo pueden aprovecharse las metodologías de aprendizaje automático y análisis de datos para desarrollar e implementar señales de venta eficaces en *Beyond Banking*, y qué casos de uso específicos permiten demostrar su impacto en el rendimiento comercial del sector financiero?

RQ3: ¿Cuáles son los factores clave y los criterios de evaluación necesarios para la creación exitosa de un ecosistema *Beyond Banking* escalable, y cómo pueden integrarse estos factores en el diseño del modelo?

El objetivo de la investigación es formular un diseño evaluado para el desarrollo de Ecosistemas de *Beyond Banking* (BBE) escalables, a partir de metodologías de ML y DA. Para ello se aplica la metodología de investigación en ciencias del diseño, desarrollada en cuatro ciclos de evaluación con el apoyo de expertos en servicios financieros y tecnología. Previamente, se recopilarán datos de estudios, casos prácticos, entrevistas con especialistas y una encuesta, a fin de fundamentar la relevancia y aceptación de los ecosistemas de *Beyond Banking* desde la perspectiva tanto de los bancos como de los clientes. Esta información servirá para identificar factores y criterios que se incorporarán como artefactos y elementos centrales en el diseño a evaluar.

Los resultados proporcionan una orientación y una clasificación de los diferentes niveles de BBE, así como de los factores decisivos para su desarrollo. Además, se han desarrollado los primeros casos de uso de sistemas de recomendación de datos utilizando metodologías de DA y AI/ML. Por último, se ha desarrollado un primer *blueprint* para el diseño de BBE, evaluado y validado principalmente en entornos simulados, que puede constituir la base para futuras aplicaciones en contextos reales. Los responsables de la toma de decisiones en el sector bancario disponen de un diseño de solución compilada ampliado para BBE 3.0, que sirve como referencia práctica y estratégica para orientar, inspirar y fundamentar decisiones sobre la implementación de iniciativas en esta área.

PALABRAS CLAVE

Ecosistema más allá de la banca, C2C, emparejamiento de datos, recomendador de datos, investigación en ciencia del diseño.

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whose support made this work possible.

‘You can't use up creativity. The more you use, the more
you have.’ Maya Angelou (1928-2014).

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ACRONYMS AND ABBREVIATIONS

(A)BBS, (Accepted) Beyond Banking Service

A, Artefact

ABM, Allocentric Business Model

AI, Artificial Intelligence

API, Application Programming Interface

AWS, Amazon Web Services

B2B, Business to Business

B2B2C, Business to Business to Customer

B2C, Business to Customer

B2C2C, Business to Customer to Customer

BB, Beyond Banking

BBE, Beyond Banking Ecosystem

BBSS, Beyond Banking Sales Signal

BM, Business Model

BMC, Business Model Canvas

BPM, Business Process Management

BVR, Bundesverband der Deutschen Volksbanken und Raiffeisenbanken

C2C, Customer to Customer

CB, Contextual Banking

CNN, Convolutional Neural Network

CRM, Customer Relationship Management

CSAT, Customer Satisfaction Score

DA, Data Analytics
DBPA, Digital Banking Platform Architecture
DK, Design Knowledge
DLT, Distributed-Ledger-Technology
DSR(P), Design Science Research Process
ER, Entity Resolution
ESG, Environmental, Social, and Governance
FIDA, Financial Data Access
GAFAM, Google, Amazon, Facebook, Apple, and Microsoft
GCN, Graph Convolutional Network
GDPR, General Data Protection Regulation
GDS, Graph Data Science
GNN, Graph Neural Network
GPUB, German private and universal banks
GS, Google Scholar
IB, International banks
KPI, Key Performance Indicator
KYC, Know Your Customer
(L)CDD, (Light) Capability-Driven Development
MCDM, Multi-criteria Decision-making
ML, Machine Learning
MVP, Minimum Viable Product
NBA, Next Best Action
NBFI, Non Banking Financial Institution
NBO, Next Best Offer
NFIS, Non Financial Inclusion Strategy
NLP, Natural Language Processing
NPD, New Product Development
NPS, Net Promoter Score

NSD, New Service Development

OB, Open Banking

OR, Odds Ratio

P, Phase/Process

PBCD, Plattform Business Canvas Design

PBMC, Platform Business Model Canvas

PSD2/3, Payment Service Directive 2/3

PSR, Payment Services Regulation

PwC, PricewaterhouseCoopers

QDA, Qualitative Data Analysis

RB, Regional banks

ROI, Return on Investment

SC, Subcode

SLA, Service Level Agreement

SME, Small and Medium-sized Enterprise

TPP, Third Party Provider

T(R)AM, Technology (Readiness) and Acceptance Model

TSP, Technical Service Provider

UTAUT, Unified Theory of Acceptance and Use of Technology

UX, User Experience

VIF, Variance Inflation Factor

VR, Virtual Reality

WoS, Web of Science

XS2A, Access to Account

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I – INTRODUCTION

I - INTRODUCTION

“2030 sollen Nicht-Finanzdienstleistungen 60 Prozent der Umsätze ausmachen” [Non-financial services to account for 60 per cent of sales in 2030] (Bölke, 2021, last section), so predicts Russia's Sberbank. “Dass die Amazonisierung als Vorbild für die hiesigen Banken taugt, muss sich zeigen – für alle sicherlich nicht, aber Nischen gibt es jede Menge jenseits von Kredit und Karte.” [It remains to be seen whether Amazonisation (This refers to the process of aligning with the online retailer Amazon through strategic business model developments towards customer centricity and digital platforms.) (Luxembourg for Finance & PwC Luxembourg, n.d.) is suitable as a model for local banks - certainly not for everyone, but there are plenty of niches beyond credit and cards.] This impressive thesis from Sberbank shows that the trend and also the potential of the future revenue sources of banks lie in non-financial services. “Wegfallende Zinsmargen [, erhöhte regulatorische Anforderungen (Ahern, 2021)] und zunehmende Konkurrenz im Provisionsgeschäft, u. a. durch neue Drittanbieter ohne Banklizenzen, setzen die (Regional-)banken unter Druck.” [Falling interest margins (at the time in 2022, when a zero interest rate policy still prevailed and the doctoral thesis was beginning), (increased regulatory requirements) and growing competition in the commission business, including from new third-party providers without banking licences, are putting (regional) banks under pressure] (Meinl, 2021, para. 22) and underpin the effort to develop new sources of revenue. This provides a compelling reason to conduct an academic study, identifying research gaps on how banks can expand and scale their Beyond Banking Ecosystems to enhance profitability and secure competitive advantages. It is important to highlight which Beyond Banking Services are actually in demand from the customer's perspective and how these findings can be translated into a scalable ecosystem concept. Expanding levels of BBE and their criteria are also being examined, and a design concept is being developed with experts. Although interest rates are high these days, interest-based transactions are always cyclical and can change again in the long term (Jung & Strohhecker, 2009, pp. 251-279). For this reason, it is nevertheless a good idea to

develop a pillar that is independent of economic cycles as a source of income in the form of Beyond Banking.

The idea of Beyond Banking and the development of additional revenue streams for banks is highly topical. With the opening of API interfaces through the Payment Services Directive 2 (PSD2) agreement from 2019 (Deloitte, 2025) to introduce more extensive financial data disclosure, bank customers can now seamlessly select third-party products through their online banking and other platforms. "Open Banking bedeutet, dass sich die geschlossene Finanzwelt unaufhaltsam zu einem offenen, kundenzentrierten Ökosystem entwickelt und sich dabei an regulatorischen Anforderungen und Neuerungen orientieren muss. Die Vision [ist], dass Banken zu modernen Serviceanbietern werden, die mehr als nur reine Finanzdienstleistungen abdecken." [Open Banking means that the closed financial world is inexorably evolving into an open, customer-centric ecosystem and must comply with regulatory requirements and innovations. The vision is that banks will become modern service providers offering more than just financial services (para. 2).] "The market understands this power. Most of the companies with the world's highest market capitalizations are tech companies that generate much of their revenue from the digital ecosystems they created .." (Chung et al., 2020, para. 3).

Many of these ecosystems are B2C plays. Others ... represent B2B spaces. Some companies tackle both: Amazon, for example, ties together e-commerce, cloud computing, logistics, and consumer electronics, while China's Tencent provides services including social media, gaming, finance, and cloud computing. (para. 3)

So when unlimited data, that of your own bank plus that of competitors, now meets agile and customer-centric players, we can expect exponential growth in new business models and market participants. These business models are supported in particular by emerging technological developments such as API, AI, and data analytics. However, traditional banks are still far behind the standard in their development in this area. Banks must therefore upgrade their platform strategy or their banking ecosystem technologically, develop new interfaces to actors and customers, set up new use cases, and intelligently link and monetise customer data. A 360-degree view of the customer is therefore indispensable for the continued existence of banks (Deloitte, 2025). Moreover, at the same time, this scalability in

digital ecosystems has to be managed with current challenges. „On the one hand, banks need to achieve the speed, agility, and flexibility innate to a fintech. On the other, they must continue managing the scale, security standards, and regulatory requirements of a traditional financial-services enterprise” (Biswas et al., 2020, p. 7, para. 1). „Two additional challenges for many banks are, first, a weak core technology and data backbone and, second, an outmoded operating model and talent strategy” (para. 2).

A study by PwC (Rederer, 2021) shows that although banks are pushing the development of digital ecosystems and recognize their urgent need for action, the operationalization of digital platforms and the willingness to invest in them are still often unclear.

Die hohen Ertragserwartungen, die an die Plattformen geknüpft werden, spiegeln sich aktuell allerdings noch nicht in der Investitionsbereitschaft wider: im kommenden Jahr [2022] wollen 43 Prozent bis zu 500.000 Euro in den Aufbau eines digitalen Ökosystems fließen lassen. Knapp ein Viertel plant nur moderate Investitionen von bis zu 100.000 Euro. [However, the high earnings expectations associated with the platforms are not yet reflected in the willingness to invest: in the coming year (2022), 43 per cent want to invest up to EUR 500,000 in the development of a digital ecosystem. Just under a quarter are only planning moderate investments of up to 100,000 euros.] (para. 3)

Thus, it is all the more necessary to scientifically substantiate and elaborate on the great potential of Beyond Banking Ecosystems and their scalability, to which dimensional levels banks can act as marketplace orchestrators, and which solutions and recommendations for action for banks can be derived from this. A recent demonstration of a scaled Beyond Banking Ecosystem was published by the cooperative banks and their IT service provider Atruvia (Bölke, 2021), who primarily operate inter-institutional customer data matching within the decentralised and regional cooperative banks' branch network. According to the definition of this doctoral thesis, this project is to be classified in the expansion stage "Beyond Banking 2.0". Furthermore, this project of the cooperative banks can also be expanded into further dimensions.

1.1. PROBLEM DEFINITION

The core idea of platforms and the scalability of solutions are not new. “It is basic human nature to want less of bad things - and more of good ones” (Elkington et al., 2010, p. 83). The era of the New Economy has already taught us to think about replicating and expanding solutions (Kelly, 1999). The phenomenon of Beyond Banking is again highly relevant and offers great potential for creating new income streams for banks. Early research and findings (Chung et al., 2020) have shown that efforts have been made to scale from the enterprise level to ecosystem 1.0 and 2.0. However, there is a shortage of scientific literature and research results for the banking industry, and no comprehensive analysis at the ecosystem level 3.0 involving an intra-institutional approach, where a C2C business model and the bank as market orchestrator, along with customer-to-customer matching using machine learning and data analytics, are explored. Additionally, key factors and evaluation criteria are outlined in a framework designed to serve as decision support for successfully establishing a scalable Beyond Banking Ecosystem. A conceptual draft has also been developed as a blueprint for banks.

Banks are generally aware of the usefulness of using a Beyond Banking Ecosystem and the potential added value for customers. However, they still largely lack the understanding of Amazonisation as a technology company and the bank's departure from exclusively classic financial services. A central thesis of the study “Digital Pulse Check 4.0” by zeb-consulting (n.d.) sums it up: “Zwei Drittel der Banken wollen ihr Geschäftsmodell bis 2023 über digitale Ökosysteme erweitern, bleiben aber zunächst bei reinen Finanzprodukten; denn um Beyond-Banking-Potenziale heben zu können, mangelt es noch an klaren Business-Cases und den nötigen Skills.” [Two-thirds of banks want to expand their business model via digital ecosystems by 2023, but are sticking with purely financial products for the time being; there is still a lack of clear business cases and the necessary skills to realise the potential beyond banking] (last section).

1.2. RESEARCH GOAL

The research goal of the doctoral thesis can be divided into the literature review, the resulting research gaps, and the associated research questions to be

investigated and verified. With the help of the verification and evaluation of the research questions, the research gaps can be answered (see chapter “1.3. Methodology of the research”).

1.2.1. Literature Review

The literature review assesses how much previous research has already explored the topic. The entire process follows a systematic literature analysis based on Webster and Watson (2002). First, a keyword and parameter search is conducted using science portals and databases such as Web of Science (WoS), Google Scholar (GS), Scopus, IEEE Xplore, and the ACM Guide to Computing Literature to identify and narrow down all scientifically relevant publications as much as possible. These are then clearly categorized and analyzed by topic. The identified research gaps form the basis for examining the research design of this thesis and for further developing research questions.

The author of this paper first uses the local and well-known search engine GS and the two databases WoS and Scopus for literature analysis (Freie Universität Bozen, 2020), as these differ in terms of the scope of the literature they provide and together offer very comprehensive coverage of the literature review. The Freie Universität Bozen (2020) confirms that the main difference between the databases is their content.

In Scopus and WoS editors select and curate which journals, books, conference proceedings and other materials are inserted. Google Scholar on the other hand will include everything that can be found via automated processes (crawling), which means that there is no quality control or filtering. Consequently, Google Scholar has much more content, but it is less structured and it is more likely to include errors in the metadata as well as including documents like presentations, posters, grey literature, websites and others. Scopus and WoS prioritize English literature, while Google Scholar is more inclusive to different languages. All three databases though, while a lot of content is present in all, differ substantially in coverage and therefore it can be useful to consult all of them when doing research. (para. 3)

A study by Martín-Martín et al. (2018) provides deeper insights into the systematic evidence about the differences between the academic search engine GS and the databases WoS and Scopus. The results show that all citations found by WoS (95%) and Scopus (92%) were also found by GS. Conversely, a significant number of unique citations from GS were not identified by the databases. This also confirms the very strong Spearman's correlation among the three service providers across all subject categories. However, since the correlations between GS and WoS (.78 to .98) are weaker than those between GS and Scopus (.92 to .99), WoS is initially chosen as the preferred interdisciplinary database to cover the uncorrelated citation data for GS in the overall search and to address the previously mentioned weaknesses of GS regarding the potential inclusion of errors in the metadata. When GS and WoS are considered together, they cover 96.6% of all sources in the representative study by Martín-Martín et al. (2018). Although the contribution of potentially new sources from the remaining 3.4% of sources covered only by Scopus is marginal, Scopus is still included in the database search to ensure the broadest possible source coverage. Additionally, the use of these databases is justified by the smaller, more accurate number of hits due to better filtering options (Technische Hochschule Nürnberg, n.d.), the scholarly nature of peer-reviewed literature, which typically undergoes an editorial process, the deep web access to content that is not freely available through search engines, and the higher availability of full texts compared to GS.

For this reason, Webster and Watson (2002) recommend using WoS, GS, and Scopus to conduct the following keyword and parameter search through backward searching. "Backward searching basically refers to collecting appropriate publications by screening the reference lists of the papers retrieved from the keyword search ("going backward in time")" (vom Brocke et al., 2015, p. 214, para. 6). Since, according to Gusenbauer (2024), the IEEE Xplore and ACM Guide to Computing Literature databases achieved the highest database backward citation coverage of 100% compared to 59 other databases' citation indices, these subject-specific publisher databases, especially in the field of computer science, are also included in the literature analysis due to the interdisciplinary nature of this thesis in economics and computer science. After completing the backward search, the "Hits" in the reference list are counted and then evaluated to determine how relevant these sources are to the research. "Relevance" here refers to whether the

sources describe various concepts or research designs in detail or only superficially or in passing. The relevant sources are listed cumulatively in the respective tables. This means that a relevant source already found in WoS, for example, is no longer listed as “relevant” in GS and other databases, thus preventing duplication of sources in the cumulative list of the concept matrix of the literature review (Table No. 7).

Table 1 of the keyword and parameter search with WoS shows 12 literature sources that are relevant for further analysis. Relevant literature sources can be found in the first and second iterations; from the third iteration onward, theoretical saturation is reached without additional findings. For example, the keyword search “non banking” in the first iteration yielded 240 hits, from which four relevant literature sources were selected that address at least one of the topics listed in the concept matrix. In the second iteration, the keyword search was supplemented with “ecosystem,” which further narrowed the selection. This resulted in three sources, two of which are relevant. In the third iteration, a different search approach was used, omitting the prefixes of all three terms “beyond,” “non,” and “open,” and replacing them with “banking” to search for additional keywords such as “ecosystem” and (“customer to customer” OR “C2C” OR “scale” OR “scaling” OR ‘design’ OR “concept”) in various combinations.

Table 1. Keyword and Parameter Search with Web of Science

It.	Keywords/Parameters	Hits	Relevance
1.	ALL=("beyond banking")	8	-
	ALL=("non banking")	240	4
	ALL=("open banking")	107	6
2.	(ALL=("beyond banking")) AND ALL=("ecosystem")	-	-
	(ALL=("non banking")) AND ALL = ("ecosystem")	3	2
	(ALL=("open banking")) AND ALL=("ecosystem")	18	-
3.	((ALL=("scale OR scaling")) AND ALL=("banking" AND "ecosystem"))	-	-

(((ALL=("design OR concept")) AND ALL=("banking" AND "ecosystem")))	-	-
((ALL=("banking")) AND ALL=("customer to customer"))	4	-
(((((ALL=("banking")) AND ALL=("ecosystem")) AND ALL=("customer to customer" OR "C2C"))))	-	-

Table 2 of the keyword and parameter search with Google Scholar shows 11 literature sources relevant for further analysis. Relevant sources appear from the fourth iteration level onward, after which theoretical saturation is reached without additional findings. Here, each of the three main keywords was supplemented with “ecosystem” and the parameter (“customer to customer” OR “C2C”), resulting in a sharply focused search that produced a feasible framework for the literature review, with 19, 90, and 129 hits.

Table 2. Keyword and Parameter Search with Google Scholar

It.	Keywords/Parameters	Hits	Relevance
1.	"beyond banking"	2490	Too many
	"non banking"	57.200	Too many
	"open banking"	11.500	Too many
2.	"beyond banking" AND "ecosystem"	359	Too many
	"non banking" AND "ecosystem"	4260	Too many
	"open banking" AND "ecosystem"	4190	Too many
3.	"scale" OR "scaling" AND "banking" AND "ecosystem"	143.000	Too many
	"design" OR "concept" AND "banking" AND "ecosystem"	191.000	Too many
	"banking" AND "customer to customer"	6.670	Too many
	"banking" AND "ecosystem" AND "customer to customer"	1.040	Too many
	"banking" AND "ecosystem" AND ("customer to customer" OR "C2C")	3.120	Too many
4.	"beyond banking" AND "ecosystem" AND ("customer to customer" OR "C2C")	19	4

"non banking" AND "ecosystem" AND ("customer to customer" OR "C2C")	90	4
"open banking" AND "ecosystem" AND ("customer to customer" OR "C2C")	129	3

Regarding Table No. 3, the keyword and parameter search was performed using Elsevier's Scopus database. Five relevant sources were identified after three search iterations. Since the first iteration with the search term “beyond banking” already yielded enough results but no relevant sources, further iterations with this keyword were unnecessary. In the second iteration, enough results were found for “non banking” combined with “ecosystem,” but there were still too many results for “open banking.” For “open banking,” an additional iteration was conducted with the parameters “ecosystem” AND (“customer to customer” OR “C2C”).

Table 3. Keyword and Parameter Search with Scopus (Elsevier)

It.	Keywords/Parameters	Hits	Relevance
1.	"beyond banking"	141	-
	"non banking"	965	Too many
	"open banking"	1.493	Too many
2.	"non banking" AND "ecosystem"	99	3
	"open banking" AND "ecosystem"	505	Too many
3.	"open banking" AND "ecosystem" AND ("customer to customer" OR "C2C")	3	2

The search in the IEEE Xplore database (Table 4) produced only one relevant result. It isn't necessary to look at more iterations because the first one, using the main keywords “beyond banking,” “non banking,” and “open banking,” was enough and only returned a few results. Adding more parameters with operators like “AND” would decrease the search results further.

Table 4. Keyword and Parameter Search with IEEE Xplore

It.	Keywords/Parameters	Hits	Relevance
1.	"beyond banking"	1	-
	"non banking"	14	1
	"open banking"	46	-

The search using the ACM database yielded similar results (Table No. 5). All main keywords already provided a manageable selection in the first iteration, of which three sources are relevant.

Table 5. Keyword and Parameter Search with ACM Guide to Computing Literature

It.	Keywords/Parameters	Hits	Relevance
1.	"beyond banking"	7	1
	"non banking"	40	-
	"open banking"	60	2

The next step involves summarizing, categorizing, and analyzing 32 relevant literature works within a concept matrix (Table No. 7). These papers are compared with the concepts discussed in this thesis, organized in chronological order from the most recent to the oldest, to evaluate how thoroughly they address specific concepts. When a particular concept is addressed, it is marked with an "x"; if it is merely mentioned or discussed superficially, it is marked with an "(x)". The concepts are grouped into three main categories. The first explores current research on beyond banking ecosystems and the approaches used, such as inter-institutional customer matching or intra-institutional customer matching, as well as the scalability of these ecosystems. The second examines use cases for beyond banking and beyond banking sales signals as data-driven recommenders, and whether data analytics and machine learning methodologies have been utilized for this purpose. The final category covers influencing factors, evaluation criteria, the design of a model using the applied methodology of design science research, and a framework serving as a decision support system for developing a successful Beyond Banking Ecosystem.

Table 6. Concept Matrix of Literature Review based on Webster and Watson (2002)

Paper	Concepts							
	Beyond Banking Ecosystems				Use Cases Beyond Banking		Creation of a scalable Beyond Banking Ecosystem	
	scaling	inter-institutional customer matching	intra-institutional customer matching	Beyond Banking Sales Signals	methodology DA/ML	influencing factors and evaluation criteria	conception of a model	using DSR Framework as decision support system
Continuous intention usage of artificial intelligence enabled digital banks: a review of expectation confirmation model (2024)					x	x	x	
A Semantic Model for Enhancing Data-Driven Open Banking Services (2023)					x	x	x	
A typology of multi-platform integration strategies (2023)	x	x				x	(x)	
Perspectives for the Implementation and Development of AI in Banking Sphere (2023)					x	(x)		
A study on the Intention to Use Open Banking in Brazil (2022)		(x)		(x)		x	x	
Banks and Fintech on Platform Economies: Contextual and Conscious Banking (2022)		x			x	x		(x)
Cluster Analysis for Customer Segmentation with Open Banking Data (2022)		x			x			
Design a Non-Banking Financial Transfer Platform for Cooperative Communities (2022)		(x)				x	x	
Disruption by design? Classification framework for the archetypes of disruptive business models (2022)		(x)	(x)				x	(x)
Fuzzy Decision Model: Evaluating and Selecting Open Banking Business Partners (2022)		x				x		x
How does a data strategy enable customer value? The case of FinTechs and traditional banks under the open finance framework (2022)						(x)		
Sequential Banking Products Recommendation and User Profiling in One Go (2022)				x	x		(x)	
Towards an understanding of consumers' FinTech adoption: the case of Open Banking (2022)						x	x	
UKRAINIAN ECOSYSTEM TRANSFORMATION CHALLENGES OF FINTECH PRODUCTS IN THE COVID-19 CONDITIONS (2022)	x	x						
Why are open banking models in Europe underperforming? (2022)	(x)					x		
A Hybrid MCDM Model for Evaluating Open Banking Business Partners (2021)		x				x		x
Agile elicitation of scalability requirements for open systems: A case study (2021)	x					x	x	x
FinTech Strategy: Linking Entrepreneurship, Finance, and Technology (2021)		x			x	x		x
Managing the supply side of digital platforms: framework, categorization and selection of complementors for industrial IoT and financial services platforms (2021)		x				x		x
Open Banking and Electronic Health Records (2021)		x					(x)	
BUSINESS ECOSYSTEMS ARE CREATING NEW OPPORTUNITIES FOR ASYMMETRIC PARTNERS (2020)		(x)			(x)			
Digital technology disruption on bank business models (2020)		x	x					
Ecosystems and Platforms: Towards a Shared Understanding (Version 2.0) (2020)		(x)				(x)		
Is open banking driving the financial industry towards a true electronic market? (2020)		(x)						
Ökosysteme im Mittelstand (2020)						x		
Identifying Scalability Debt in Open Systems (2019)	x					x		
The FinTech Ecosystem (2019)		(x)	(x)		(x)			
Towards Secure Open Banking Architecture: An Evaluation with OWASP (2019)		x				x	x	
TRANSFORMATION OF FINANCIAL INTERMEDIATION IN THE CONTEXT OF SPREAD OF DIGITAL TRENDS (2019)		x			x			
Strategies for Developing On-Line Business Models in Retail Banking (2018)		(x)	(x)	(x)	(x)			
The Ant Empire: Fintech Media and Corporate Convergence within and beyond Alibaba (2018)			x					
The Future Bank: Banking services seen through the eye of Generation Y, risin' up to the challenge of industrial transformation. (2018)				x	x			

The results of the literature review can be summarized in the following six areas:

1. Inter-institutional customer matching and intra-institutional customer matching

Four papers mainly focus on the ecosystem approach to inter-institutional customer matching. They explore the cooperation approach with fintechs and financial products within an open banking ecosystem (Gagliardi, 2019; Sibanda et al., 2020; Wang & Doan, 2018). The intra-institutional approach involves exchanging financial product data and is demonstrated with an example (Wang & Doan, 2018). Stranieri et al. (2021) provide evidence of a use case beyond banking with open banking combined with electronic health records.

2. Scalability, key factors, and conceptual design of a Beyond Banking ecosystem

Ten papers examine the (technical) design of open banking and the key factors for successful implementation. The Unified Theory of Acceptance and Use of Technology (UTAUT) (Chan et al., 2022) and Technology Readiness and Acceptance Model (TRAM) (Magalhaes et al., 2022) methodologies are utilized here. The studies also address scalability requirements during agile software development frameworks (Brataas et al., 2021), multiple cybersecurity issues in open systems (Kellezi et al., 2019), and a semantic model for improving data-driven open banking services (Paneque et al., 2023). The concepts emphasize the inter-institutional customer matching approach.

3. Use of various data analytics and artificial intelligence (AI) with machine learning to enhance banking ecosystems.

Three out of four papers (Bartels, 2022; Bhatnagr et al., 2024; Mochalina et al., 2023) focus on methodologies for customer data matching and customer profiling using data analytics and AI, as well as how these are utilized to develop banking ecosystems. Additionally, Boulenger et al. (2022) examine user profiling and its application in deriving sequential banking product recommendations.

4. Evaluation of potential participants in open banking ecosystems using decision support system frameworks

Five contributions focus on evaluating open banking participants from different perspectives for banks, including using multi-criteria decision-making (MCDM) models (Daiy et al., 2021; Trung et al., 2022). These contributions highlight different viewpoints of various actors in the ecosystem. The approach is based on selecting the right partners in the digital ecosystem and developing a framework, categorizing complements, and analyzing the key factors that influence the evaluation and selection of complements (Buchholz & de Bie, 2021).

5. Banking strategies, historical context, and overall business ecosystems.

Here, future banking strategies (Grassi et al., 2022) and the historical background of open banking (Dratva, 2020; Kotarba, 2018) are discussed across seven papers. Additionally, the focus is on establishing a common understanding of the key terms used in the context of general ecosystems (Müller-Stewens & Stonig, 2020; Lyytikäinen, 2020).

6. Edge cases of open banking products

Two papers address the evolving needs of Generation Y regarding open banking products (Kämpe & Näsman, 2018) and during the COVID-19 pandemic (Podolchak et al., 2022). The insights offer motivation for use cases beyond banking.

In summary, research is already underway on ecosystems at the inter-institutional level for Beyond Banking (and Open Banking). However, the emphasis has been on financial products rather than Beyond Banking. The intra-institutional approach has not been studied.

Initial use cases for Beyond Banking have been addressed in a general way, but can be expanded in an intra-institutional customer matching environment. To this end, Beyond Banking Sales Signals can be developed as data-driven recommenders using data analytics and machine learning methodologies.

The technical design of a scalable Beyond Banking ecosystem was examined based on acceptance models, a security architecture, and an agile Scrum framework. However, the development of a design focused on an intra-institutional customer matching method using the design science research approach has not been undertaken yet. This method could offer further insights into scalability, key influencing factors, and criteria for evaluating a successful Beyond Banking Ecosystem. Additionally, decision support systems frameworks

for assessing potential participants in Beyond Banking ecosystems at the intra-institutional level, with an emphasis on Beyond Banking products, can be further developed.

1.2.2. Research Gaps and Research Questions

Building on the summary of the literature review and the insights gained into possible research priorities, this doctoral thesis will focus on three topics that have not yet been sufficiently researched scientifically to date (see chapters on research gaps):

1. The sizing and scaling of Beyond Banking Ecosystems through intra- and inter-institutional customer data matching for the financial sector. A combined view of intra- and inter-institutional customer matching and beyond is feasible.

As of 2023, the most common view in the banking industry is that beyond banking includes customer demand for third-party providers from non-banks (Beyond Banking 2.0). Cooperations are formed with non-banks to ensure a wider range of financial services or closely related financial or near-financial services (near banking) offered by the bank (Omarini, 2018). The potential of the platform concept and the multi-dimensional movement of an actor (=bank) are often overlooked or not thoroughly considered (Deloitte, 2025). To succeed in ecosystems, traditional companies need to change how they think about their customers (Chung et al., 2020).

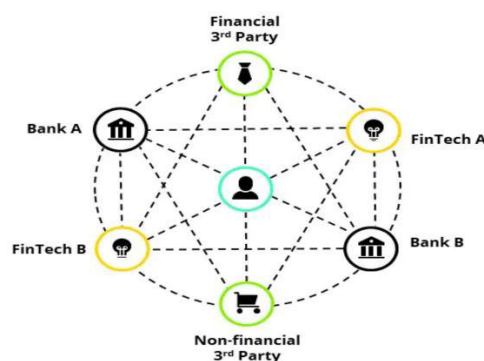
Instead of limiting themselves to services within their historical industry borders, they may venture beyond in an effort to serve customers from one end of the customer journey to the other. For instance, opportunistic companies in the housing market - such as the United Kingdom's ZPG - are trying to create end-to-end ecosystems that may span search, property comparisons, mortgage shopping, household moving, switching phone and cable companies, and access to home-improvement professionals. (para. 6)

[Das übergeordnete] Ziel sollte ... sein, eine Plattform zu erschaffen, die für Drittanbieter geöffnet ist und Kunden eine holistische, konsistente User Experience bietet, die alles berücksichtigt, um diese Ende-zu-Ende völlig zufrieden zu stellen (see figure 1). Denkbar sind hierbei die Anbindung von Telekommunikationsunternehmen, Unternehmen der Versorgungswirtschaft, IoT Devices, Einzelhändlern, Banken &

Versicherungen sowie Fintechs und Regierungsorganen. [(The overarching) goal should be ... to create a platform that is open to third-party providers and offers customers a holistic, consistent user experience that takes everything into account in order to fully satisfy them end-to-end (see Figure 1). It is conceivable that telecommunications companies, utility companies, IoT devices, retailers, banks & insurance companies, fintechs and government bodies could be connected.] (Deloitte, 2025)

The motivation for this dissertation, stemming from identified research gaps, is that there has been little study on Beyond Banking (BB) within the context of ecosystems. Most research is limited to ecosystem approaches focused on near-banking use cases. Additionally, the emphasis is on inter-institutional customer data matching methods, which depend on cooperation with specific partners (third-party providers) because banks lack the necessary BB knowledge to offer related services directly. However, the potential for customers within the same bank (BB) to exchange services with each other (C2C) remains largely unexplored. In this scenario, a partner is not always needed; instead, customers can serve as both providers and consumers of services (e.g., craft services) within the bank's core, creating these services themselves. Consequently, research mainly concentrates on the third development stage, Beyond Banking 3.0, specifically intra-institutional customer data matching. While there are sufficient research insights for general ecosystems (see literature review), there is a lack of studies on Beyond Banking ecosystems with an intra-institutional focus.

Figure 1. Multi-actor Customer-centric Platform (Deloitte, 2025)



Key factors such as strategy, technology, data management, compliance, and the development of a partner ecosystem contribute to building a successful Beyond

Banking Ecosystem. The large customer base and its valuable data, despite decreasing data sovereignty for banks, remain significant assets. These assets can be enriched, personalized, and monetized effectively through an intelligent platform strategy across multiple dimensions and involving various actors. Additionally, the different dimensional levels of Beyond Banking Ecosystems should be clearly defined, and the platforms properly classified and categorized based on their functional and dimensional focus.

This allows us to formulate the following research question (RQ1) for the first research gap: *How can combining intra- and inter-institutional customer data matching improve the sizing and scaling of Beyond Banking Ecosystems in the financial sector?*

2. Use cases for Beyond Banking, especially for sales, such as Beyond Banking Sales Signals, leveraging machine learning and data analytics methods.

New, elaborated use cases in the Beyond Banking sector aim to serve as catalysts and idea generators for new, unexplored revenue sources. The following example concepts could be promising:

Quick loans for urgent medical needs are possible within a Beyond Banking Ecosystem. Often, consumers must cover significant costs themselves because their insurance does not cover certain services or approval involves lengthy administrative processes, while medical providers frequently require upfront payment. By linking insurers, hospitals, and banks in an open ecosystem connected through APIs, these entities can serve customers who urgently need financing for large medical expenses (Zühlke Engineering, 2020). Automated sales prompts can then be delivered through multiple channels—both digital, like email or messages in online banking, and to the bank’s sales team via CRM—to boost sales conversion. This approach not only calls for the development and sale of new financial or quasi-financial products but also allows monetization of customer data within the ecosystem. For example, account activity can provide insights into the purchasing habits of health-conscious customers, which can aid in risk and cost assessment for insurers. Customers who agree to share their data with third-party providers can be compensated for doing so. Additionally, insurers can encourage healthier lifestyles by informing customers about shops or products where they can spend

money, and in return, customers can earn discounts on insurance products for adopting healthier habits.

Another starting point is to promote pay transparency. Whether it's about pay inequality, workers' rights, or simply getting a promotion, account data can give professionals the insights they need to compete in the global workplace. An app that aggregates the average salaries of professionals in the same field is worth considering. Companies go to great lengths to hide their employee salaries, but data shows this is counterproductive. An INSEAD study (Nordigen, 2019) that looked at salary statistics in Danish companies found that disclosing salary statistics showing the difference in pay between the sexes helped reduce the pay gap by 7%. Open banking-based salary comparison apps could also assist workers seeking promotion; data showing how much workers in the same field earn could be the most effective tool for salary negotiations. This would help promote fair pay and sustainable labor migration.

Further use cases for Beyond Banking, including monetization approaches related to data as an asset, will be discussed in the dissertation. Based on these use cases, suitable data-driven sales impulses—referred to as Beyond Banking Sales Signals—will be conceptually developed, from impulse generation to delivery to sales. Additionally, these sales signals will be generated based on various dimensional considerations (e.g., inter- and intra-institutional) using analysis techniques such as data mining and predictive analytics. The focus of the work will be on the generated sales signals as a recommendation feature within the dimension Beyond Banking 3.0 (intra-institutional). A conceptual design of these sales signals within an operational Beyond Banking ecosystem will be addressed in the next section.

For the second research gap, the research question (RQ2) can be stated as follows: *How can machine learning and data analytics methodologies be utilized to develop and implement effective Beyond Banking Sales Signals, and what are the specific use cases that demonstrate their impact on sales performance in the financial sector?*

3. Key factors and evaluation criteria for successfully developing a scalable Beyond Banking Ecosystem and its conceptual model.

This topic aims to conceptually develop a scalable Beyond Banking System of dimension class 3.0. First, the key influencing factors and evaluation criteria for

successfully creating such a system are identified. This is followed by an evaluation and an implementation design of the model, as well as a final assessment of the results. Features like modularity and connector availability are prioritized to align with the concept of scaling.

The following research question (RQ3) can be formulated to address the third research gap: *What are the main influencing factors and evaluation criteria for successfully creating a scalable Beyond Banking Ecosystem, and how can these factors be incorporated into the development of the model?*

Therefore, this thesis aims to serve as a guide for expanding beyond banking platforms and to establish a leading role in acquiring knowledge and sharing information before banks or other organizations address these research gaps. The research questions and the methodology for assessing the research project are explained in more detail in the following chapters.

1.3. METHODOLOGY OF THE RESEARCH

The following hypotheses will be formulated to address the research project and its areas. The content of these hypotheses is organized according to the research areas.

Pertaining to the first research gap and question

H1: There is substantial revenue potential for Beyond Banking.

H1.1: There are no academic readings or research findings for the Ecosystem 1.0 and 2.0 banking industries.

H1.2: There is no comprehensive review at Ecosystem Level 3.0 with an intra-institutional approach, where a C2C business model is used, and the bank functions as a market orchestrator.

H1.3: Customer-to-customer matching (C2C) has not yet been implemented using data analytic methodologies for Beyond Banking projects.

H1.4: The market accepts a scaled Beyond Banking Ecosystem and the associated customer data matching (from level 2.0).

H1.5: Customers want to receive non-banking offers from the bank and, in return, allow extended data analysis and sharing for better, targeted, and personalized marketing efforts.

H1.6: Incentives encourage customers to decide on extended data evaluation and transmission.

Pertaining to the second research gap and research question

H2: To leverage beyond-banking potential, there is still a lack of clear business cases and necessary skills.

H2.1: Important decision-makers are not (yet) fully aware of the possibilities for dimensionalizing and scaling Beyond Banking Ecosystems.

H2.2: The potential of Beyond Banking Sales Signals is not fully utilized.

H2.3: Beyond Banking Sales Signals are consistently used in sales.

H2.4: When Beyond Banking Sales Signals are used effectively in sales, these sales impulses are consistently well-targeted and promising.

Pertaining to the third research gap and research question

H3: There is no universally used guideline, concept, or framework for building a scalable Beyond Banking Ecosystem in the banking industry.

H3.1: An exemplary, conceptual implementation design can be used as a blueprint for banks to align scalable Beyond Banking Ecosystems strategically.

H3.2: A design at dimension level 3.0 and above, focusing on the intra-institutional C2C approach, still has not been published.

H3.3: This design approach offers considerable added value for banks and customers.

H3.4: The scalability of BBEs (Beyond Banking Ecosystems) is given despite banks' technical and infrastructural challenges.

H3.5: Decisive influencing factors and evaluation criteria can determine the value of a successful BBE.

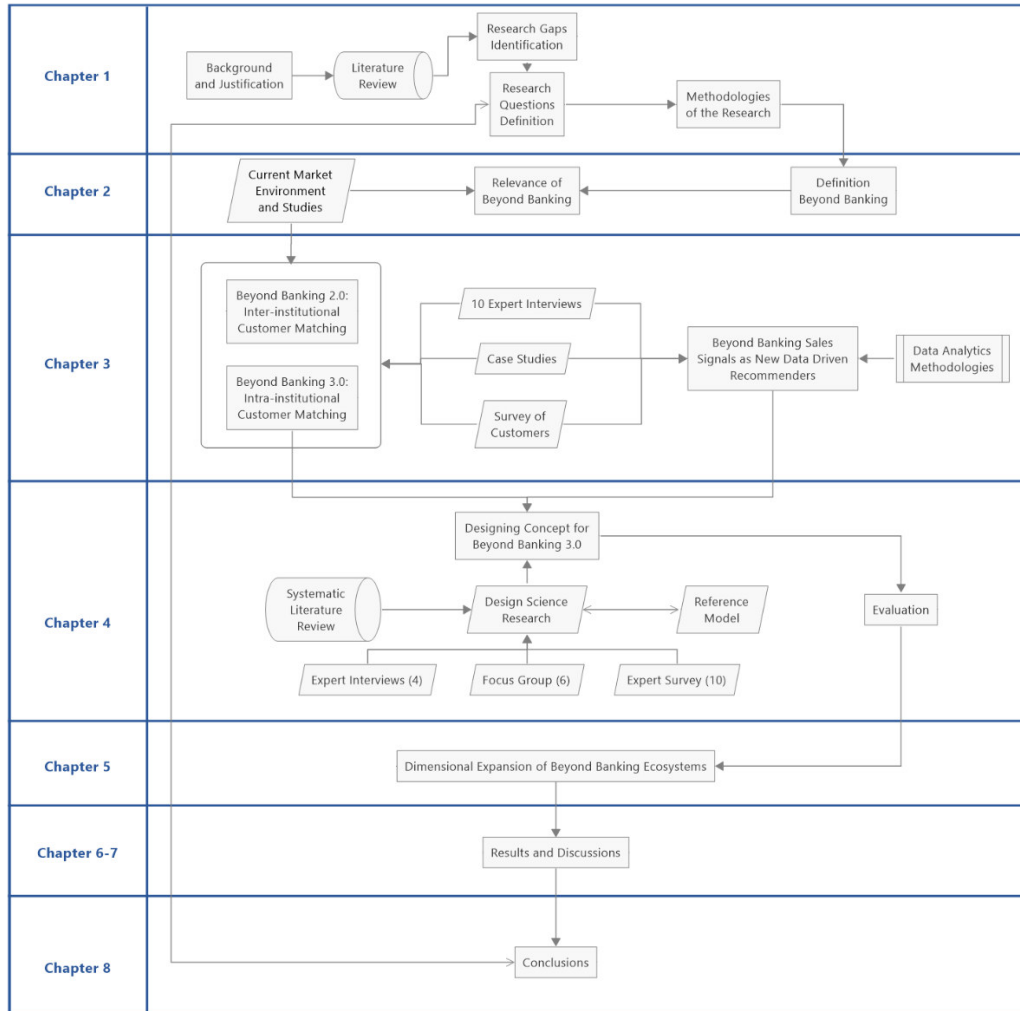
In addition to the literature research, which continuously supports the technical and argumentative foundation of the dissertation, the focus is on qualitative research to answer the research questions. This is because the topic is part of a current field of study, where experts must also contribute to creating new

knowledge (Lamnek & Krell, 2016). The main goal is to develop a new Beyond Banking Ecosystem 3.0 (classification of 3.0 will be explained later in this thesis) based on an intra-institutional approach that uses customer matchings via data analytics. This should be seen as an exploratory function within an iterative qualitative research process. Behind this focus on qualitative research is a mixed-methods approach that generally includes a survey and several expert interviews or discussions (Mayring, 2022) at the bank, customer, and non-bank or start-up levels. This approach aims to collect primary data and generate new research insights from various perspectives of the involved actors (Mazhar et al., 2021) within a BBE (Beyond Banking Ecosystem).

The following diagram (Figure 2) illustrates the entire research process of the thesis. Chapters 3 and 4 focus on the entire research process. Figure 3 provides an overview of which hypotheses are to be verified using which scientific methods.

After explaining the initial defining aspects and significance of Beyond Banking and supporting its relevance from today's viewpoint with current market conditions and studies (including H1.1, H1.2, and H1.3), the two phenomena of Beyond Banking 2.0 with inter-institutional customer matching and Beyond Banking 3.0 with intra-institutional customer matching are then examined. In Chapter 3, these approaches—Beyond Banking 2.0 and Beyond Banking 3.0—are explored. Semi-standardized expert interviews (Hopf, 2004), which utilize a methodology based on qualitative content analysis, are employed to gain deeper, more meaningful insights. The transcription and interview procedures follow the guidelines of Lamnek & Krell (2016). This thesis mainly applies a deductive category approach, using pre-formulated questions and existing categories aligned with the research questions and hypotheses from the literature review. Consequently, categories are systematically assigned to relevant text passages (Mayring, 2022).

Figure 2. Thesis Structure and Workflow Concerning Research Sub-Objectives



In the next step, additional sub-questions are developed to verify specific hypotheses and answer the main questions. To do this, main categories and sub-categories are created for both the main questions and the sub-questions. After conducting the interviews, the interviewees' responses are coded and assigned to the appropriate categories in a coding framework. After thorough research, the MAXQDA software (Friese, 2016) was selected for conducting qualitative data analysis (QDA) and evaluating the interviews. Notably, the seamless integration of AI, which automatically transcribes and translates the interview texts in a time-

efficient manner, allowing the author to continue with manual editing and coding, was particularly convincing (Gao et al., 2023).

Before collecting data, it is crucial to identify the appropriate experts, especially regarding their competencies and working environment related to the topic. According to Kuckartz (2018), the quality of information depends on selecting interview participants who take part in expert interviews or whose responses are later evaluated. Conversely, Creswell (2009) states that a concept or phenomenon that needs to be understood, especially when it has been little researched, warrants a qualitative approach. For this reason, Mayring's deductive category application is combined with an iterative process that ensures continuous formative review of the reliability of the categories and the coding framework. This allows for necessary adjustments to be made. To critically assess the criteria of reliability and validity, an inductive approach to developing additional sub-codes is also acceptable, enabling flexible responses to new findings in a manner that is consistent, intersubjective, and transparent. This process can be followed by final work on the interview texts and the subsequent interpretation of results. Additionally, quantitative elements such as frequency or correlation analyses can be integrated into the evaluation.

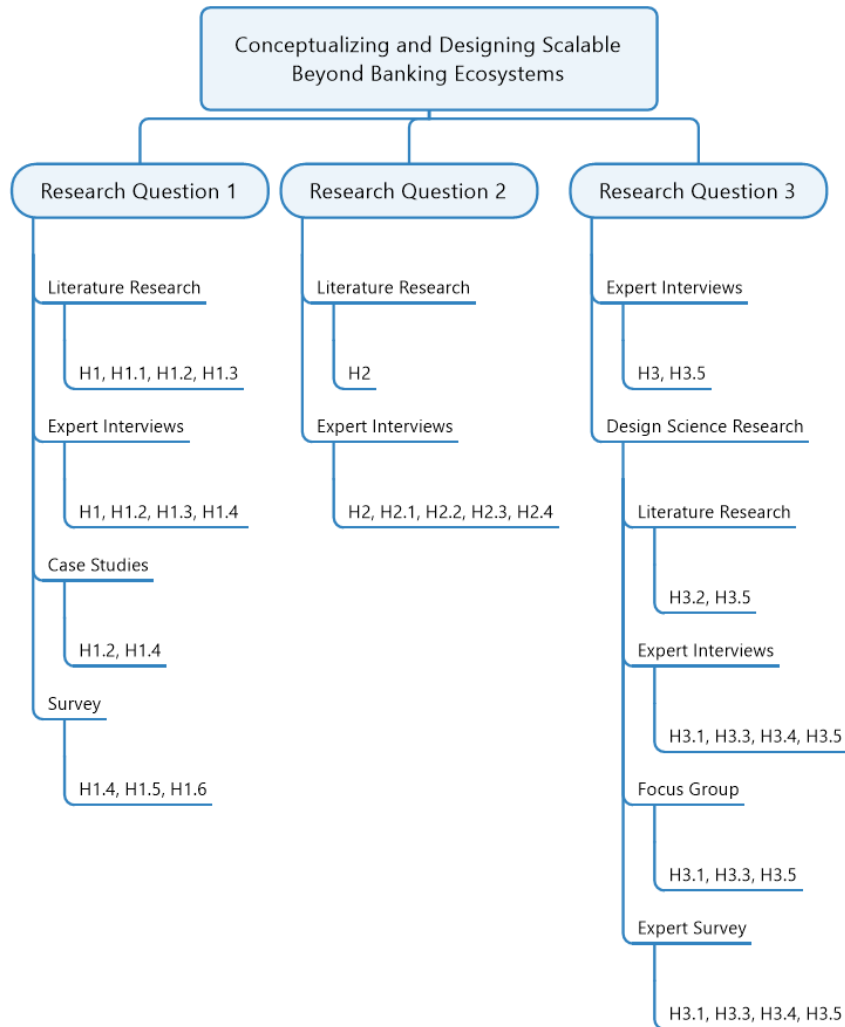
The primary goal of interviewing experts is to reveal the efforts banks are currently making in open banking models, particularly in Beyond Banking Ecosystems (see H1, H1.2, H1.3, and H1.4). The potential for expanding and scaling Beyond Banking Ecosystems will be examined (H2 and H2.1), and banks need to consider which use cases they will implement to unlock Beyond Banking opportunities. The concept is also extended to include sales strategies and how Beyond Banking Sales Signals are utilized in sales processes to boost revenue (H2.2 to H2.4). A total of 10 experts from private, regional, and international banks will be interviewed about the phenomenon of inter-institutional customer matching (Beyond Banking 2.0) and the targeted intra-institutional customer matching approach (Beyond Banking 3.0). These experts, representing banks, non-banks, startups, and IT or platform service providers involved in open and beyond banking, will be selected using this method. Furthermore, their insights may provide preliminary answers to RQ3 concerning factors influencing and criteria for evaluating the development of a scalable BBE, supporting potential partial

validation of hypotheses H3, H3.4, and H3.5. Additionally, case studies (Gerring, 2007) will help demonstrate the viability and market acceptance of a scaled Beyond Banking Ecosystem and associated customer data matching (H1.4).

The survey mainly aims to gather quantitative and representative evidence (Watson, 2015) that a scaled Beyond Banking Ecosystem, including various expansion stages, is in demand or necessary in the market and that a clear customer benefit is emerging from it (H1.4). Customers might ask themselves, among other things, whether they want to receive non-banking offers from their bank at all and whether they are willing to allow banks to use and share more data for better, more targeted, and personalized marketing efforts (H1.5 and H1.6).

To ensure the sample accurately reflects the customer's perspective, the minimum sample size must be reached. The acceptance of using a scaled BBE with expansion stages 2.0 to 3.0 and verifying customer-to-customer matching (C2C) through data analytics, which has not yet been published on the market, are to be used to test hypotheses H1.4 to H1.6.

Figure 3. Methodologies Used to Verify the Hypotheses



In Chapter 4, the doctoral thesis focuses on conceptualizing a scalable Beyond Banking Ecosystem. This concept is to be evaluated within the framework of a model assessment. The emphasis is on developing a level 3.0 ecosystem that facilitates C2C matching. Building on the findings of previous studies that identified use cases for Beyond Banking and related sales signals, and employing suitable analysis methods and parameters—particularly data analysis and machine

learning technologies—C2C matches will be identified and generated as actionable sales signals for distribution.

The concept of the scalable Beyond Banking Ecosystem 3.0 is built using the Design Science Research (DSR) methodology. “DSR seeks to enhance human knowledge with the creation of innovative artefacts and the generation of design knowledge (DK) via innovative solutions to real-world problems” (vom Brocke, Hevner, Maedche, 2020, p. 1, para. 2).

The goal of a DSR research project is to extend the boundaries of human and organizational capabilities by designing new and innovative artifacts represented by constructs, models, methods, and instantiations (Hevner et al. 2004, Gregor & Hevner 2013). DSR aims to generate knowledge of how things can and should be constructed or arranged (i.e., designed), usually by human agency, to achieve a desired set of goals; referred to as design knowledge (DK). (p. 2, para. 1)

The methodology begins with a specific systematic literature review. This review, which has already been conducted, is supplemented by an additional part to deepen the knowledge base for the target design. This sub-process aims to identify areas that require further research (H3.2 and H3.5). It also serves to define the problem space of the DSR and provides a foundation for shaping the solution space (Hevner & vom Brocke, 2023). During this step, the reference model is also examined; it builds an abstract representation of domain knowledge related to the phenomenon of interest in this research (Legner et al., 2020). This model connects with previously published models as a starting point (model 0 = M0) and forms the basis for further research into the target design model (Model n = Mn). The first iteration involves developing and evaluating the design model according to the research requirements and initial findings from the problem space (M1), which should be based on the reference model (M0). This model is then evaluated through additional iteration cycles within the solution space.

This is followed by four expert interviews that generate qualitative insights (Mayring, 2022), which are conducted using the same QDA approach as the previous interviews. These insights can be used to establish requirements (meta requirements) for the solution space, which are strongly grounded in the problem space. This process can already lead to the development of artefacts that address the problem space. Additionally, design principles can be derived from the

interview results, which can inform the design of artefacts (Tuunanen et al., 2024). Furthermore, interviews are employed to evaluate designed artefacts (2nd iteration with M2), thereby refining or expanding the design knowledge (H3, H3.1, H3.3, H3.4, and H3.5).

Finally, a focus group of 6 experts, which will also include at least the experts from the previous expert interviews, will be formed as an effective empirical tool to generate and evaluate design knowledge (3rd iteration with M3) in order to ensure practical consistency and internal validity at all times. Not only the effectiveness of entire artefacts, but also individual aspects such as the effectiveness of specific design principles can be evaluated, as well as individual functionalities, mechanisms, software features, or scalability (Henriques & O'Neill, 2023). After the third iteration, an expert survey of approximately 10 experts is conducted (H3.1, H3.3, H3.4, and H3.5) to generate practical relevance using diffusion research (Mettler, 2009) and to confirm and promote its use in practice (fourth iteration with M4). Final surveys in the focus group will identify any remaining issues and suggestions for improvement for the target design, which can serve as a basis for further research outside this thesis (M4.x).

As part of the evaluation, key influencing factors and evaluation criteria are used to determine the value of a successful BBE (H3 and H3.5). Market observations and analyses from primary research, as well as secondary data from literature review, will be included in the overall assessment of the research questions.

II – BEYOND BANKING AS A CENTRAL SOURCE OF INCOME

II - BEYOND BANKING AS A CENTRAL SOURCE OF INCOME

This chapter will examine the defining aspects of Beyond Banking and distinguish between the development stage 1.0 and subsequent stages. In addition, the relevance of Beyond Banking will be substantiated by current market analyses and studies, and Beyond Banking will be classified as a central source of income for banks. Initial fundamental considerations on regulatory framework conditions, possible applications, and methodological guidelines for the development of business models for Beyond Banking will be elaborated in this chapter.

2.1. DEFINITION BEYOND BANKING

Before exploring the significance of beyond banking in more detail, it is important to first define and categorize the term beyond banking. In essence, beyond banking refers to activities outside traditional banking operations, such as generating revenue beyond conventional services (Junghanns & Niebudek, 2019). Through new partnerships with third-party providers, innovative business models can be created that fall outside the scope of traditional banking services. Beyond banking includes a variety of new financial products, services, and technologies designed to enhance the customer experience, increase efficiency, and expand access to financial services (Reiter et al., 2024).

When comparing the two periods directly and examining historical developments, the term “beyond banking,” which refers to nonbank activities, was first mentioned in the early 1900s in the US (Liang & Savage, 1990). While banking activities at that time were limited and regulated by state or federal law, banks began expanding internationally. During this period, bank holding companies owned major nonbank subsidiaries or adopted initial nonbank strategies by establishing small banks and companies abroad that offered other financial services, such as insurance. The Glass-Steagall Act of 1933 and the Bank Holding Company Act of 1956 introduced further restrictions on the regulation of multibank holding companies. Around 1970, Congress amended the Bank Holding Company Act to create a new framework for expanding bank holding companies into nonbank activities. Before the rise of the Internet in the 1980s and 1990s, the

term “beyond banking” mainly referred to crossing national borders and comparing domestic and international banking transactions (Schauer, 1991; Sharpe, 1982), which differs from today's concept of Beyond Banking. It wasn't until the implementation of the Open Banking Strategy that the full potential of Beyond Banking—as understood today by banks and other market participants, and in some cases already put into practice—was realized. This shift was largely driven by the 2008 global financial crisis and the 2018 rollout of the European PSD2 directive, which accelerated competition and forced banks to open their systems (Premchand & Choudhry, 2018). The following subchapters will explore what open banking and its associated regulatory framework entail.

2.2. DEFINITION OF TERMS AND FIRST STAGE OF DEVELOPMENT 1.0

Beyond Banking and its various interpretations and definitions will now be discussed. Beyond Banking is quickly understood as a collective term that extends beyond the traditional business of banks. According to Bölke (2021), however, Beyond Banking is recognized as one of four dimensions that make up a modern banking ecosystem.

New Banking als eine der anderen drei Dimensionen umfasst beispielsweise alle Leistungen, die Banken heute schon anbieten, nur eben digital. Dazu zählen mobile Zahlungsdienste und Instant-Payment-Methoden oder auch moderne Ratingmodelle sowie digitale Onboarding-Prozesse für die Kunden. Beim Near Banking integrieren Banken ihre eigenen Dienste beispielsweise bei Dritten, die selbst keine Banken sind, oder sie ermöglichen Services wie Peer-2-Peer-Zahlungen. Auch diese Leistungen gab es im Prinzip auch schon vor der Digitalisierung. Mit dem Einsatz von Technologien verlagern Banken diese Leistungen oder veredeln sie. Non-Banking wird gerne mit Beyond Banking gleichgesetzt. Gemeint ist das Bereitstellen diverser Leistungen, die keinen Bezug zum eigentlichen Banking mehr aufweisen, aus Kundensicht jedoch nachgefragt sein könnten – zum Beispiel Gutscheine, Reisen, verschiedene Events. Im Unterschied zu diesen drei Dimensionen erweitert Beyond Banking bereits bestehende Banking-Leistungen um Leistungen, die sie vorher noch gar nicht angeboten haben, aber an bestehende Leistungen andocken können. Die Anwendungspalette reicht derzeit häufig vom digitalen Safe über das Crowdfunding bis hin zum Budgetcontrolling. [New banking, one of the other three dimensions, covers all services that banks currently

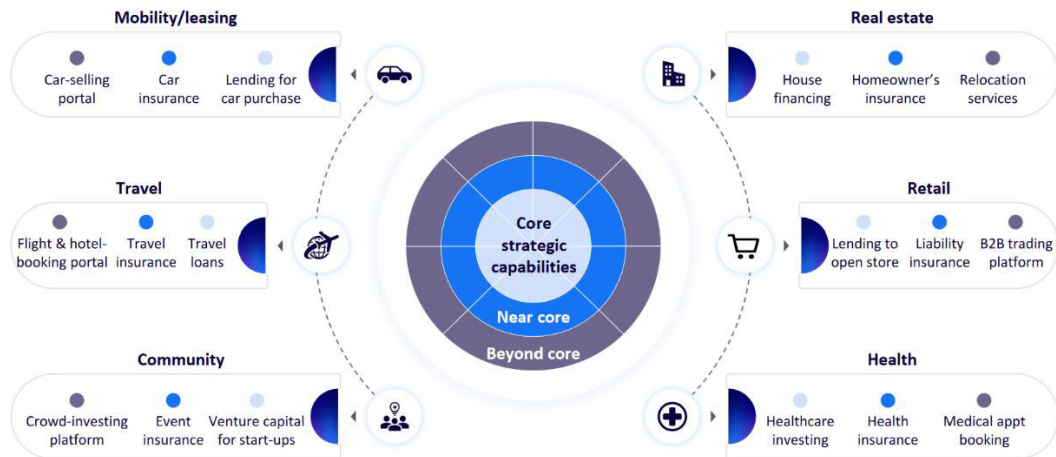
offer, but in digital form. These include mobile payment services, instant payment methods, modern rating models, and digital onboarding processes for customers. In near banking, banks integrate their services with third parties that are not banks or enable services such as peer-to-peer payments. These services existed before digitalization, but with technology, banks are enhancing or shifting these services. Non-banking is often called beyond banking and refers to services no longer related to traditional banking but still in demand, like vouchers, travel, and events. Unlike the other three dimensions, beyond banking expands banking by adding new services that weren't previously offered but can be connected to existing ones. The current applications often include digital safes, crowd investing, and budget control.] (para. 3-6)

Open banking refers to the widespread sharing of consumer data between banks and other third-party providers (TPPs). Beyond banking is therefore a part of open banking and is subordinate to it as one of four dimensions (Plaitakis & Staschen, 2020). The four dimensions beneath open banking describe the types of data and services involved.

Another overview (Figure 4) from Arthur D. Little (Katzenschlaeger et al., 2023) also provides a suitable representation to distinguish thematically between Core, Near, and Beyond Banking. Using example use cases in Mobility/Leasing, Travel, Community, Real Estate, Retail, and Health, the possible design of services from Core to Beyond Banking can be understood. For instance, in Mobility/Leasing, the development can be exemplified from "Lending for car purchase" (Core), to "Car insurance" (Near), and finally to "Car-selling portal" (Beyond).

This doctoral thesis uses Beyond Banking as a collective term for related concepts of non-banking and Beyond Banking itself. It will not cover New Banking or Near Banking in this thesis. While Beyond Banking can target various customer groups, the focus will be on private customers in retail banking (Galloway, 1994). Other related definitions discussed here include Non-Financial Inclusion Strategies (NFIS) (Tuba & Lawack, 2023) and Non-Banking Financial Institutions (NBFI) (Liang & Reichert, 2012).

Figure 4. Internal Perspectives Using Core, Near-core, and Beyond-core Logic (Katzenschlaeger et al., 2023)



Among other things, the thesis is meant to serve as a guide through the different stages of developing a Beyond Banking Ecosystem. The first stage, 1.0, marks the start of the Beyond Banking business. It involves manually providing near- or beyond-banking services as a tipster function, meaning isolated initial Beyond Banking relationships without an automated ecosystem approach. Examples include brokerage of insurance or other services, which can be considered near banking. Banks have a history of manually conducting transactions beyond traditional banking (Liang & Savage, 1990), which characterizes the first stage of Beyond Banking. The supposed ecosystem is the bank's physically established network of contacts for potential transaction brokerage. It is only with the advent of open banking that business relationships, trade, and data flows are mapped in a digital infrastructure. Disruptive technologies, expanding customer outreach through various sales channels, and positive, personalized customer experiences (Goodale, 2012) create the foundation for a digital, interactive ecosystem. Due to its connecting nature and the development of network effects, a platform ecosystem particularly enhances the interaction among actors (Zhu et al., 2016). "The one-sided market often features a one-way connection, while the two-sided market highlights interaction among multiple parties" (p. 50, para. 1). These traits characterize the development stages of Beyond Banking Ecosystems, which are discussed in detail in section 3.1.

2.3. RELEVANCE OF BEYOND BANKING

This chapter explores the importance of Beyond Banking through analyses of current market conditions and studies at both the national (German market) and international levels. It also reviews the developments and efforts already underway in this area. Following this, it provides a current assessment of the regulatory framework and an analysis of existing and potential application possibilities and features of Beyond Banking (ecosystems).

2.3.1. Current Market Environment and Studies

First, market environment studies on Beyond Banking will be reviewed to assess how much the ecosystem concept has already been explored in this area. Initial (partial) validations of hypotheses H1, H1.1, H1.2, and the first research question RQ1 can already be conducted here.

2.3.1.1. *National Market Environment*

The revenue potential for banks has already been recognized in the national, i.e., German, market environment. Various studies suggest that the business model of banks is evolving from a financial service provider to a general everyday service provider (Sancar & Sgardelli, 2021). Deutsche Bank AG also recognizes competitive advantages and is aiming for network effects by expanding a beyond-banking platform business model. The integration of third-party providers expands the range of personalized apps and services for customers, which is lucrative for (new) customers (Bauer, 2020). A study by PriceWaterhouseCoopers (PwC) confirms this trend that banks are transforming themselves into solution providers (Becker et al., 2020) and that ecosystems are increasingly dealing with different partner models and focusing on integrating financial technologies into the ecosystem. One way to secure the customer interface as a bank in the ecosystem (Pommerening, 2022) was the establishment of identity services with “Verimi” as a digital wallet (ID wallet), which was formed in 2017 by a founding consortium consisting of Deutsche Bank, Bundesdruckerei, Axel Springer, Badenia-Versicherung, Deutsche Bahn, and Lufthansa, and with “Yes,” which was financially supported by cooperative banks and savings banks at the end of 2018. With Verimi and Yes, “sollte eine Alternative

zu dem bisher weit verbreiteten Facebook- oder auch der Google-Login (Social Sign-on) angeboten und eine Identitätsplattform geschaffen werden” [an alternative to the previously widespread Facebook or Google login (social sign-on) should be offered and an identity platform created] (p. 81, para. 2).

Regional banks are mainly focusing on creating a regional digital ecosystem (Knörrer et al., 2021). The goal is to collaborate to add value to a region, connect the supply and demand of local market participants, and foster network effects. The ecosystem's target group includes all private individuals and businesses within the region that represent the demand and supply sides. Hybrid setups in B2B and B2C models are possible. These digital ecosystems can be built around common life events and topics such as construction and housing. Examples of regional banks providing services beyond banking include the “VR-Privatsekretär” (VR private secretary), which helps with a variety of private tasks, and the “Mein-RW Solar” platform, which offers eco-friendly and innovative solar energy solutions as a comprehensive package.

On the other hand, the challenges discussed in German studies are:

- Technical implementation involves an API architecture with open banking, featuring sophisticated labeling of account transaction data and structured, analyzable information as a foundation. It also requires technical deployment using monitored machine learning based on AI (Sancar & Sgardelli, 2021).
- Modern and fast architecture, including cloud computing services, to store and evaluate the high volumes of data generated in real time (Knörrer et al., 2021).
- Compared to banks in other countries, German banks are falling noticeably behind and have not yet managed to impress (Leger & Bollhöfer, 2024). This is shown in the slow pace at which new ideas, trends, and innovations are adopted, with traditional banks being too slow compared to neobanks.
- Achieving a critical mass of participants in the ecosystem is crucial for protecting the bank's economic interests and ensuring benefits for participants (Knörrer et al., 2021).

2.3.1.2. *International Market Environment*

A look at the international market environment also shows a similar picture of revenue potential and the importance of Beyond Banking. The potential to access

sectors like telecommunications and energy (Omarini, 2021) and connect with existing bank customers or attract new ones through these sectors increases this importance. Additionally, ecosystem partners will create new revenue streams for banks (Katzenschlaeger et al., 2023). “Using nonbanking products to enrich a bank’s existing offerings can create a better, more holistic value proposition that helps them build deeper and more valuable relationships with customers” (p. 5, para. 2). Other growth sectors include the housing market, support for e-commerce, enhancing the payment experience, and becoming a leading identity provider (Herrmann, 2021).

Europe falls behind in international comparisons. There are strong case studies beyond banking in the global market. JP Morgan Chase & Co. plans to develop a comprehensive travel service (Katzenschlaeger et al., 2023). To achieve this, the company has acquired the entire value chain, from the booking system to a luxury travel agency and a restaurant review firm. “JPMorgan aims to control the entire buying journey and better position its banking products within it, perhaps following with automobiles and homes soon. Similarly, Capital One Financial Corporation set up its own travel booking service, Capital One Travel” (p. 5, para. 7).

In Asia, DBS Bank exemplifies a market orchestrator (Katzenschlaeger et al., 2023) by serving as a market intermediary that leverages its extensive reach among small and medium-sized enterprises (SMEs) and private customers, creating a marketplace for them. Currently, the ecosystem spans areas such as automobiles, education, housing and living, health, real estate, travel, and leisure. This is made possible by the new lifestyle app “PayLah!” (Stężycki, 2024), which enables users to book taxis, order food, and purchase tickets through a single interface.

Other examples include KBC Bank in Belgium (Sirakova-Yordanova, 2024), which offers a wide range of Beyond Banking services, including prepaid mobile phone top-ups, electricity bill payments, public transportation tickets, parking fees in selected cities, travel amenities such as fast lanes and lounge passes at Brussels Airport, and other mobility services like booking car-sharing vehicles, bicycles, refueling, managing leased vehicles or bicycles (including breakdown reporting), goal alerts for the Jupiler Pro League, garbage collection for rewards, the purchase

of movie tickets and vouchers, health services, and comprehensive digital document storage and data exchange.

According to Sirakova-Yordanova (2024), Russia's Sberbank enhances these services with an online shopping platform, discounts and special offers, a loyalty program, and an e-wallet in the retail and travel booking sectors, restaurant reservations, event tickets, and online games in the lifestyle sector. It also expands healthcare with wellness services, an online pharmacy, medical advice, and offers online courses and training, including language lessons in education. In the automotive sector, it provides vehicle purchases; in household services, it offers appliances, electronics, repairs, and installation services; in the beauty and fashion sector, there is an online fashion and beauty shop, style consulting, and beauty services; in entertainment, it offers music streaming, e-books and audiobooks, online games, a gaming platform, live sports streaming; and in the technology sector, it features an online marketplace for gadgets and accessories, software and hardware support, and cloud services. Revolut adds donations and charity, accommodation bookings, and lifestyle services such as news, fitness, meditation, and food ordering to the Beyond Banking universe.

Additionally, few financial institutions offer super apps and integrated services beyond banking (Katzenschlaeger et al., 2023). Tinkoff and Alipay are prime examples of this, having expanded from specialized areas such as ride-hailing, delivery, telecoms, and marketplaces into super apps with extensive ecosystems beyond banking. WeBank, which originated from WeChat and is owned by the Chinese technology and social media giant Tencent (Czímer et al., 2022), has also become a marketplace specialist in commerce, with 1.3 billion and 570 million monthly active users.

The challenges mentioned by Katzenschlaeger et al. (2023) are:

- Dependence on outdated practices that emphasize in-house development and maintain a high level of confidentiality.
- Inadequate tech capabilities with “legacy IT infrastructure does not always support the construction and co-orchestration of an ecosystem; modernizing the tech stack and specifically upgrading the connectivity capabilities is often necessary and requires high financial investments” (p. 6, para. 4).

- Focus on near banking. “Many banking ecosystem products are currently in the “near banking” stage” (para. 5).
- Lack of long-term focus. “Building and independently managing an ecosystem without a partner requires substantial upfront investments, which can take several years to recoup and thus calls for unwavering attention and a sufficiently long planning horizon” (para. 6).
- Stimulating a digital banking platform ecosystem can lead to unexpected results (Zachariadis & Ozcan, 2017). Poor quality or unreliable services from third parties may harm the bank's trust and reputation.

Lynn et al. (2020) summarize the specific challenges for emerging markets as follows:

- “At a regulatory level, many emerging markets may not have the regulations and technical standards in place to support open banking in general” (p. 330, para. 2).
- “Even if .. [regulations and technical standards] were in place, or for example PSD2 was adopted, businesses may not be prepared or may not understand the complexity of implementing these standards” (para. 2).
- “The adoption of an open banking culture in an emerging market may have unexpected consequences for the structure and stability of the domestic banking market. It may encourage new entrants into the market and thus erode the domestic markets” (para. 2).
- “Global players present significant challenges in the supervision, accounting, and taxation of cross-border transactions, which may be challenging to emerging markets” (p. 331, para. 1).
- “To enable greater access to incumbent systems and customer data, adapting technology designed for other financial systems to the local requirements of a given emerging market may be a significant challenge” (para. 2).

2.3.2. Regulatory Framework Conditions

This chapter describes the specific regulatory framework conditions that banks must deal with if they want to pursue Beyond Banking Services via an ecosystem approach. An international comparison is also presented to find out

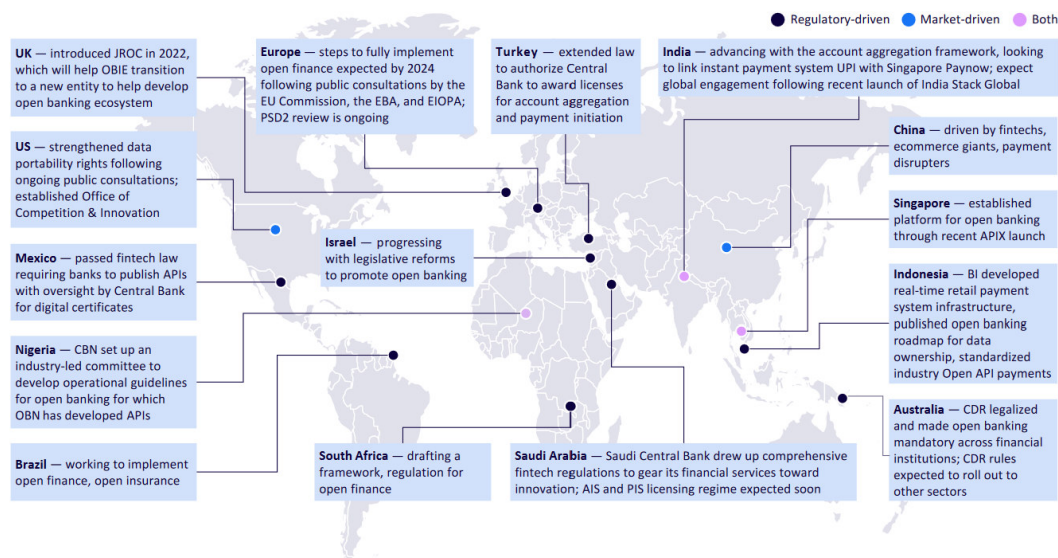
what is happening in this area of regulation outside Europe. Since Beyond Banking is a subgroup of Open Banking, it can initially be assumed that Beyond Banking is subject to the same regulatory requirements.

Banks are among the most regulated companies because a default of a bank can have enormous impacts: not only for its customers, but also for financial markets and the wider economy. To satisfy these regulations and ensure their stability, banks have large compliance and risk departments (Frei, 2023, pp. 173-174, para. 3).

According to Katzenschlaeger et al. (2023), Figure 5 shows that open banking and open finance regulations are being issued in several markets across the globe, establishing regulatory clarity for businesses and enabling them.

In other markets (e.g., the US and Switzerland), the push is led more by the industry. There are also markets with a hybrid approach, with both regulators and market participants in the driver seat. As open banking and open finance mature, the borders are blurring between regulatory versus market-driven and open banking versus open finance (p. 2, para. 5).

Figure 5. Open Banking/Open Finance Landscape (Katzenschlaeger et al., 2023)



Notes: JROC = Joint Regulatory Oversight Committee, OBIE = Open Banking Implementation Entity, CBN = Central Bank of Nigeria, OBN = Open Banking Nigeria, EBA = European Banking Authority, EIOPA = European Insurance and Occupational Pensions Authority, PSD2 = Payment Services Directive 2, AIS = Account Information Service, PIS = Payment Initiation Service, UPI = Unified Payments Interface, BI = Bank Indonesia, and CDR = Consumer Data Right
Source: Arthur D. Little

In the EU, banks engaging in open banking are governed by regulations based on two main pillars: the GDPR and PSD2 agreements (Zeller & Lynch, 2021). In brief, the General Data Protection Regulation (GDPR) safeguards consumers' personal data and their rights (Voigt & von dem Bussche, 2017). This regulation primarily oversees the handling of personal data and requires that data processing, sharing, or transfer of personal data only occurs with the consumer's explicit consent through an opt-in declaration. Whether personal data is processed or shared with third parties depends on the specific case or the nature of the use.

The EU Directive PSD2 (Deutsche Bundesbank, n.d.), which was implemented in a two-stage process in 2018 and 2019, aims to regulate payment services and providers to enhance security in transactions, boost consumer protection, encourage innovation, and foster competition in the market. The Fraunhofer Institute (Pohl et al., 2022) highlights not only the promotion of innovation and the emergence of new players and fintechs but also the integration of regulations such as consumer protection through strong customer authentication, known as two-factor authentication, competition regulation among European banks, and the potential for new players and fintechs to join payment transactions through payment initiation and customer information services.

PSD2 also introduces interfaces such as the Access-to-Account interface (XS2A) for gathering account information or initiating payments, and the FinTS interface for supporting multibanking (Pohl et al., 2022). The screen scraping method is used to collect visual information displayed on the desktop, in an application, or on a website by extracting raw text from screen elements like images or text through copying. For example, this method can be used to assess the creditworthiness of a potential new customer. However, the XS2A interface alone is not sufficient for this purpose. Customer consent is required for data processing when using these methods and interfaces. Nonetheless, PSD2 only governs the retrieval of account information from payment accounts; it lacks uniform interfaces or regulations for data exchange beyond banking, covering other requirements or use cases. The German Federal Association of Consumer Organizations (Cerulli-Harms & Thorun, 2021) also highlights contradictions between providers' business models and consumer interests. Additionally, Chaib (2018) criticizes the absence of technical standards for data sharing, noting that six nations (Bahrain, Brazil, the

European Union, Hong Kong, India, and Japan) permit the industry to establish their own standards for data exchange. Martínez Resano (2021) further explains that while PSD2 pertains only to payment services, there are no adequate standards for services beyond banking. The range of available options is broad in terms of technical implementation. The shift from old products and distribution channels to new digital interfaces and tools fosters independent competition and emphasizes the need for uniformity in how technological innovation impacts markets.

With the new amendment and EU directive PSD3/PSR (Gerstmayr, 2024) currently under discussion in the European Parliament and expected to take effect at the earliest by the end of 2025, there are no indications of regulation for Beyond Banking. The upcoming directive only plans to improve current PSD2 laws, add e-money institutions to the same supervisory regime, and increase transparency and simplify cash transactions. A long-time expert and CEO of a Beyond Banking Ecosystem (Voigt & Holland, 2024) also notes that both PSD2 and the upcoming PSD3 will not be enough to establish a Europe-wide central data standard for competitive advantages. Today, there are no standardized data exchange options for Beyond Banking, and banks still have diverse interfaces.

2.3.3. Application Possibilities and Characteristics

In summary, the potential applications from the previous research are outlined as follows:

- Identity services and platforms such as “Verimi” and “Yes” (Pommerening, 2022).
- Regional digital ecosystem (Knörrer et al., 2021). Hybrid constellations in B2B and B2C models are possible.
- Private concierge service
- Comprehensive solutions for smart energy supply using solar technology
- Full-service travel and booking service (Katzenschlaeger et al., 2023).
- Market orchestrator in the ecosystem covering topics such as cars, education, home and living, health, property, and travel and leisure.
- All other possible products that are appropriate for platforms and marketplaces (Sirakova-Yordanova, 2024).

Further current research suggests that the beyond banking use cases listed above can be expanded and scaled, particularly with the help of AI integration through predictive analysis, the process of using data to forecast future outcomes, “to identify sales opportunities, cross-sell opportunities or metrics around operational data” (van de Venn, 2023, p. 371, para. 6) and find patterns that might predict future behavior. An applied emotional AI (Jameaba, 2024) by using behavioral prediction algorithms, “provides banks ... with insights that are discernible from the cadence, pattern, and behavior in past calls of the voice of the customer”, to generate data-driven recommendations for action for various sales channels.

In summary, the characteristics found in earlier research are as follows:

- The bank's business model is changing from just offering financial services to providing a wide variety of everyday services (Sancar & Sgardelli, 2021).
- Emphasize network effects by linking third-party providers and increasing the variety of personalized apps and services for customers (Bauer et al., 2020).
- Bringing together supply and demand from regional market participants (Knörrer et al., 2021) as a market orchestrator.
- The implementation of such digital ecosystems can be centered around common life events and topics such as building and living.
- API architecture with open banking that features sophisticated labeling of account transaction data, structured analyzable data, and technical implementation using monitored machine learning based on AI (Sancar & Sgardelli, 2021).
- Evaluation and storage of large amounts of data generated in real time using modern, high-speed architecture, including cloud computing services (Knörrer et al., 2021).
- Reaching a critical number of participants in the ecosystem is essential to safeguard the bank's economic interests and the benefits for participants.
- By integrating banking products with existing offerings, a more comprehensive value proposition can be developed, resulting in deeper and more valuable customer relationships (Katzenschlaeger et al., 2023).

- Ensuring high-quality or reliable services from third parties to build trust and a positive reputation in the bank (Zachariadis & Ozcan, 2017).
- Consideration of regulatory requirements such as GDPR (Voigt & von dem Bussche, 2017) and PSD2 (Pohl et al., 2022), as well as the use of standardized interfaces.

According to Chougule & Dudekula (2024), other key features and qualities of a (beyond banking) ecosystem include the move toward mass personalization through custom and individualized products tailored to customers' specific preferences and needs. This mass personalization, also called hyper-personalization, combined with a precisely tailored customer experience (Prisznyák, 2023), could become a vital future trait for ecosystems to effectively meet user requests and deliver a perfect experience. Mass hyper-personalization is defined as “an efficient, dynamic, and high-volume process of targeting, designing, and delivering customized service experiences for an audience of one, based on a set of unique criteria, e.g., by using foundation models that are prompted or fine-tuned with user-specific data” (Seppala et al., 2023). This list of possible applications and traits is not complete and may be expanded continually.

2.4. METHODOLOGICAL GUIDELINES FOR BUSINESS MODEL DEVELOPMENT

This chapter provides initial methodological guidelines for developing business models, especially for Beyond Banking models. A systematic analysis of current maturity models for adaptation and extension to the design of an ecosystem approach according to stage 3.0 will be discussed starting in chapter 4.5.

There is extensive published literature on methodological guidelines for developing business models. A capability-based approach to business model innovation, as described by Mezger (2014), divides the process into three dimensions: technological or business model sensing, seizing with a focus on innovation activities, and reconfiguring to select and source business model-specific competencies and resources, as well as to integrate partners with complementary capabilities. The Light Capability-Driven Development (LCDD) Method for Start-Ups, also outlined by Koç et al. (2016), follows a similar approach, helping startups “to find out further configurations of their products and services

by analyzing their business ideas from the capability point of view” (p. 22, para. 5). This model consists of three phases: the preparation phase, which involves providing information and models such as the meta-model, defining CDD terms, and offering an example; the analysis phase, where the core proposition of the business idea is articulated as a capability, the key activities for implementing the capability are listed, and the goals are documented; and finally, the design phase, which involves modeling key activities such as BPM, capturing objectives as goal models, and adding KPIs to monitor progress.

Business model designers seeking a comprehensive understanding of business model innovation guidelines can consult Clauss (2017), which offers a hierarchical three-level scale for assessing business model innovation. According to Clauss, the concept can be used “as formative measures of three dimensions of business model innovation at the second level, namely value creation innovation, value proposition innovation, and value capture innovation. At the third level, these three dimensions form the metaconstruct of business model innovation” (p. 385, para. 1).

According to Afuah & Tucci (2001), “a business model can be conceptualized as a system that is made up of components, linkages between the components, and dynamics” (p. 4, para. 1). So, “components refer to the elements to be addressed by a business model” (Bucherer, 2011, p. 17, para. 2). Bucherer thus provides an overview of business model components covered in readings by leading authors in business model research in the 2000s, such as Linder & Cantrell (2000), Afuah & Tucci (2001), Amit & Zott (2001), Petrovic et al. (2001), Weill and Vitale (2001), Chesbrough and Rosenbloom (2002), and Betz (2002), which address the different intentions and perspectives of a business model. Examples of components include value proposition, customer value, value offering, value model, revenue model, revenue, revenue sources, profit model, pricing model, price, and channel model.

Omarini (2023) is currently advocating for a radical rethinking of business models toward open banking. Here, many companies have shifted “has shifted from the value chain and the company’s value proposition (pipeline business models) to value for customers, which requires a change in mindset and pushes companies to develop new solutions for customers” (p. 80, para. 2). This business

model strategy has a transformative effect on the company, where a platform strategy can be implemented.

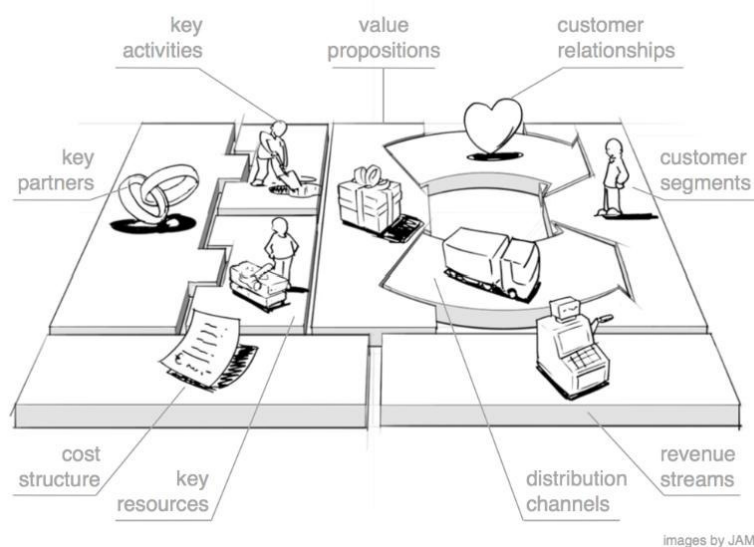
Here, banks offer a core around which other players can build their offering, in addition to connecting users across different groups, facilitating matchmaking. With this model, there is a radical re-thinking of the business model. Banks indeed also try to monetize APIs as well as competing and profiting from a self-enhanced value proposition to customers, fulfilling shifting market needs (p. 89, para. 2).

General guidelines for developing a business model were examined from different criteria and perspectives. However, what might specific guidelines for Beyond Banking business models look like?

Initial research did not reveal any guidelines on developing business models for Beyond Banking, but there are findings related to the field of open banking. Here, Kämpe & Näsman (2018) reference the Business Model Canvas and a new service development framework for customer co-creation.

The Business Model Canvas (BMC), according to Osterwalder & Pigneur (2010) (Figure 6), is a modern concept that everyone understands, supports description and discussion, and turns the holistic approach based on customer needs into the operation of a company.

Figure 6. The Business Model Canvas (Osterwalder & Pigneur, 2010)



This concept “consists of nine basic building blocks that illustrate how a company plans to generate revenue. The nine blocks address the four main aspects of a business: customers, offer, infrastructure, and financial viability” (p. 6, para. 2).

An expanded business model canvas is examined by Fritscher & Pigneur (2015) in order to outline the dynamic aspect of this concept and identify three stages of maturity for the business model canvas. To improve the static design usage of the business model canvas in relation to its coherence, “guidelines can help to verify these relationships [between the elements] and thereby help to create more coherent models” (p. 94, para. 3). To represent the dynamic aspect of interactions happening inside the business model, “these interactions can be further strengthened by drawing arrows to outline the main story thread [using design-thinking mechanics, such as storytelling] in what we call BM Mechanics” (p. 94, para. 5) (Figure 7). To represent the transformation from one state to another of a business model, “it was found that making different versions of a business model could help in analyzing its reaction to the context ... Using layers to illustrate only the changes is a design technique that helps to overcome some of these constraints” (p. 94, para. 7). The extension of the BMC to the platform approach of the Platform Business Model Canvas (PBMC) or Plattform Business Canvas Design (PBCD) is discussed in Chapter 4.2.

Figure 7. Summary of Concept, Design Technique and CAD Functions (Fritscher & Pigneur, 2015)

Maturity	Concept	Design Technique	CAD functions
Novice	BM Canvas Coherence	Guidelines, rules	Colors, validation,
Expert	BM Mechanics	Storytelling	Colors, arrows,
Master	BM Evolution	Renovation, what-if, scenario planning	Layers, versioning,

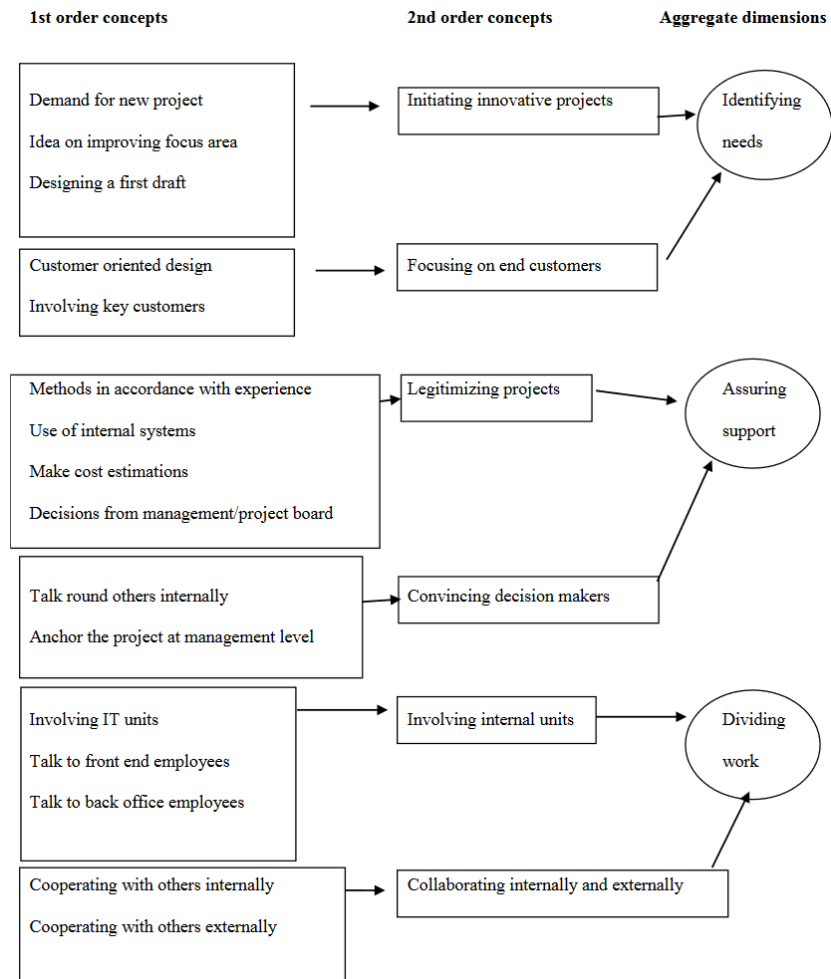
Another model that places customer needs at the center of the modern business approach is New Service Development (NSD). “New service development relies on the complex task of understanding and anticipating latent customer needs. To facilitate proactive learning about the customer, recent findings stress customer involvement in the development process and observations of customers in real action” (Matthing et al., 2004, p. 1, para. 1). Hydle et al. (2016) conducted empirical research on this business model approach and compared existing frameworks, “used practice theory to uncover activities performed for new service development and identified empirically different dimensions than those already

theoretically derived” (p. 63, para. 1). While conceptual research on NSD by Froehle & Roth (2007) focuses on the project aspect, by den Hertog et al. (2010) on capabilities, and by PDMA (n.d.) on the NPD (New Product Development) process, Hydle et al. (2016) aim to create an integrative framework that considers the three theoretical studies with practical, empirical relevance to develop overarching key dimensions of new service development practices. These main dimensions are identified in the new integrative NSD practices framework as identifying needs, securing support, and dividing work (Figure 8).

In summary, it can be said that all of the concepts and models mentioned above are valid approaches and modeling methodologies for BBEs and can potentially be used. In the design process in chapter 4.5., a hybrid form of various approaches from the business model designs described above could conceivably be used, incorporating the guiding principles of holistic customer needs via customer centricity and platform models according to Omarini (2023), specifically from the perspective of the open banking model, and according to Osterwalder & Pigneur (2010) should be incorporated into the model design.

A capability-based conceptualization of business model innovation, based on Mezger (2014), and the LCDD according to Koç et al. (2016), are well-suited as methodologies from the perspective of banking capabilities. Experts from the provider side can adopt and describe this perspective accurately during interviews. Meanwhile, bank customers are surveyed about their acceptance and needs for BB services, which can enrich the NSD model according to Matthing et al. (2004) or the integrative framework by Hydle et al. (2016) as drivers and motivating factors. Therefore, no final decision has been made on which model will ultimately be used, as each has its strengths and limitations from different viewpoints, and further research may identify which elements are crucial for designing a BBE. Based on the elements examined in Chapter 3 and the upcoming systematic analysis of current maturity models, the DSR research process will determine which models are ultimately useful and when in the modification process they should be applied.

Figure 8. NSD Practices Framework (Hydle et al., 2016)



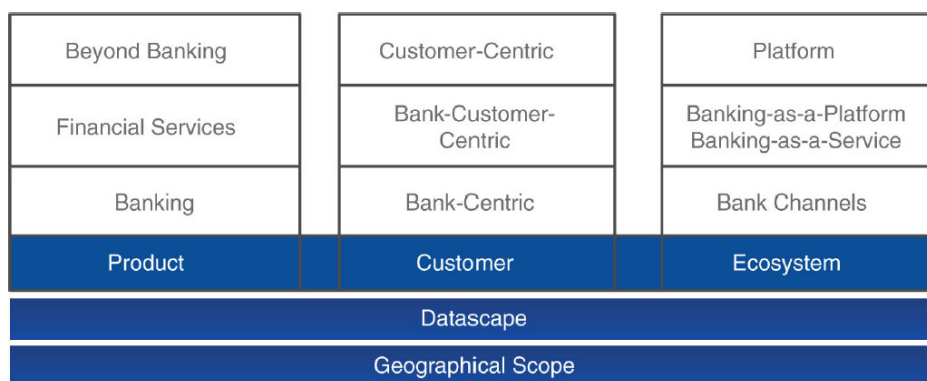
**III – SCALING BEYOND
BANKING ECOSYSTEMS:
INTRA- AND INTER-
INSTITUTIONAL CUSTOMER
DATA MATCHING FOR THE
FINANCIAL SECTOR**

III - SCALING BEYOND BANKING ECOSYSTEMS: INTRA- AND INTER-INSTITUTIONAL CUSTOMER DATA MATCHING FOR THE FINANCIAL SECTOR

With the dawn of the open banking era, Beyond Banking can now realize its full potential. Open banking (Standaert et al., 2020) disruptively reveals and makes accessible all relevant touchpoints in banking: products, customers, and ecosystems (Figure 9).

First, opening products refers to banks expanding their offering with other financial services, while potentially adding non-financial services in a later phase. This is also increasingly being referred to as Beyond banking. Second, the customer focus is changing: from bank-centric (the bank has a primary role in fulfilling a customer's need with its banking products) to bank-customer-centric (the banking products have a secondary role, but the bank supports its customers in their end-to-end journeys) to customer-centric (the bank's role is only tertiary, as its banking products are not considered to be an essential component of the customer journey). Third, opening the bank's ecosystem involves expanding its reach from its own bank channels to delivering financial services via platforms, which can be either a third-party platform ('banking-as-a-service') or the bank's own platform, including third-party services ('banking-as-a-platform'). The end-state for this dimension are general-purpose platforms through which customers can orchestrate all of their digital activities (pp. 368-369).

Figure 9. Framework for an Open Banking Strategy (Standaert et al., 2020)



According to the biological definition (Gómez-Márquez, 2023), an ecosystem describes a group of organisms living and interacting within a specific environment. From the banking domain (Standaert et al., 2020), we can therefore refer to a customer-centric approach in the platform ecosystem, where the customer interacts with the bank and its partners. This is where the second stage of development 2.0 of this scientific work begins, with the opening of the banking ecosystem and the offering of financial services, or more specifically, access to beyond banking services via a platform with third-party providers. As Zhu et al. (2016) predicted, the market is now shifting from a one-sided market to a combined one-sided and two-sided market, and the banking sector is experiencing a similar transition, with a bilateral relationship between banks and third-party providers that regularly exchange data streams and create value for customers. The importance and different strategies of ecosystems are discussed in sections 4.1. and 4.2.

3.1. DISTINGUISHING BETWEEN THE TWO SCALES 2.0 AND 3.0

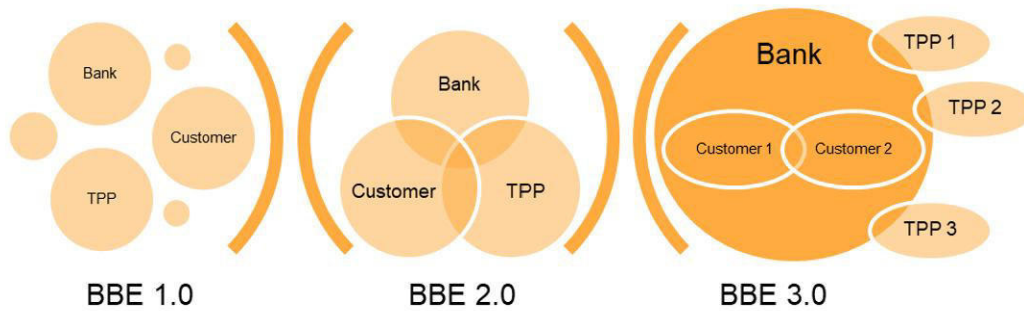
This chapter starts by analyzing and comparing the two phenomena of Beyond Banking 2.0 and 3.0. Based on previous (historical) observations and studies, three stages of a Beyond Banking Ecosystem have been identified. These can be represented as follows:

Stage 1.0: Isolated initial Beyond Banking relationships without an automated ecosystem approach (Liang & Savage, 1990).

Stage 2.0: An inter-institutional approach (B2C) where bank customers receive offers from third-party providers (TPPs) (Zhu et al., 2016).

Stage 3.0: An intra-institutional approach (C2C) where bank customers within a bank can act as both mutual suppliers and consumers, and the bank serves as a marketplace operator (Knörrer et al., 2021).

Figure 10. Different Stages of Beyond Banking Ecosystems based on Liang & Savage, 1990; Zhu et al., 2016; Knörrer et al., 2021



Following the initial Beyond Banking relationships that operated without an automated ecosystem approach (Liang & Savage, 1990) and served as tipster or recommendation functions, the implementation of the European PSD2 directive in 2018 spurred open banking and expanded Beyond Banking business. Isolated business structures already existed before PSD2 was implemented (Chadaeva, 2019; Omarini, 2018; Zachariadis & Ozcan, 2017; Zhu et al., 2016), evolving toward BBE 2.0 with an inter-institutional approach. This approach mapped bilateral contractual relationships between banks and third-party providers (TPPs) and enabled bank customers to access TPP services. This bilateral relationship between bank customers and TPPs is facilitated through the bank acting as a vehicle. By establishing this connection, the bank typically receives a fee-based service from the TPP.

The newer phenomenon of BBE 3.0 with an intra-institutional approach (Knörrer et al., 2021) has emerged in recent years, especially among cooperative banks. In this setup, the bank now acts as a market orchestrator, connecting its own customers with each other and trying to match supply and demand as an intermediary, potentially increasing the services offered by several TPPs in the market. If bank customers can meet supply and demand themselves, additional TPPs are not needed. Moreover, the bank can develop the services of a TPP or create new services and make them available to its customers. Alternatively, multiple TPPs can also provide one or more services simultaneously, complementing each other and serving the bank's customers via the bank. A hybrid form of services is possible. A potential Stage 4 with multiple levels, combined with previous levels

and additional dimensions involving banks, customers, and TPPs within the ecosystem, warrants further research.

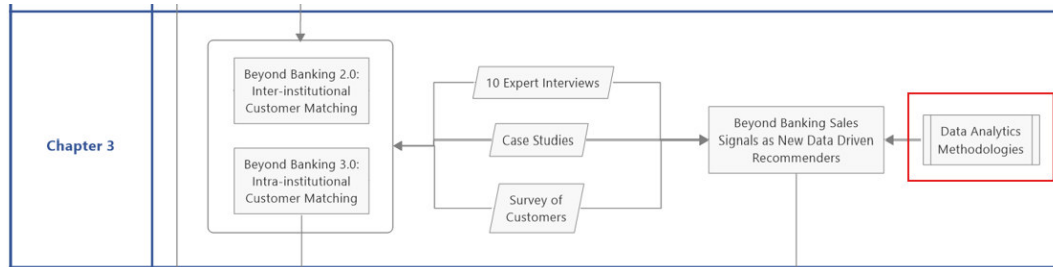
This versioning approach designates a “Major” version increase (x.0), such as from 2.0 to 3.0, when several key criteria are met: the introduction of new actor roles (e.g., customers becoming providers) in the intra-institutional model (C2C), new monetization methods like Marketplace Fees, updated technical infrastructure needs (including matching, escrow, provider KYC), and new legal considerations. This method aligns with the SemVer principle, which indicates incompatible or fundamental changes (semver.org, n.d.), and with Kuhn and Christensen's concept of paradigm shifts (Christensen, 1997; Kuhn, 1970). “Major” versions (x.0) signify significant paradigm shifts in science and practice—such as changes in actor roles, value creation processes, governance, regulation, and architectural requirements. Conversely, “Minor” versions (0.x) are reserved for backward-compatible functional extensions.

The BBE 2.0 phenomenon will not be replaced by the next stage, BBE 3.0; instead, both will continue to coexist. The added value, advantages, aspirations, and plans of banks and their experts at both stages will be analyzed in detail through expert interviews and case studies in the following chapters. To achieve this, the acceptance of Beyond Banking services among bank customers will be examined using a survey.

3.2. CUSTOMER DATA MATCHING OF THE BIG FIVE GAFAM

After explaining the importance of Beyond Banking in Chapter 2 and developing the phenomena BBE 2.0 and 3.0 from various market studies, which were then illustrated and compared, the next chapter focuses on customer data matching. Here (Figure 11, with the area highlighted in red as the focus area), different data usage options are identified and compared from the perspective of the Big Five—Google, Amazon, Facebook, Apple, and Microsoft (GAFAM for short) (Miguel de Bustos & Izquierdo-Castillo, 2019)—to develop models for banks. The chapter also discusses how customer data matching is performed and the data analytics methods used.

Figure 11. Section "Data Analytics Methodologies"



3.2.1. Comparison of Data Usage Options

Google, Amazon, Facebook (Meta), Apple, and Microsoft are GAFAM companies that rely heavily on customer data to support their business models. These firms use various data-matching techniques and advanced analytics methods to improve their services, enhance customer experiences, and inform business decisions. This chapter offers an overview of the primary data matching techniques and data analytics methods used by GAFAM companies. GAFAM companies employ various methods to match and combine customer data across their platforms and services.

User Accounts and Authentication: A key method for linking customer data is using user accounts (Aggarwal, 2015), where unique identifiers like email addresses or phone numbers are connected to personal profiles. This allows smooth matching of user data across multiple devices and services, providing a consistent customer experience. For example, Google's ecosystem revolves around its user account, which tracks interactions across services like Gmail, YouTube, and Google Search (Google, 2024).

Cookies and Tracking Pixels: Cookies and tracking pixels are key tools in data matching (Alpaydin, 2020), especially for companies like Google and Meta (Facebook). These methods enable the collection of user behavior data across various websites and apps, facilitating targeted advertising and personalized content. Tracking pixels, in particular, are used in email marketing and web analytics to monitor user activity silently (McAfee & Brynjolfsson, 2012).

Device Fingerprinting: Device fingerprinting involves collecting device-specific information (Dedić & Stanier, 2017), such as IP addresses, browser

configurations, and hardware attributes, to create a unique identifier for each device. Even when cookies are cleared or disabled, device fingerprinting can still track users, giving companies a persistent way to identify individuals across sessions.

Cross-device Tracking: Cross-device tracking enables companies to link user activity across multiple devices (Google Research Blog, 2016). This is usually done through user authentication across devices, where interactions are matched based on account logins or through probabilistic matching techniques that analyze patterns in device usage.

GAFAM companies utilize the following data analytics methodologies.

Artificial Intelligence (AI) and Machine Learning (ML): Using AI and ML, which Russell et al. (1995) describe as a subfield of AI, they learn from experience and thus “adapt to new circumstances and to detect and extrapolate patterns” (p. 5, para. 2). These technologies are at the core of GAFAM's data analytics capabilities. For example, predictive analytics relies on past data to forecast future behaviors, such as purchasing decisions or content preferences. Amazon's recommendation engine is a prime example (Alpaydin, 2020), where collaborative filtering algorithms suggest products based on user behavior and similarity to other users.

Natural Language Processing (NLP) is commonly used to interpret and analyze human language in applications such as voice search (Google Assistant, Amazon Alexa) and sentiment analysis of customer reviews. NLP models assist GAFAM companies in processing large amounts of unstructured text data (Kelleher & Tierney, 2018), providing more detailed customer insights and enabling automated customer service interactions.

Deep learning models are used for image and video recognition, a key feature in platforms like Facebook and Google Photos (Aggarwal, 2015). These models automatically categorize and tag visual content, improving search, recommendations, and moderation. According to Goodfellow et al. (2016), Deep Learning is explained:

Deep learning is a particular kind of machine learning that achieves great power and flexibility by learning to represent the world as a nested hierarchy of concepts and

representations, with each concept defined in relation to simpler concepts, and more abstract representations computed in terms of less abstract ones. (p. 8, para. 3)

Big Data Analytics: GAFAM companies utilize big data frameworks such as Hadoop and Apache Spark to handle enormous amounts of customer data (Dean & Ghemawat, 2008). For example, Google's original development of MapReduce transformed large-scale data processing, allowing analysis of distributed datasets at unprecedented levels. Hadoop, Apache Spark, and MapReduce are tools used to process and analyze large datasets efficiently (Akil et al., 2017). Hadoop provides distributed storage and processing across multiple computers. MapReduce is the original processing model that processes data in stages: Map, which decomposes data into key-value pairs; and Reduce, which aggregates pairs with the same key. Apache Spark is a newer, faster, and more versatile platform that supports in-memory processing and is suitable for complex tasks like machine learning and real-time data analysis.

Data lakes and warehouses serve as central storage repositories for structured, semi-structured, and unstructured data (Harby & Zulkernine, 2022). Data lakes store raw data in various formats, making them suitable for exploratory analysis, machine learning, and real-time applications. Conversely, data warehouses contain structured, cleaned data organized according to specific schemas. They are optimized for business intelligence, reporting, and standardized queries. For example, Amazon Web Services (AWS) offers services like Amazon S3, while Google provides BigQuery, a serverless data warehouse designed for real-time analytics (McAfee & Brynjolfsson, 2012). These tools enable companies to efficiently execute complex queries and run machine learning models on large datasets. Harby & Zulkernine (2022) also mention a unified architecture called Lakehouse, which combines the flexibility of data lakes with the governance and performance advantages of data warehouses within a single framework.

Behavioral Analytics: A/B testing is a widely used technique to assess the performance of different product or service versions. For instance, Facebook regularly conducts A/B tests (Google Research Blog, 2016) to improve its news feed algorithm by trying out different ranking methods and studying their effects on user engagement.

Cohort analysis groups users based on shared characteristics or behaviors (Dedić & Stanier, 2017), enabling companies to track how specific actions, such as signing up for a service, influence long-term retention or engagement. Companies like Google and Amazon use this approach to optimize customer acquisition and retention strategies.

Recommendation Systems: Amazon's recommendation engine is a well-known example of collaborative filtering (Anderson, 2006), which analyzes interactions between users and items (such as purchases, clicks, or ratings) to suggest relevant products. Matrix factorization (Alpaydin, 2020), a key algorithm in this domain, decomposes large interaction matrices into latent factors that explain user-item relationships.

Content-based filtering algorithms recommend items based on the characteristics of content a user has previously interacted with (Kelleher & Tierney, 2018). For example, Google's YouTube recommendation algorithm combines collaborative filtering with content-based features as a hybrid approach to suggest videos that match a user's viewing history.

Social network analysis is essential on platforms like Meta (Facebook), where user relationships are depicted as graphs (Zuboff, 2019). Graph databases store these relationships and facilitate exploring connections, such as friend recommendations and influence networks. These methods also help companies monitor how information or behaviors spread through social graphs.

GAFAM companies' extensive data matching and analytics raise serious privacy and security concerns. However, privacy advocates often criticize the detail and widespread nature of GAFAM's data collection and matching methods, especially regarding cross-device tracking and data from third-party sources (Zuboff, 2019). GAFAM companies have responded by using data anonymization and giving users more control over their data, but worries about the extent of data collection and use still remain.

3.2.2. Derivation Models for Banks

Drawing from the data matching and analytics methods used by GAFAM companies, banks can create models tailored to their specific needs, such as risk

management, fraud detection, and personalized financial services. This section explains how banks can adopt these approaches and which GAFAM strategies support them. It also provides initial ideas for intra-institutional customer matching methods.

Adaptive Data Matching Models for Banks created by the GAFAM companies generally are as follows.

Customer Identity and Account Matching: Banks can implement account-based matching methods similar to those used by GAFAM companies, where unique identifiers such as account numbers or social security numbers are used to unify customer data across various channels. By leveraging these identifiers, banks can provide a consistent experience across online banking, ATMs, and in-branch services. This approach reflects how Google links user accounts across services like Gmail and Google Search (Aggarwal, 2015). In the banking sector, this has been applied through Know Your Customer (KYC) protocols (Jagtiani & Lemieux, 2018), which utilize multiple identifiers to authenticate and monitor customer data across platforms.

Cookies, Tracking Pixels, and Banking Applications: Although cookies and tracking pixels are traditionally used in e-commerce, these tools can be adapted for secure banking apps. Session cookies can handle authenticated sessions in online banking systems, while tracking pixels can be embedded in email alerts to monitor user engagement with security notices or promotional messages. While these technologies are common in GAFAM ecosystems (Alpaydin, 2020), banks must make sure that such tracking methods follow financial rules, like the GDPR (Cambronero et al., 2024).

Device Fingerprinting for Fraud Prevention: Device fingerprinting is a powerful tool that banks can use to improve security and detect fraud. Banks can monitor user behavior and flag suspicious login attempts by collecting device-specific data like IP addresses and browser settings. This method, used by GAFAM companies to track users across devices (Dedić & Stanier, 2017), is already implemented in banking to spot unusual activities (Wang et al., 2024), helping to prevent fraud and enhance the accuracy of transaction monitoring systems.

Cross-device Tracking in Multi-channel Banking: By utilizing cross-device tracking, banks can connect customer activity across various devices, such as

mobile phones, desktops, and ATMs, ensuring customers have a seamless experience no matter how they interact with their bank. GAFAM's method of cross-device tracking, where user activity is monitored and analyzed across different devices through authenticated logins (Google Research Blog, 2016), can be applied in banking. This is vital for delivering integrated services like omnichannel banking (O'Niel, 2023), enabling banks to provide real-time support and targeted financial recommendations across platforms.

Adaptive Data Analytics Models for Banks by the GAFAM companies are generally outlined as follows.

Predictive analytics and machine learning: Depending on the purpose, ML can be categorized into supervised learning and unsupervised learning. Supervised learning uses labeled datasets (Jiang et al., 2020; Shaer & Shami, 2023), where each input has a known output (label). The goal is to learn a function f that makes accurate predictions on new inputs. Common applications include classification (e.g., fraud detection) and regression (e.g., creditworthiness assessment). Unsupervised learning handles unlabeled data (IBM, 2021) and aims to find hidden patterns or structures, such as through clustering or dimension reduction. It is used for customer segmentation, anomaly detection, and exploratory data analysis. Supervised learning tends to be more accurate because it trains on clearly defined labels, but can be complex to prepare. In contrast, unsupervised learning is more flexible, involves less manual data preparation, but may identify less precise patterns.

Banks can utilize machine learning (ML) models similar to those used by Amazon but tailored to financial results like credit scoring and loan default predictions. By examining customer transaction histories, credit behaviors, and external financial data, banks can more accurately forecast the likelihood of loan repayment. Banks such as Capital One and FICO have effectively implemented machine learning-based credit scoring (Jagtiani & Lemieux, 2018), resulting in better risk assessments for borrowers. This method is comparable to how GAFAM companies use predictive analytics for personalized recommendations (Alpaydin, 2020). Additionally, predictability techniques can be adapted for use beyond banking services.

Banks can utilize NLP techniques to enhance customer service. NLP can be applied in chatbots and virtual assistants to help answer customer questions or analyze real-time sentiments. This technology is already used by GAFAM companies for automated customer support (Kelleher & Tierney, 2018). It is also being integrated into banking through services like AI-powered chatbots (e.g., Bank of America's "Erica") (Ngai et al., 2021), which leverage NLP to simplify customer interactions and provide personalized financial advice.

Big Data Analytics for Advanced Customer Segmentation (Clustering as unsupervised learning): Banks handle large amounts of transactional and financial data. They can better segment customers by using big data analytics tools like Hadoop or Apache Spark to identify high-value clients or those at risk of churning. For example, JPMorgan Chase applies big data analytics for personalized marketing and fraud detection (Saxena & Muneeb, 2024). GAFAM's extensive data infrastructure, which supports customer segmentation and predictive marketing (McAfee & Brynjolfsson, 2012), can be similarly utilized by banks to optimize customer engagement and boost profitability. Algorithms such as K-means or Hierarchical Clustering help identify distinct customer groups (Kaushik & Mathur, 2014) (e.g., high-net-worth individuals or risk-averse investors), enabling banks to customize product offerings and matchmaking services.

Banks can leverage data lakes and warehouses like Amazon's S3 or Google's BigQuery to store both structured and unstructured transactional data. Banks such as HSBC and ING already utilize these data storage systems (Jagtiani & Lemieux, 2018) to manage large datasets and perform real-time queries that enhance customer insights and fraud detection. These tools enable more advanced data processing, allowing banks to conduct real-time analytics on extensive customer datasets, similar to GAFAM companies (Dean & Ghemawat, 2008). When choosing a data storage and security system, it's also crucial to consider how the data is classified—either as data in motion or data at rest (Parveen & Basit, 2023). "Data in motion" refers to data traveling between systems, often processed in real-time applications or streaming frameworks. "Data at rest" pertains to data stored in persistent storage, such as hard drives, databases, or cloud storage. Recognizing this distinction is vital for selecting appropriate storage and analysis platforms and ensuring security and governance compliance.

Behavioral Analytics for Financial Product Recommendations: Banks can use A/B testing to improve financial product offerings by trying out different options for loans, savings accounts, or interest rates. For example, banks like ING and BBVA use A/B testing to see how customers respond to different product designs (Wheeler, 2023), helping them enhance customer experience. This is similar to how Facebook uses A/B testing to boost user engagement by testing various algorithm setups (Google Research Blog, 2016).

Banks can employ cohort analysis to monitor how different customer groups respond to specific products or promotions over time. By examining account sign-ups and service usage behaviors, banks can improve their retention strategies. This method is similar to the cohort analysis techniques used by GAFAM companies to understand long-term engagement and can be vital for banks aiming to boost customer loyalty (Dedić & Stanier, 2017).

Recommendation Engines for Personalized Financial Products: Banks can adopt recommendation systems similar to those used by Amazon but tailored for financial products such as credit cards, investment plans, or savings accounts. They can provide personalized product suggestions by analyzing transaction data and spending habits. This method has been embraced by Citi and Wells Fargo, who use recommendation engines to propose customized financial products based on customer data, much like how Amazon recommends products (Anderson, 2006).

Graph Theory for Relationship-based Banking: Banks can leverage graph theory and social network analysis to visualize customer relationships, especially in corporate banking. By examining business networks, banks can identify key influencers and decision-makers within financial ecosystems, leading to better risk assessments and strategic partnerships. HSBC and Standard Chartered have employed network analysis (Zuboff, 2019) to understand inter-company financial ties and manage risk more effectively. This approach is similar to how Meta (Facebook) uses graph theory to analyze user relationships and influence networks.

Graph theory for relationship-based banking with social network analysis is an initial data analytics methodology that aims to match customer data within a bank. As discussed earlier, other similar approaches include collaborative filtering and recommendation engines. In this context, banks functioning as platform operators can use collaborative filtering to offer personalized product or partner

suggestions. GAFAM companies often utilize this method in their recommendation systems, and banks can adopt it to connect customers with relevant financial products or partners. The User-Item Collaborative Filtering method examines past interactions between customers and products to generate recommendations. For example, it might suggest specific loan products to borrowers based on the borrowing histories of similar customers. The User-User Collaborative Filtering method identifies matches between customers by finding similar profiles. Banks can use it to connect lenders and borrowers with comparable financial behaviors and needs. Conversely, it can also identify opposing profiles and bring them together, such as bank customers seeking a service and those offering that service.

These derivation models for banks related to the customer data matching approach can be considered and included as attributes later in the design concept. The specifics of the bank as a market orchestrator role holder are discussed in section 3.3.2.1.

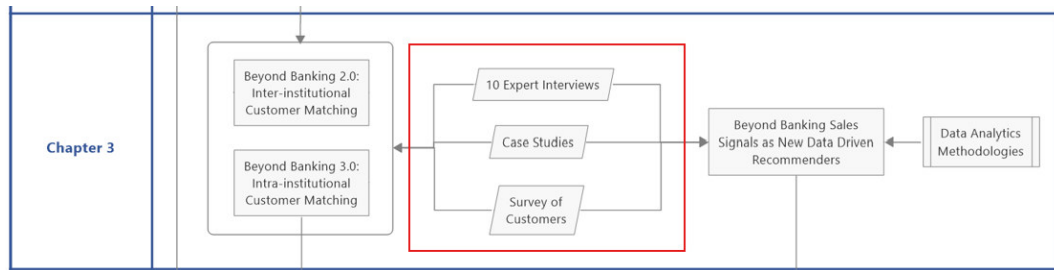
3.3. POTENTIAL ANALYSIS AND USE CASES

After identifying GAFAM's customer data matching approaches and deriving use cases for banks, this chapter centers on the methodological development of the two phenomena (Figure 12, with the area highlighted in red as the focus area), BBE 2.0 and 3.0. Using expert interviews (chapter 3.3.3.) and case studies (3.3.1.2., 3.3.2.7., and 3.3.2.10.), the potential and possible use cases on the banking side—mainly from the provider perspective—and particularly for BBE 3.0, will be analyzed. Additionally, potential Beyond Banking Sales Signals as new data-driven recommenders (see chapters 3.3.5. and 3.3.6.) will be derived from this. For the demand side (bank customers), a survey and further studies will assess the acceptance of Beyond Banking Services (3.3.4.).

The goal is to examine how critical banking experts are of the potential of Beyond Banking and the phenomena of BBE 2.0 and 3.0, both now and in the future, as well as what actions banks are currently taking and plan to take in these areas. It also investigates how widely guidelines, concepts, and frameworks for building a scalable Beyond Banking Ecosystem are adopted across the banking industry (H3). The overall findings will help identify additional attributes and factors

influencing these developments, serving as the basis for a sound design concept for BBE 3.0, which will then be presented in Chapter 4.

Figure 12. Section “Methodic Elaboration of the Phenomena”



3.3.1. Beyond Banking 2.0: Inter-institutional Customer Matching

While Chapter 2.3.1. identified initial national and international studies on the importance of Beyond Banking, this chapter focuses on the phenomenon of BBE 2.0 with inter-institutional customer matching. First, current observations with examples will demonstrate the approaches banks are already implementing today. A case study will then offer a more detailed analytical review of the observed approaches. Finally, expert interviews in Chapter 3.3.3. will showcase the developments, added value, collaborations, and offerings that this phenomenon promises. Additionally, customer data matching and acceptance, use cases, challenges, and risks at this stage of development will also be highlighted.

3.3.1.1. Current Observations and Examples

Current observations and research findings confirm that approaches to BBE 2.0 are already being implemented or planned (sections 2.3.1.1. and 2.3.1.2.). However, Katzenschlaeger et al. (2023) point out that banks still focus too much on Near Banking solutions. Therefore, it is especially important to identify and filter which research findings on Beyond Banking can be presented in addition to those already discussed in chapters 2.3.1.1. and 2.3.1.2.

First, it should be noted that, on the one hand, only a few new research findings or insights can be found under the search terms “beyond banking” and “non-banking” to supplement the previously mentioned chapters and the BBE 2.0

model examined. On the other hand, many findings focus on Near Banking or other Core Banking services, confirming the statement by Katzenschlaeger et al. (2023). The following additional examples can therefore be listed:

American Express offers more details about the activities of BBE 2.0. Through its Bank 2.0 strategy (Fairchild & Thomas-Kennedy, 2021), the company plans to use its American Express Card to give access to exclusive events like music, film, and sport, including rare tickets for must-see shows and pre-sale events (Heather Hook, 2017).

Other examples show the increasing trend of banks working with third-party providers across different sectors to develop more integrated financial ecosystems that address changing customer demands. Emirates NBD introduced SkyShopper (Mariani et al., 2021), a broad ecosystem offering services like flight bookings and electronics shopping. This effort is part of their strategy to team up with merchants such as Emaar and Axiom Telecom, providing a variety of lifestyle services beyond conventional banking.

Bank of America has built a digital car dealership platform that supports its auto finance operations (Stężycki, 2024). Similarly, BBVA has developed a platform for car dealers, enabling them to offer financing directly through their dealerships. These efforts illustrate how banks can partner with automotive businesses to deliver integrated financial services.

Bradesco, one of Brazil's leading banks, has invested in fintech through its innovaBra initiative (Dock, 2023). This strategy involves creating and acquiring fintech firms such as Next, Digio, and Bitz, as well as collaborating with startups to diversify its service offerings beyond traditional banking. Similarly, the Brazilian supermarket chain Muffato launched Mupay, a digital account functioning as a super app. This app enables customers to carry out financial transactions and access services like shopping at partner stores, exemplifying a successful implementation of the beyond banking approach.

3.3.1.2. *Case Study Atruvia and the Cooperative Banks (1/2)*

After listing various observations and examples of the BBE 2.0 approach, this chapter then concentrates on one company (Atruvia) and a specific group of cooperative banks to explore the research topic of the inter-institutional model

more thoroughly through a short case study. The goal here is also to partially address the hypothesis from the perspective of providers (banks and IT providers) regarding whether the acceptance of a scaled Beyond Banking Ecosystem and the related customer data matching (from level 2.0) is present in the market (H1.4).

A case study is therefore regarded as a research method to describe the prevailing phenomenon of BBE 2.0 from an extensive and in-depth perspective (Yin, 2009). Furthermore, this method enables us to preserve the holistic and meaningful characteristics of real-time events, such as the examination of a company and other cooperative banks. The case study process follows a deductive hypothesis testing approach (Johansson, 2007), where hypothesis H1.4 (The market accepts a scaled Beyond Banking Ecosystem and the associated customer data matching (from level 2.0)) is tested in a case and, according to Hancock et al. (2021), holds an illustrative character.

The case study is based on Atruvia AG, which acts as the digitalization partner within the cooperative financial group (Atruvia, n.d.-b). It offers a range of IT solutions and services, from invoicing through its agree21 banking system to app development. As of now, it serves 951 banks, including around 700 cooperative banks, and achieved EUR 1.5 billion in sales in 2023. Cooperative banks are distinguished from savings and private banks primarily by their legal structure as registered cooperatives, a factor that heavily influences the operations of cooperative banks (Jovanović & Voigt, 2016). These credit cooperatives operate based on the principles of solidarity, self-help, and equal treatment (Aschhoff & Henningsen, 1995), focusing on providing economic support to their members rather than generating profits for distant investors (Eim, 2007).

This timeline outlines Atruvia and the cooperative banks' activities outside traditional banking, highlighting their initiatives and growth. In 2015, Atruvia was formed from the merger of Fiducia IT AG and GAD eG (IBM, 2022). It serves as the digitization partner for Germany's cooperative banks, offering tailored IT solutions and services. By 2020, Atruvia had expanded its banking-as-a-service offerings, modernizing core banking processes and adopting new technologies to boost customer engagement and operational efficiency.

In 2021, the cooperative banking sector, including Atruvia, stepped up its efforts to digitize services (S&P Global Ratings, 2024). This involved developing

platforms that incorporate beyond-banking services to enhance customer loyalty and experience. Volksbank Mittelhessen, in partnership with Atruvia, launched several Beyond Banking features (Hanker & Stein, 2021). They overhauled their entire product portfolio, regularly removing irrelevant products and services while designing and introducing new near- or beyond-banking offerings, such as ecosystem platforms focused on topics like "building and living" or "elderly care services."

In 2022, the BVR (=National Association of German Cooperative Banks) launched a new regional digital platform that extends beyond traditional banking services. It encompasses sectors such as housing, health, and care to attract a younger clientele. Additionally, Volksbank eG Südheide founded Quidt GmbH in the same year (Quidt, n.d.), a company with a digital agency that applies its SME expertise to develop various consulting solutions and internal implementations (Edlinger-Kerle & Lange, 2023). The goal of this company is to serve corporate banking clients needing digital industry knowledge and use cases, including digital order processing, process management, and web app development.

In April 2023, the venture-building and strategic investment studio amberra was established within the cooperative financial network (Rejmanowski, 2024). It aims to develop a comprehensive ecosystem extending beyond traditional banking, encompassing areas like sustainability, health, and regional economies. Meanwhile, MeinPlus, a subsidiary of DG Nexolution, launched a cashback feature that integrates account management, payment cards, and a benefits program (DG Nexolution, 2024; MeinPlus, 2024). This feature enables users to automatically earn cashback on purchases made at partner retailers with their cards. The initiative is designed to boost customer loyalty and offer meaningful benefits beyond standard banking services.

In March 2024, member banks launched the amberra fund to support strategic investments in initiatives that go beyond traditional banking (Rejmanowski, 2024). The goal is to improve the offerings of the cooperative financial network and promote innovation. By June 2024, DG Nexolution announced an investment in benfido (DG Nexolution, 2024; MeinPlus, 2024), a tech company focused on beyond-banking solutions. This move aims to strengthen MeinPlus's technological expertise and increase its value for cooperative banks.

The partnership with benfido will allow MeinPlus to utilize advanced payment analytics and card-linked marketing, further expanding the benefits ecosystem for customers.

In 2024, Atruvia continues to advance its initiatives, focusing on areas like sustainability and regional economic aid (Rejmanowski, 2024). Cooperative banks are increasingly incorporating non-banking services into their business strategies to generate new revenue sources and strengthen customer connections.

From an analytical perspective, the acceptance of a scaled Beyond Banking Ecosystem and the associated customer data matching (from level 2.0) is supported on the market side by the initiatives mentioned. Hypothesis H1.4 can thus be tested. Various initiatives and strategies are being launched by Atruvia, individual cooperative banks, and other partners such as amberra, related to specific areas of life, along with MeinPlus as a joint value-added program. However, the profitability and scalability of these business models remain uncertain. There are no public results available yet, and it is unclear if they will be shared publicly in the future. The implementation of Beyond Banking approaches is still in its early stages. Some banks have established venture capital and incubator companies to invest financially in potential FinTechs or other TPPs externally, while others are creating their own companies to develop the Beyond Banking concept internally. MeinPlus is expected to be integrated into the VR Banking app (Atruvia, 2024) as the nationwide value-added program of the cooperative banks, managed and maintained by Atruvia to reach millions of German citizens (Atruvia, n.d.-a). While this holds promise, how is this potential defined or measured? It can be assessed directly through the sale of additional Beyond Banking services or indirectly by increasing digital touchpoints in the banking app, which can enhance customer loyalty and attract new customers.

3.3.2. Beyond Banking 3.0: Intra-institutional Customer Matching and Creating Beyond Banking Sales Signals as New Data-driven Recommenders

After outlining current observations, examples, initial initiatives, and strategies in the early stages of cooperative banks' move toward BBE 2.0, this chapter now shifts focus to the 3.0 phenomenon with an intra-institutional

customer matching approach. Before delving into more detailed observations, examples, and supporting case studies involving various banking groups such as German private banks, regional banks, and international banks, this chapter first examines the bank as a marketplace orchestrator and discusses Beyond Banking Sales Signals as new data-driven recommender systems. Finally, with insights from expert interviews in chapter 3.3.3., we will explain the developments, added value, collaborations, and offerings associated with BBE 3.0 and the related Beyond Banking Sales Signals (BBSS). Additionally, this chapter highlights customer data matching and acceptance, usage, business cases, challenges, and risks at this stage of development.

3.3.2.1. *Banks as Marketplace Orchestrators*

Chapter 3.1. already explained the phenomenon of BBE 3.0, where the bank acts as a marketplace orchestrator between suppliers and consumers (Knörrer et al., 2021). This chapter defines the marketplace orchestrator as a platform operator or leader within the ecosystem and describes the specific traits of the bank as the holder of this role.

As the platform's orchestrator, the company manages the ecosystem's value proposition (Eickmeyer, 2023). It establishes the strategy and ensures that all products and services are seamlessly integrated into a customer journey, shaping how customers move through it (Grandt & Bollig, 2024). The company also designs incentives to attract and keep customers over time. It owns and analyzes customer data to inform decision-making. Furthermore, the orchestrator oversees the integration of additional services to deliver a cohesive and unified offering.

In addition to the orchestrator, the ecosystem includes other roles such as the realiser and the enabler (see Figure 13). The realiser, also known as the implementer, acts as a service provider and product supplier within the ecosystem. They are essential for delivering services and are a pivotal part of the ecosystem strategy (Grandt & Bollig, 2024). Realisers often serve multiple ecosystems, leveraging cloud technology, standardization, and APIs to efficiently and swiftly integrate their offerings. An enabler is typically a facilitator and often operates behind the scenes in the ecosystem. They focus on B2B services that support other

ecosystem members and are responsible for providing and transforming the technical solutions needed to run the ecosystem platform.

Figure 13. Roles in the Ecosystem (Grandt & Bollig, 2024; based on Krechting & Kawohl, 2018)



According to Matkovskaya et al. (2022), the specific characteristics of the bank as an orchestrator can be summarized as follows:

- “By forming ecosystems, banks are reaching a new level of organization of activities, expanding their competencies, and diversifying their activities” (p. 26, para. 7)
- Creating banking ecosystems offers a chance to enhance financial performance and generate new growth opportunities.
- When creating ecosystems for banks, new opportunities often have a hidden aspect.
- These opportunities allow for increasing the customer base and creating unique, combined banking and financial products.
- Innovative technologies develop within ecosystems, established through collaboration between the orchestrator and complementarities. These partnerships enable access to innovations across different fields and facilitate

the management and ownership of intellectual property generated within the ecosystem.

Current banks that orchestrate ecosystems include İşbank (Demir et al., 2024), which participates in multiple ecosystems centered around a corporate accelerator, and Ping An. This company “integrated additional services along the customer journey, which formed its health, mobility, and financial service ecosystems” (Miehé & Gassmann, 2024, p. 70, para. 3).

Alternatively, ecosystems can emerge across multiple customer journeys by a common touchpoint, as the example of Twint demonstrates. This ecosystem involves multiple customer journeys such as banking, retail, and other services, all of which share the payment process as a customer touchpoint. (p. 70, para. 4)

To implement customer matching as a market orchestrator within a BBE 3.0 model, it is recommended that a bank employs market design principles and auction mechanisms to dynamically match customers, adjusting the supply and demand for financial products.

Double-sided auction systems enable suppliers and demanders to submit their offers, with the platform matching parties based on mutually beneficial terms. This approach helps optimize resource allocation within the platform (Zou et al., 2018). Market clearing algorithms ensure real-time balance between supply and demand in financial markets (Tsaousoglou et al., 2022). The bank can also adapt its offerings dynamically by analyzing customer preferences and financial objectives to better align with market conditions.

Examples include (Wu et al., 2024) the VCG (Vickrey–Clarke–Groves) mechanism, which selects all bid combinations that maximize overall social utility and charges each winner exactly the “damage” their winning bid causes to others. This method enforces truth-telling incentives and promotes social efficiency. Another example, as noted by Malik et al. (2023), is the McAfee mechanism, which sorts buy and sell bids into an intersection and sets the price at the boundary of this set. This approach reduces inefficiencies in small markets and guarantees at least half the optimal efficiency. Blum et al. (2002) analyze procedures where bids arrive in real time and can be immediately accepted or rejected (online clearing algorithms). These algorithms make instant decisions to accept or reject bids to minimize delays.

Finanzdienstleister sind mit ihrer Expertise und Erfahrung innerhalb der IT als Plattformbetreiber prädestiniert. Mit ihrer Markterfahrung bringen sie zudem ideale Voraussetzungen mit als Steuerungszentrale eines Ökosystems zu fungieren. Damit sind sowohl die Rollen Orchestrator als auch Enabler möglich. Ebenso ist aber auch die Rolle als Realisierer oder eine Mischvariante denkbar. [With their expertise and experience in IT, financial service providers are predestined to be platform operators. With their market experience, they are also ideally placed to act as the control centre of an ecosystem. This means that both the roles of orchestrator and enabler are possible. However, the role of realiser or a hybrid variant is also conceivable.] (Grandt & Bollig, 2024, p. 13, para. 4)

In principle, therefore, the bank does not necessarily need to assume the role of orchestrator. However, considering the holistic approach, maximum control and management of the data treasure trove and the related customer journey, as well as access to innovations and intellectual property, it is initially advisable for banks to take on the role of orchestrator in a BBE 3.0 approach, taking the above aspects into account.

3.3.2.2. *Beyond Banking Sales Signals*

Sales signals and data-driven recommenders are used in sales, particularly in customer relationship management (CRM) (Tarnowska et al., 2020). Recommender systems can help boost customer satisfaction and company revenue. “In general, these systems are based on analyzing customer behavior using AI. The goal is to provide customers with added value by offering personalized content and services at the point of sale (PoS)” (Gentsch, 2018, p. 221). These sales signals can also serve as next best actions (NBA) or, more specifically, as next best offers (NBO) (Wuttke, 2023). NBAs suggest a higher-level approach based on analyzing historical customer data to generate direct, predicted recommendations for marketing, sales, or service teams at the customer level. Examples of NBAs include NBOs, which specify which product should be offered to which customer and when; Next Best Services (Hinn, 2023), which determine the best way to assist a customer; and Next Best Customer, which identifies potential customers to approach next. Channel preferences and the optimal timing for displaying data-driven, automated prompts should also be considered.

Sales signals are an essential part of the research work. Once the potential analysis and use case formation are identified through literature research, surveys, and expert interviews on BBE 3.0, these sales signals can serve as a foundation for developing so-called Beyond Banking Sales Signals (BBSS) as (data-driven) recommenders in chapter 3.3.5. and 3.3.6.

3.3.2.3. *Market Research: German Private Banks*

In this chapter, German private banks will initially be analyzed based on market research using public literature sources to determine how much they are implementing or planning approaches and strategies according to BBE 3.0. Any BBSSs can also be identified. The scope of the analysis is based on current observations and examples, along with a comprehensive case study that considers the largest German private banks.

3.3.2.4. *Current Observations and Examples*

This chapter examines how far German private banks are adopting a BBE 3.0 approach. If so, it will also explore whether BBSSs are already in use or if there are plans to implement them.

After thorough research, there are no definitive, self-initiated, or completed projects related to BBE 3.0, and as a result, no BBSSs can be identified in the German private banking market so far. The following are a few incomplete and often conceptual approaches highlighted.

Allianz X, a subsidiary and digital investment arm of the Allianz Group, holds financial interests in a wide range of companies (O'Hara, 2021). The following companies are worth mentioning here, as they pursue different C2C approaches, primarily in the area of beyond banking.

Allianz X with its portfolio companies (Allianz X, n.d.-c) includes C2FO (C2FO, n.d.) as a working capital marketplace that “connects companies that need cash (suppliers) with companies that have cash (buyers) to optimize working capital” (Allianz X, n.d.-a, para. 1). It also features heycar (heycar, n.d.), described as “the fastest growing platform for quality used cars in the European automotive industry” (Allianz X, n.d.-b, para. 1). Purpose Unlimited is a “platform bringing together entrepreneurs to innovate the next generation of asset management,

wealth management, and SMB banking” (Allianz X, n.d.-d, para. 1). SafeBoda (SafeBoda, n.d.) is an “African ride-hailing and financial services platform” (Allianz X, n.d.-e, para. 1). SDA (SDA, n.d.) is a digital service platform with unique architecture that facilitates collaboration with external partners (Allianz X, n.d.-f). Urgent.ly (Urgent.ly, n.d.) is a “digital platform for on-demand roadside assistance services” (Allianz X, n.d.-g, para. 1). WeLab (WeLab, n.d.) is described as “a leading provider of online lending and digital banking solutions in China and Southeast Asia” (Allianz X, n.d.-h, para. 1).

Deutsche Bank (Stoy, 2023) also promotes collaboration among clients interested in sustainable investments. This approach can help clients share insights and opportunities, creating a marketplace for ESG-focused financial products. At that time (2023), the idea was adopted to develop a nationwide network of craft businesses for energy-efficient renovations and solutions for carbon offsetting.

ING Germany's Dealwise program (Hatton, 2024) paves the way for a potential C2C approach, where retailers can offer their products online through an ING partner network, and ING bank customers, as potential users, can purchase these products via an intermediary process. For each purchase, there is a cashback provided in varying amounts as a percentage of the purchase value. If retailers, like bank customers (demanders), must also be customers of ING Bank to list their products, this can be described as a closed C2C approach within a bank. Whether being an ING Bank customer on the retailer side is a prerequisite for access to the loyalty program cannot be determined from publicly available sources.

Due to vague concepts and the ongoing attempts at BBE 3.0 by German private banks, along with the lack of officially available information to date—even after extensive research—it is not possible to conduct a detailed case study analysis of this banking group (notably Deutsche Bank, Postbank, and Commerzbank).

3.3.2.5. *Market Research: Regional Banks*

After examining strategies and approaches to BBE 3.0 at German private banks, this chapter now shifts focus to regional banks, especially savings banks and cooperative banks in Germany. The market research here also includes a literature review using publicly available sources. Additionally, BBSSs are to be identified. The scope of the analysis is based on current observations and examples, and a

continuing case study building on the case study in chapter 3.3.1.2., which considers the concepts of regional banks in Germany.

3.3.2.6. *Current Observations and Examples*

Unlike German private banks, several regional banks are based on the BBE 3.0 model. Market research groups these examples into three categories based on how they implement the model: banks that work with partners, banks without a partner model, and self-initiatives or initiatives that cover parts of a BBE 3.0.

Regional banks collaborating with partners to establish a BBE include Sparkasse Dortmund with its “Das Echte” [The Genuine] portal (Sparkasse Dortmund, n.d.), Gestalterbank with its relaunch of the MehrKonto portal (Mehrwerk, 2022), and Sparkasse Holstein with its “moingiro!” portal (Sparkasse Holstein, n.d.) for various value-added services such as event and travel bookings, online shops, and cashback programs, all of which are also app-enabled. These banks work with Mehrwerk, a company that describes itself as “Europe’s leading developer of data-based value-added services” (Mehrwerk, n.d.-b, para. 1) and focuses on a B2B platform serving highly dynamic, high-volume markets like banking, energy supply, insurance, telecommunications, and trade (Mehrwerk, n.d.-a).

Another example is Sparkasse Bremen, which offers a B2B2C marketplace for value-added services with the start-up Etnas (Barth, 2022), and has a similar business model to that of Mehrwerk and benfido (Etnas, n.d.). It should be noted that both cooperation models with Mehrwerk and Etnas focus on BBE 2.0 and do not yet pursue a C2C approach. However, the next example in the savings bank environment advances this further toward BBE 3.0. The digital platform Bliggit (Bliggit, n.d.-b), founded by Stadtparkasse Wuppertal and WSW Wuppertaler Stadtwerke GmbH, which collaborates with its partner Ecosystems 4 business AG (Ecosystems 4 business, n.d.), connects people, companies, and associations in the city of Wuppertal and the surrounding area for mutual benefit. The city of Saarlouis is also a partner of the platform. Bliggit also offers users personalized, regional assistance functions for daily life and interest-based recommendations for leisure activities (Bliggit, n.d.-a). Bliggit partners can use the platform to create content,

connect digital services, and establish direct contact with citizens in the region or city.

In the second category of regional banks without a partner model and self-initiatives for BBE 3.0, the following approaches are examined. These cooperative, platform-based ecosystems include, on one hand, a cooperative booking platform for the South Tyrol region that connects holiday providers and consumers, and on the other hand, the streaming platform *resonate* (Theurl, 2024), owned and operated by members (*resonate*, n.d.), as well as *govdigital*, a cooperative of public IT service providers that organizes collaborations and joint platforms for digital administration across Germany (*govdigital*, n.d.). However, these cooperative initiatives were not developed or supported by banks, but they could learn from these models or potentially become participants in such ecosystems in the future.

A banking initiative, on the other hand, is based on a merger of several regional banks, including Kreissparkasse Göppingen, with its “multi-generational house” (Vogel & Reiner, 2021), to address the issue of care jointly. Additional examples of platform cooperatives are listed by the German Cooperative and Raiffeisen Association (DGRV) (Wieg, n.d.). Among others, *UrStrom eG*, which operates as an e-car sharing platform, is mentioned here. Due to the challenges in establishing a car-sharing platform, the cooperative has joined forces with seven other energy cooperatives to form the European umbrella cooperative *The Mobility Factory SCE (TMF)*. “TMF stellt ein Buchungssystem (Buchungs-App) sowie ein Management- und Abrechnungsprogramm, also die technische Plattform, für die nationalen Mitgliedsgenossenschaften bereit” [TMF provides a booking system (booking app) and a management and billing program, i.e., the technical platform, for the national member cooperatives.] (Wieg, n.d., para. 5).

The third category, where initiatives can address sub-areas of a BBE 3.0, is discussed below.

VR-Crowd is a crowd investing platform collaborating with cooperative banks in Germany (*VR-Crowd*, n.d.) and operates as a digital marketplace where private investors act as a group of micro-investors, providing financial support to projects run by companies that are clients of cooperative banks. The infrastructure and networking concept aligns with the C2C approach, but there is no link to *Beyond Banking*. Conversely, *Beyond Business Solutions* considers itself a

specialist in creating and implementing regional ecosystems for local banks (Beyond Business Solutions, n.d.). These digital regional ecosystems serve as online platforms that connect local customers with providers. However, it is unclear how strictly a C2C approach is followed, based on the available data.

In summary, there are various cooperative regional concepts being promoted, either with or without the involvement of banks. Banks can leverage even more ideas, participate in different projects, and serve as drivers and providers of a wide range of value-added solutions for their customers. Regional banks are well-suited for the C2C model, because their decentralized structure and local roots give them the ability to develop a new, regionally digitized platform business model (Naughton & Pommerening, 2023).

3.3.2.7. *Case Study Atruvia and the Cooperative Banks (2/2)*

Since Chapter 3.3.1.2. focused on developments at Atruvia and the cooperative banks in BBE 2.0, this chapter continues the case study on progress in BBE 3.0 and also examines the use of BBSSs. With the launch of the Beyond Banking Initiative in 2022 (National Association of German Cooperative Banks—BVR, 2022), approved by the BVR as the umbrella organization for cooperative banks, the first question that arises is how much the leading cooperative institutions are already involved in Beyond Banking activities Ecosystems

The four main cooperative institutions often seen in public include “BVR,” the umbrella organization of the cooperative credit industry in Germany (Bundesverband der Deutschen Volksbanken und Raiffeisenbanken, n.d.), DZ Bank as the central institution of the cooperative financial group and the central bank for about 700 cooperative banks in Germany (DZ Bank, n.d.), Atruvia as an IT service provider and digitalization partner (Atruvia, n.d.-b), and DG Nexolution as a specialist in payment, procurement, marketing, and digitalization (DG Nexolution, n.d.). Within the cooperative financial group, DG Nexolution is implementing the European Payment Initiative (EPI) (DZ Bank, 2024) via Wero, a digital wallet solution serving as a joint European competitor to PayPal (EPI Company, 2024). This enables German customers to make instant account-to-account transfers through their banking app. However, no public data indicates any activities related to BBE 3.0 within this alliance. This may be because the BVR

functions solely as an association that decides on initiatives, leaving implementation to the operating banks. DZ Bank, in turn, acts as a holding company primarily serving institutional clients, corporate clients, and wealth management customers. Retail banking customers (private clients) are served by the 700 cooperative banks (DZ Bank, n.d.). DG Nexolution also consolidates its Beyond Banking activities into its MeinPlus initiative, a cashback and loyalty program managed by benfido (DG Nexolution, 2024; MeinPlus, 2024). Most recently, a resolution by the BVR (Rejmanowski, 2024) focused on consolidating Beyond Banking resources within the newly established company amberra. Accordingly, Atruvia and the cooperative banks will be examined in detail to assess their activities related to BBE 3.0.

Atruvia groups its Beyond Banking activities under the “Digitale Mehrwertlösungen” [Digital value-added solutions] department (Atruvia, 2023), which focuses on additional, non-banking services. What services are provided to cooperative banks in this division?

Für den Privatkundenbereich stehen mittlerweile drei digitale Mehrwertlösungen bereit. „EinfachVermietet“ ist eine zeitsparende Lösung für private Vermieter, die neue Mieter für ihre Immobilien suchen. Der „Vertragsmanager“ enthält ein leistungsstarkes Tool zur Vertragsverwaltung und Überwachung von Kündigungsfristen. Der „CO2Check“ spricht Menschen mit hohem Umweltbewusstsein an. [Three digital value-added solutions are now available for private customers. ‘EinfachVermietet’ is a time-saving solution for private landlords seeking new tenants for their properties. The ‘Contract Manager’ contains a powerful tool for contract management and monitoring notice periods. The ‘CO2Check’ appeals to people with a high level of environmental awareness.] (para. 15)

Particularly notable is the value-added solution “EinfachVermietet” (EinfachVermietet, n.d.), which connects tenants and landlords, helping to find the ideal tenant for a rental property using filters and decision criteria. Here, individual banks, brokers, and other service providers can be linked on the supply side, while prospective tenants are connected on the demand side, which reflects a C2C approach. Due to the high number of interested parties in this ecosystem, the bank also has the opportunity to acquire potential banking customers and integrate them into its own banking ecosystem.

The fourth product will be the future integration of the MeinPlus cashback and loyalty program (Atruvia, 2024). C2C status is currently uncertain, as publicly available data does not indicate whether a potential merchant offering the program must also be a cooperative bank customer (Leipziger Volksbank, n.d.). Nonetheless, there is potential for C2C expansion.

The cooperative banks, on the other hand, have already implemented specific models based on the BBE 3.0 framework. The company VR Star (VR Star, n.d.) is proving to be a leader in this area. It was created through a partnership between Volksbank Bodensee-Oberschwaben eG and VR Bank Südliche Weinstraße-Wasgau eG and functions as a digital ecosystem for the region and beyond, connecting all regional stakeholders. In summary, this is a comprehensive platform architecture that links the appropriate provider network with cooperative bank customers for each selected cooperative bank in Germany. Additional offerings beyond banking include special regional events and the already integrated MeinPlus.

Another example is simplyLOCAL (simplyLOCAL, n.d.) with Volksbank Seesen, which serves the surrounding areas of Alfeld, Bad Gandersheim, Seesen, Bockenem, Einbeck, Langelsheim, and Leinebergland (Volksbank Seesen, n.d.). This model combines elements of the MeinPlus program and the infrastructure and network concept of VR Star, allowing customers to earn points from purchases at restaurants, shops, and other businesses in these regions and redeem them for cash.

VR-Bank Würzburg offers various networking initiatives (VR-Bank Würzburg, n.d.-a). VRisch vom Hof (VR-Bank Würzburg, n.d.-c) is a model that connects farm shops and direct marketers with bank customers who can benefit from regional and fresh produce. VR-360-Grad (VR-Bank Würzburg, n.d.-b) is a network of experts composed of proven internal and external banking specialists and consultants. The services offered include coaching, consulting, seminars, and other support. VR-PrivatAssistent (VR-Bank Würzburg, n.d.-d) is a fee-based service that assists bank customers and non-customers with a wide range of personal tasks. Individual services include creating an emergency folder, digitizing private documents, supporting real estate projects, and referring tradespeople and service providers. Even if there is no direct, technically automated platform

approach, manual referrals by a personal assistant on behalf of the bank can lead to preferential or exclusive treatment of providers already known to the bank.

In addition to the activities of cooperative banks in the direct C2C environment, amberra, as a corporate venturing studio, has made its first investment in the real estate start-up Impleco (Impleco, 2024) to support the growth and scaling of the construction and housing ecosystem. This aligns with the goal of the cooperative building society Schwäbisch Hall, which is also a shareholder in Impleco. It aims to offer a variety of value-added services throughout the entire customer journey with a stronger network mentality (Thaten, 2023). This could include, for example, referring service providers for questions about energy-efficient home renovations. Another example is its portal, wohnglück.de, where users can access various use cases, including renting and selling real estate. The underlying service platform PIA (“Personal Real Estate Assistant”) can also serve as an ecosystem solution for other cooperative partners to develop new regional ecosystems and, if needed, connect them (Impleco, n.d.).

Finally, BBSSs should not go unmentioned. Although no specific references to the use of BBSSs were identified in this case study, the newly founded company Truuco (Truuco, n.d.) in the cooperative financial group, as a start-up for data-driven sales and marketing recommenders (smart data), could lay the foundation for BBSSs, provided that BBE use cases lead to success in the future.

In summary, it is entirely reasonable to expect that cooperative banks will establish more regional ecosystems with a C2C approach to connect people within their local community. Attention should also continue to be directed toward amberra as a Beyond Banking Builder and investor in the cooperative financial group, where it remains to be seen what additional initiatives will be taken in the future following the initial investment in BBE 2.0 and 3.0.

3.3.2.8. *Market Research: International Banks*

This final chapter on current market research focuses on the international banking group's activities, use cases, and developments related to BBE 3.0. Case studies and detailed analyses will also offer in-depth insights.

3.3.2.9. *Current Observations and Examples*

In international comparison, some examples can be found that follow the BBE 3.0 models or approaches in advance. Especially the Asian market seems to be a pioneer here, providing a focus with its concrete examples.

The first example shows Singapore's DBS. "Its car marketplace provides a one-stop shop where consumers can browse available vehicles from dealers or owners, and save money on a car loan, vehicle insurance and fuel" (Alame et al., 2020, p. 10, para. 2). Continuing in the Asian market, PT Bank Rakyat Indonesia showcases several examples (PT Bank Rakyat Indonesia, 2021) of how banks can selectively dive into various platform economies. Its banking app BRImo (PT Bank Rakyat Indonesia, n.d.) combines daily banking with various beyond banking services, such as purchasing travel tickets, BRI Liga 1 tickets, and game vouchers, as well as a loyalty program in the form of a points collection and lottery system to participate in draws or exchange points for the next restaurant or online shopping. BRImo is also an LPG gas platform ordering system (PT Bank Rakyat Indonesia, 2021), and with pasar.id as a traditional market ecosystem, users can find the nearest market for their shopping needs (pasar.id, n.d.). A PwC study supplements C2C approaches in India (PwC, 2024) with solutions in areas such as education, offering a "university management solution catering to needs and requirements of students, university and teachers" (p. 47, para. 3), and in healthcare, with a "vendor management portal for hospitals to patient record management, payment gateways for patients and staff, invoicing portal for admin staff" (p. 47, para. 5).

Georgia, as an Eurasian country, has found a national pioneer in the form of TBC Bank as a digital ecosystem operator (TBC Bank, 2021). TBC Bank owns various ecosystem brands under the merged ecosystems TBC Net and is active in four areas: Housing, Lifestyle, E-Commerce, and Automobile. For example, in the Housing sector, Livo.ge is a technology-driven platform that offers its customers various traditional and innovative housing solutions, from basic property listings to air pollution indicators for specific areas. Any other bank can also list their real estate offerings for their customers through these platforms. In the E-Commerce sector, the platforms Vendoo.ge and Mymarket.ge, which are part of TBC Net, hold 62% of the total market share among comparable e-commerce platforms in Georgia. With a market share of 81%, the two automotive platforms Myauto.ge, as a car

auction platform, and Myparts.ge, as a platform for used and spare car parts, dominate the market. The Lifestyle segment includes various platforms such as Swoop.ge, a major Georgian couponing platform; TKT.ge, a leading Georgian online ticketing platform; Mytravel.ge, an enabler for travelers to rent accommodations and cars through Myauto.ge; and Saba.com.ge, a Georgian e-book platform offering users a wide selection of Georgian and translated literature. TBC Bank is making a statement here that all marketplace verticals do not have to proceed linearly, but that individual strands with use cases like Mytravel.ge and Myauto.ge can be interconnected, which precisely corresponds to a C2C ecosystem.

On the European side, early initiatives in this area can also be observed. In the housing market sector, a digital housing market ecosystem was launched in Finland in 2018 (Lyytikäinen, 2020), established by several Finnish banks and PropTech companies that “aims to bring real estate agents, banks, and builders on to one platform, to enable digital housing market. [The target is to] .. to make housing market work faster, safer, and more flexible, it is no longer location specific” (p. 27, section 4).

Another example is Raiffeisen OÖ Ventures eGen from Austria (Hell, 2022). Through their Beyond Banking ecosystem, they aim to provide people and businesses with the best solutions for all life situations and needs. A recent example is “der regionale Online-Marktplatz findeR.at, der Menschen und Unternehmen verbindet und die Region digital spürbar und erlebbar [machen soll]” [the regional online marketplace findeR.at, which connects people and companies and makes the region digitally perceptible and tangible] (Raiffeisen OÖ Ventures, n.d., para. 6).

3.3.2.10. *Case Studies*

This chapter will examine three selected case studies: Alibaba with its associated companies such as Taobao, Tencent with its WeChat super app, and on the other hand, Twint as internationally successful examples of BBE 3.0. These three international case studies are chosen because, on the one hand, they are not bound by German or European law as long as they do not handle personal data of EU citizens (Gstrein & Zwitter, 2021). Additionally, TWINT is considered the dominant ecosystem phenomenon in Switzerland with high relevance to everyday

life (Miehé & Gassmann, 2024). In Asia, it is primarily the Big Tech ecosystems Alibaba and Tencent with their super apps (Fasnacht, 2023) that have enormous reach and customer numbers and serve as flagship ecosystems with significant network effects. The activities and developments these companies demonstrate in the C2C sector are also explained, along with any targeted BBSSs, if available.

In a short period, dominant ecosystems have emerged in China based on core competencies within intelligence agencies, social media (Tencent), and e-commerce (Alibaba) (Fasnacht, 2023). The cross-industry ecosystems of Tencent and Alibaba are seen as models and focus on data as a central element of their business strategies. While Tencent initially focused on messaging services and began venturing into payments with WeChat in 2013, subsequently disrupting the healthcare industry, Alibaba continued to concentrate on e-commerce and entered the financial sector and other industries through Alipay in 2004, which is now a service of Ant Financial. Ant Financial, owned by Jack Ma, founder of the Alibaba Group, and Tencent, developer of the messaging service WeChat, now control over 90% of online payment businesses in China (Chanjaroen & Koh, 2018). Several major companies manage multiple ecosystems. For example, Alibaba (Lyytikäinen, 2020) began as a wholesale marketplace and now operates a C2C marketplace (1688.com), a third-party-seller B2C platform (Taobao), and a sales and marketing service (Juhuasuan). These large, successful firms typically start in one market and later expand or shift into others (Jacobides, 2019). Many related companies become "multihomed," participating across several ecosystems to benefit from broader client access.

Figure 14 (Fasnacht, 2023) clearly shows how extensive the Alibaba Group's presence is across various industries. The ecosystem includes the company's activities in sectors such as China Retail, Cross Border & Global Retail, O2O (Online-to-Offline) Retail, Marketing, Social Media, Technology, Finance, Logistics, and Digital Media and Entertainment. Besides the companies already mentioned, there are other companies in the C2C sector.

Figure 14. Overview of the Alibaba Ecosystem (Fasnacht, 2023)



While Taobao as a platform offers products from retailers and small businesses, T-Mall focuses on a wide range of premium products from nationally and globally well-known brands and established merchants. In 2014, Alibaba launched Idle Fish, a C2C marketplace for secondhand goods and niche products (Fasnacht, 2023; Zha et al., 2024). Other B2C ecosystems include, for example, AliExpress, through which Chinese merchants can sell their products to consumers in other countries. Additional B2C consumer services are Ele.me as a delivery platform, Koubei as a platform for restaurant and local service providers, and Fliggy as an online travel booking platform. In the health sector, AliHealth integrates as a health platform the “Verkauf von Medikamenten und medizinische Dienstleistungen wie Konsultationen, Impfungen und körperliche Untersuchungen. Die Plattformen Tmall und Alipay ermöglichen es Kunden, ihre Medikamente direkt zu bestellen und in rund 30 Städten innerhalb von 30 min geliefert zu bekommen.” [sale of medicines and medical services such as consultations, vaccinations, and physical exams. The Tmall and Alipay platforms allow customers to order their medicines directly and have them delivered in around 30 cities within 30 minutes.] (Fasnacht, 2023, p. 194, para. 1) In 2020, the Dr. Deer app was launched, offering medical content and appointment booking. Users can make minimum bookings for medical services via smartphones. Additionally,

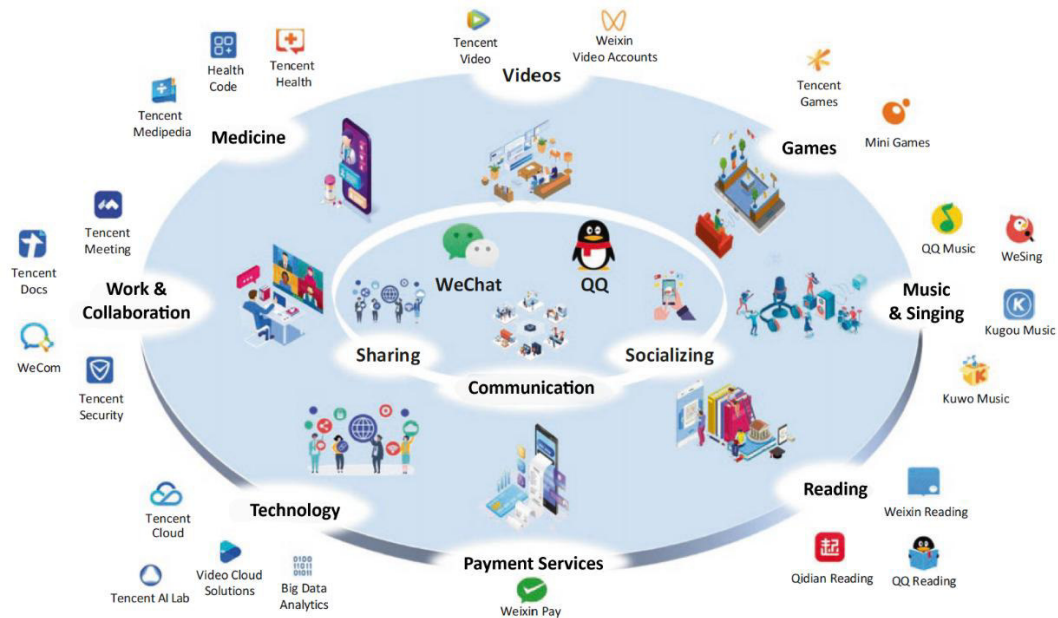
Alibaba collaborates with various e-commerce platforms such as Lazada in Southeast Asia, Daraz in Pakistan, Tokopedia in Indonesia, and Zomato in India.

Ant Group (Ant Financial), as Alibaba's financial arm, is described by Betz (2022) as "a corporation that manages a whole portfolio of products and services which are all integrated into the Alipay app" (p. 70, para. 2). Alipay has grown from simply being a payment tool to a comprehensive super app (Betz, 2021). Users now have access to various services, including food delivery and waste collection (Tudor-Ackroyd & Bray, 2020). The integration of many providers, along with the complex relationships among them and additional independent services, characterizes this super app as an ecosystem (Betz, 2021).

Another example of an ecosystem is the largest online mutual aid C2C platform (Fang et al., 2020). This platform aims to address the lack of affordable healthcare for low-wage workers (Betz, 2021). For a small monthly fee, users get a basic health plan covering 100 critical illnesses and offering up to approximately USD 46,000 in coverage during illness, with costs shared collectively by all users (Business Wire, 2019). Alipay charges an 8% insurance fee on the paid amount. Besides technology-supported risk pooling, there is potential to involve various stakeholders, such as insurance companies (Lee, 2019), and to expand beyond banking services.

In addition to Alipay, WeChat from Tencent also positions itself as a super app. Along with QQ as an instant messenger (You et al., 2015) and WeChat, Tencent initially builds an ecosystem centered on communication, sharing, and socializing (Fasnacht, 2023). Around this foundation of exchange, various products are added, covering areas such as videos, games, music and singing, reading, payment services, technology, work and collaboration, and medicine (see Figure 15).

Figure 15. WeChat-Super-App as an Integrator of the Tencent Ecosystem (Fasnacht, 2023)



Tencent is a world leader in the video game industry and in the e-sports segment in terms of revenue (Nguyen Thanh Luan & Nguyen Ba Long, 2022). According to Napitupulu (2020), another strength of Tencent, besides its highly diversified business portfolio (similar to Alibaba), is its strongly financially supported R&D department. The focus here is on the essential services that people really need and that they can provide to the market. Virtual Reality (VR) technology is the main focus of their research. Tencent believes that VR is the future of the gaming, entertainment, and technology industries because millions of people already spend parts of their daily lives in online virtual worlds today (Boellstorff, 2015).

Additionally, Tencent has entered the C2C market by investing in Paipai, similar to Alibaba (Shang, 2022). “PaiPai profitable through advertising, information top, special recommendation, special display, and other special services” (p. 30, para. 6).

Alibaba, Tencent, and leading platform providers largely share a presence in key industries: commerce (mainly e-commerce), social media, and finance (Fasnacht, 2021, 2023). These open and digital ecosystems are centered around these sectors, known as the golden triangle. Successful ecosystems today typically

start in one core industry and then grow into others. To thrive within this golden triangle, an essential approach is embracing open innovation and open data.

Another sign of success is the development of an ecosystem of ecosystems. This involves integrating into all industries relevant to users' daily lives through diverse products and services supported by a wide innovation network. The interconnectedness and network effects bolster growth, and success is evaluated on a collective basis. If the company can expand its partnerships and enhance each one's importance while preserving high flexibility and autonomy for its collaborators, then "bekommt der Gewinner in so einem System alles und die Zuschauer sind Verlierer und stehen dabei klein und unbedeutend neben dem Sieger." [in such a system, the winner gets everything and the spectators are the losers, standing small and insignificant next to the winner] (Fasnacht, 2023, p. 202, para. 2) A quote from Fasnacht sums it up: „Ein Ökosystem von Ökosystemen generiert durch diverse Verflechtungen Netzwerkeffekte, welche sich dermaßen auf den Gesamtwert auswirken, dass das System alles für sich beansprucht und so konkurrenzlos erscheint – the winner takes it all.“ [An ecosystem of ecosystems generates network effects through various interconnections, which influence the overall value to such an extent that the system claims everything for itself and appears unbeatable – the winner takes it all.] (para. 3)

A third success factor is the improvement of financial inclusion (Wang & Arner, 2024). Due to their interconnected data bases from various ecosystems, these Big Tech companies can create accurate customer profiles, design credit products for different consumption scenarios, and provide improved and simplified access to finances, especially for the unserved and underbanked segments. Alibaba and Tencent are so ubiquitous in China that even homeless people have access to the app, financial resources, and opportunities to build small wealth (Lau & Leimer, 2021).

HSBC and Standard Chartered are notable examples of banks forming BigTech partnerships, mainly generating their highest revenues from Chinese and Asia Pacific markets. HSBC collaborates with Alipay and WeChat Pay for payments, along with initiatives with Tencent in both personal and corporate finance. Standard Chartered (SC) partners with Alipay, WeChat Pay, and Huawei for payments and works with Tencent in corporate banking. It also partners with

Alibaba Group companies, especially Ant Group/AntChain, on blockchain projects, trade finance, and cross-border remittances. For example, Standard Chartered helped develop eTradeConnect, Hong Kong's first blockchain-based trade finance platform launched by OneConnect (Ping An) in October 2018, serving as a technical and regulatory supporter. Additionally, it supports the AntChain platform "Trusple," providing trade finance services for SMEs on a DLT-based platform, acting as a consulting bank and financial service provider for buyers and sellers involved in collections and settlement.

Finally, it is worth noting that a McKinsey projection suggests around twelve ecosystem clusters will account for 25% of global revenues by 2030 (Dietz et al., 2020). In essence, USD 70 trillion in revenue might be redistributed across conventional industry boundaries. Successful international imitators of super apps or super ecosystems like WeChat are already present in the market with GoTo (Indonesia), Grab (Singapore), Kakao (South Korea), PayTM (India), Rakuten (Japan), or Zalo (Vietnam) (Fastnacht, 2023).

Another ecosystem phenomenon is emerging in Switzerland with the leading mobile payment app TWINT (Miehé & Gassmann, 2024), which has 6 million active users (TWINT, n.d.-a) in a country with a population of 8.5 million. This is due to the provision of a C2C communication network "offered services such as peer-to-peer payments using a user's mobile phone number, online and in-store mobile digital payments using a QR code and simplified payments without a card reader for small and medium enterprises" (Andraszewicz et al., 2023, p. 12). Functions like C2C donations and fundraising (TWINT, n.d.-b) are already available. According to Miehé & Gassmann (2024), TWINT has expanded its ecosystem with various (Beyond Banking) services but has not focused on the end customer perspective. Instead, it relies more on the offerings of its business partners. These Beyond Banking services are approached here with a B2C strategy, including digital vouchers, super deals, subscription comparisons, and mobility services like parking and fueling (TWINT, n.d.-c).

In summary, it can be stated that TWINT already has the critical mass of users in Switzerland and serves as a dominant everyday payment companion. The infrastructure of a C2C approach based on peer-to-peer payments is also recognizable, but it seems to be limited to payments only. Beyond Banking Services

are currently less treated from an ecosystem perspective. The question here is to what extent the network effect among providers and users within the ecosystem is already taking hold, and to what extent the services are successful under the implementation and management of business partners. It is advisable in the future to consistently align offerings with customer needs and to actively network sought-after Beyond Banking Services.

3.3.3. Expert Interviews

This chapter now covers the analysis of the expert interviews. The hypotheses to be examined and the methodology have already been described in detail in Chapter 1.3.

Kruse (2015) states that the process for selecting and grouping experts was followed properly. This indicates that three key expert groups are essential to ensure thorough coverage of knowledge from different perspectives. The first group includes technical experts. The second group consists of process knowledge, often linked to informal or tacit understanding. The third group encompasses interpretative knowledge, covering ideas, ideologies, and explanatory frameworks. Using this approach, 10 experts were identified who demonstrate attributes of all three groups to provide a diverse range of insights. Based on previous research, which distinguished between German private and universal banks, regional banks, and international banks geographically, these experts will be assigned to these three groups in the second iteration. All participants interviewed are verified experts in their field, holding senior or lead roles and possessing specialized knowledge in areas such as consultancies, IT providers (including BaaS/SaaS), banks, FinTechs, and niche Beyond Banking companies.

3.3.3.1. Expert Descriptions

The following experts have been selected and will be described in more detail:

Group 1: “German private and universal banks”

Expert 1 (Senior Project Manager): Senior professional with over 5 years of banking experience, currently working at a software agency specializing in custom

software for large banking groups, combined with knowledge in AI with machine learning and data analytics. Previously served as Sales Director at two startups responsible for the sales of digital solutions, and also established crowdfunding platforms and BBE in online banking.

Expert 2 (Chapter Lead Business Connectivity): Lead professional with approximately 13 years of experience in business development within corporate banking at major banks. Experience in designing new business models, especially in the areas of APIs, ecosystems, and DLT.

Expert 3 (Founder and Managing Director of several companies in the Beyond Banking sector): Corporate generalist and entrepreneur specializing in data-driven loyalty and advertising technology. Over 24 years of experience developing digital business intelligence solutions used by millions. Expertise centers on beyond banking, contextual banking, and sustainable banking solutions.

Group 2: "Regional banks"

Expert 4 (Head of Partnering and Integration): Senior/Lead professional with over 20 years of experience in banking and various industries. Previously worked at different digital agencies focusing on e-commerce and digital transformation. His current focus is on developing new business models beyond banking, using AI and machine learning to improve customer engagement and digital touchpoints.

Expert 5 (Tribe Lead Near- and Beyond Banking): Experienced professional with an IT background and over 20 years of experience in financial services. Earlier, focused on digitalizing banks within a leading consultancy, including developing digital banking products for online banking and apps, as well as digitizing processes. In recent years, the focus has shifted to developing near- and beyond banking services.

Expert 6 (CEO of a regional digital value-added ecosystem): Experienced professional with approximately 24 years in banking, specializing in innovation, corporate development, and omnichannel strategies. Currently, the expert serves as the CEO of a regional ecosystem that provides an app, with expertise in platform economy and ecosystems.

Group 3: “International banks”

Expert 7 (Head of Product): Subject matter expert/Lead professional with approximately 12 years of banking experience in Switzerland, initially as a technical product specialist focused on defending the customer interface with a connection to open banking in (mobile) payment banking. Currently, working as a Lead Product in a FinTech company with a focus on Data Banking and Open Banking.

Expert 8 (CRO): Lead professional with over 15 years of banking experience in France and the USA. Expertise lies in scoring, statistical models, and decision engines in the areas of risk and compliance. Today, the expert works as a CRO at a consumer credit FinTech with open banking approaches.

Expert 9 (Digital Marketing Manager): Senior professional with more than 12 years of experience in various startups and agencies in growth and digital marketing (B2B and B2C campaigns) with a focus on data analytics in Turkey. Currently, the expert is responsible for performance marketing to acquire new customers, CRM with retention rates, and increasing organic traffic to activate customers via e-commerce engines such as SEO/SEA at a FinTech.

Expert 10 (Vice President of Open Banking and Ecosystem Design): Experienced professional with 13 years in banking and expertise in product development, service and product design, innovation, and Scrum methodologies. Currently, the expert oversees the strategic direction of open banking and ecosystem design within a digital innovation and design team.

3.3.3.2. Results and Discussions

The starting point of the literature guide (Appendix 1), along with the associated questions based on the following categories and subcodes, is a comprehensive review of relevant theories, models, or empirical studies related to research questions RQ1-3. This review provides the theoretical foundation (see Concept Matrix in Table No. 6, chapter 1.2.1.), from which RQ1-3 are derived. Building on these established theoretical concepts, the first nine primary categories were created to represent key aspects of the theory. Each main category includes subcategories (subcodes) that highlight more specific facets or dimensions, enabling a more detailed analysis of the material. This structured approach helps

capture complex content in a nuanced way. The deductive method thus supports a systematic, theory-driven analysis of qualitative data, enhancing both the validity and reliability of the research results. Additionally, another category called “Challenges and Risks” was added beyond the three research questions to explore these aspects and present a complete picture of the potential or negative sides of these phenomena BB 2.0 and 3.0.

Before exploring the research questions and the associated interview questions with QDA, it is necessary to review the coding system. Table 7 lists the three research questions along with their main questions, which have been grouped into categories. Subcodes are assigned to these categories to provide more detailed analysis and insights. Most subcodes were developed using a deductive approach, but during the process, additional relevant codes emerged to address the research questions, aligning with an inductive approach. It should be noted that the category “Revenue Potential Beyond Banking” was analyzed using an inductive research approach through a comprehensive review and analysis of the interview transcripts. It is also important to mention that relevant answers, which are mentioned in a different response section of another question, are included in the analysis. Due to this approach, where various text sources throughout the entire interviews are used for analysis and interpretation for this category, some other categories and subcodes are also initially (superficially) analyzed and evaluated. Therefore, the following deductively based subcodes are examined in more detail, and to avoid repetitions, only new insights are considered and added. In total, 10 categories are divided into 26 subcodes, with the first category, as previously described, following an inductive approach, and the remaining nine categories following a deductive approach.

Table 7. Coding System for Expert Interview Findings

Research Questions	Categories	Subcodes	Number of citations (frequency)	Frequency in % of 670 citations
RQ1			483	72,09%
	Revenue Potential Beyond Banking		262	39,10%
		Customer Adoption Barriers	22	2,95%
		Ecosystem Integration Limitations	28	3,76%
		Provider Impatience	9	1,21%
		Indirect Revenue Potential	70	9,40%
		Data-driven Sales Opportunities	49	6,58%
		Diversified Beyond-Banking Services	72	9,66%
		Assessment	12	1,61%
	Developments Beyond Banking 2.0		130	19,40%
		Observations	13	1,74%
		Added values for customers and banks	70	9,40%
		Co-operations and offers	47	6,31%
	Experiences Beyond Banking 3.0		39	5,82%
		Yes/No	11	1,48%
		C2C-matching	12	1,61%
		B2C-matching	16	2,15%
	Acceptance and organisational effects		52	7,76%
RQ2			92	13,73%
	Business Models		42	6,27%
		Hypothesis evaluation	11	1,48%
		Use/Business Cases 2.0	18	2,42%
		Use/Business Cases 3.0	13	1,74%
	Possibilities of Dimensionalisation and Scaling		21	3,13%
		Decision-makers	8	
	Beyond Banking Sales Signals		29	4,33%
		Yes/No	13	1,74%
		If yes, utilising potential and determining	6	0,81%
		Establishment and use	10	1,34%
RQ3			34	5,07%
	Guideline/Concept/Framework for creation of BBE		15	2,24%
		Yes/No	12	1,61%
		Concepts and frameworks	3	0,40%
	Key influencing factors and Criteria		19	2,84%
	Challenges and Risks		61	9,10%
		Challenges for BB 2.0 and 3.0	13	1,74%
		Legal risks	17	2,28%
		IT risks	18	2,42%
		Other risks	13	1,74%

3.3.3.3. *Investigation of the Research Questions*

The interview questions related to the research questions are addressed by analyzing coded segments within the categories and summarizing the key statements derived from them. The overall evaluation is conducted in two steps: first, a single-expert analysis where each expert's central statements or summaries for each category are documented. Second, a role-based expert analysis using cross-tabulation involves assigning experts to three groups—"German private and universal banks," "Regional banks," and "International banks"—and comparing their statements across these groupings.

3.3.3.4. *Single-based Expert Analysis*

Due to the openly posed question regarding the revenue potential of Beyond Banking, the experts provided numerous and nuanced statements that should be identified and analyzed. These nuanced statements can be grouped into seven inductively formed subcodes (sc.): "Customer Adoption Barriers," "Ecosystem Integration Limitations," "Provider Impatience," "Indirect Revenue Potential," "Data-driven Sales Opportunities," "Diversified Beyond-Banking Services," and "Assessment." Table 8 initially summarizes the first subcodes: "Customer Adoption Barriers," "Ecosystem Integration Limitations," and "Provider Impatience." Table 9 summarizes the subcodes "Indirect Revenue Potential," "Data-driven Sales Opportunities," "Diversified Beyond-Banking Services," and "Assessment."

Table 7. Expert Feedback on the Category “Revenue Potential Beyond Banking” (subcodes 1-3)

	Expert	Categories Subcodes	Revenue Potential Beyond Banking		
			Customer Adoption Barriers	Ecosystem Integration Limitations	Provider Impatience
German private and universal banks	Expert 1 (SPM)	No high acceptance rate for digital banking (60-63% use online banking); inhibitions exist, overly invasive or intrusive offers from providers scare off German customers (e.g., Starbucks logo on transaction with redirection to Starbucks homepage)		Banking remains isolated in Germany, with online banking used primarily for shopping and other apps. Strict regulations, limited knowledge among decision-makers, and a lack of technical integration expertise hinder development. There's also a general lack of knowledge, relevance, and willingness to invest. Customer surveys are needed.	Banks are not patient enough to really understand ecosystems, to be willing to invest first and to have patience until measurable returns and developments are achieved. There is a lack of knowledge and foresight on how such models can be implemented and established.
	Expert 2 (CLBC)			Many attempts to build ecosystems, but unsuccessful. Term burned in the company.	
	Expert 3 (F+MD)	Customers do not find generic offers attractive and look elsewhere for information; tunnel vision trained in customers over decades means they associate banks only with banking products. Active opt-ins are further hurdles, convincing individual customers requires enormous communication effort; training of employees for widespread use		Poor customer penetration; market participants such as end customers and partners are willing, but the bank is a bottleneck and a slowing factor because there is little knowledge in BB. Lack of understanding and internal skills (e.g., targeting customers, personalization).	
Regional banks	Expert 4 (HPI)	Banks focus primarily on their core business, compounded by a shortage of skilled workers and the need to digitize products. Questions about which BB services help and how they should be channeled to customers.		Decentralization of regional banks makes persuasion and implementation more difficult. Customization is necessary, which makes scaling difficult; regulations are a hindrance. Sales signals for core products must first be successful before BBSS can be addressed. Learning is necessary.	No time or capacity due to core business and regulations. Decision-makers see long-term indirect revenues but face an agency problem since bank decision-makers stay about 4-5 years. Why bother when core business runs smoothly? Innovator's dilemma: ignoring it risks being left behind by competitors.
	Expert 5 (TLNBB)	Customers associate banks with banking services, not BB. Customer benefits are not sufficiently addressed and customers do not want branded products.		Skills not available, reliant on external experts. Banks do not see the need, think too much in monetary terms. Skills gaps in digital solutions in the direction of holistic consulting. Too short-sighted, potential is not recognized. Securing business in times of crisis.	
	Expert 6 (CEO)	Banks are reluctant to take an active role. Banks have not recognized the need to develop new business models. Arrogance and unwillingness to learn. Little knowledge available on how BB can be offered.		Banks always need to know the price tag when marketplaces are built. Banks should understand that the focus is on providing benefits or developing special services, not monetary gains.	BB services generate too little revenue compared to the core business. The learning effect and experience that can be gained from customer data is overlooked.
International banks	Expert 7 (HP)			Platform economy and network thinking are not very prevalent, but steps are being taken in this direction. Asia is much further ahead. Startups are showing how the next super app can be built. Agreement on a standardized interface is challenging.	Customer adaptation to BB products requires time—it's evolution, not revolution. Banks fear wrong recommendations and will accept only with high hit rates, but they are still doing well. Marketing and initial costs are needed before revenues, making the hurdle and time too great.
	Expert 8 (CRO)				
	Expert 9 (DMM)				
	Expert 10 (VPOP)	Data use is limited due to opt-in behavior on the part of customers and regulations. Banks scare customers with data use and can squander their trust bonus. Customers are not yet aware that they can find additional services at their bank.		Reluctance to share data due to regulations and protection, only using customer-approved data. In-house models are used but not shared. Only incoming data is aggregated. Sometimes, waiting for regulators to expand data use. Legal team has limited knowledge of BB and infrastructure. Data pseudonymization is needed to share with TPPs. Lack of business models and skilled staff.	

Regarding the Customer Adoption Barriers (subcode 1), it can be summarized that their online banking adoption in Germany is relatively low, with only 60-63% usage, partly due to a cultural tendency to avoid openly discussing financial matters. This is also evidenced by the fact that overly invasive offers (e.g., logo branding at the transaction level) deter German customers and make them feel harassed (table no. 8, exp. 1, sc. 1). Other hurdles for customers include the delivery of generic, non-exclusive offers, which does not help and encourages customers to seek information from other providers (table no. 8, exp. 3). Experts agree that customers have never associated beyond banking services with banks, and decades of tunnel vision on core banking services have caused customers not to associate this new type of service with banks (table no. 8, exp. 3, 5, and 10). Additionally, experts 5 and 6 reflect that the customer benefit for BB and the related need are not recognized on the bank's side for developing new business models. Customer benefit is crucial, not branded products. Lastly, on one hand, the hesitant activation of customer opt-ins and regulatory hurdles hinder customers, while on the other hand, banks scare customers with their data usage, risking their trust advantage. The conviction of individual customers requires enormous communication efforts with customers and training efforts with employees (table no. 8, exp. 3 and 10).

Under the subcode Ecosystem Integration Limitations (sc. 2), a unified picture is presented regarding the lack of knowledge on the bank's side, especially among decision-makers, about Beyond Banking. In Germany, banking services remain isolated and siloed, unlike the integrated ecosystems in Asia. This fragmentation results in a lack of cross-functionality and impulse purchase opportunities within the banking experience.

Evidence of the lack of knowledge about BB is shown by experts 1, 3, 4, 5, 7, and 10 (table no. 8, sc. 2) and can be listed as missing knowledge in the creation of theories and concepts, such as market-oriented products and BBE development, missing technical integration knowledge from partners, lack of relevance and willingness to invest, as well as a missing necessary empirical preparation like customer surveys before project start (expert 1). As a result, the bank is the bottleneck and a hindering factor in such projects due to understanding gaps and missing internal skills, such as targeting customers and personalizing offers (expert 3). These skills then need to be purchased from external experts. However, a

cultural shift in banking must take place, as banks still think too monetarily in direct business cases and feel the need to attach price tags. Since BB primarily relies on indirect revenue models (see sc. 4), it is understandable that these cannot always be directly linked to monetary values (exp. 5 and 6, sc. 2). Providing benefits or developing special services is the focus, rather than monetary services (expert 6). Due to dependencies on decisions by regulatory authorities and also the lack of knowledge, for example, in the legal department, BB projects are delayed or not implemented (expert 10). An argument against the lack of knowledge must not overlook the fact that the topic of BB, according to the understanding of open banking, has only existed for about more than a decade (Chapter 2.1.). However, a look at Asia shows that they have internalized the idea of platforms and networks. Asians use entire ecosystems for applications of all kinds, e.g., for shopping, where impulse purchases often occur, in contrast to German users, who use online banking solely for banking (exp. 1 and 7). Thus, banking in Germany remains a very isolating topic (expert 1), and in Switzerland, reaching an agreement on standardized interfaces is challenging (expert 7).

The Provider Impatience (sc. 3) illustrates the consequences of the conclusions from the previous subcodes. Banks are often unwilling to wait for ecosystem-based business models to develop and generate sustainable revenues. Additionally, customers require time to adapt to new services beyond traditional banking. Additionally, this impatience is evidenced by the banks' lack of foresight regarding how such models are developed, implemented, and established. Furthermore, there is a lack of recognition for the upfront investment and necessary marketing activities that require time to amortize costs and achieve measurable profitability (experts 1 and 7). Expert 4 points out that there is no time or capacity available due to a focus on core business and regulatory requirements. Additionally, the expert mentions two dilemmas. The agency problem highlights that decision-makers at the executive level are typically in office for an average of 4 to 5 years, which is inconsistent with a comprehensive and long-term strategic orientation of BB. The focus on BB is questioned as long as the core business is functioning. The other dilemma illustrates the innovator's dilemma, which suggests that the company will eventually be left behind by competitors if it does not continue to pursue and take BB seriously. Expert 6 notes that BB services generate too little revenue compared to the core business. It is also forgotten what

learning effects and insights can be gained from customer data. However, this statement should be critically examined, as international bank examples like TBC and DBS, with dominant market shares, profit from the BBE approach even when other parameters and conditions differ. Finally, expert 7 states that customer-side adaptation to BB takes time and should be understood as an evolution rather than a revolution. On the bank side, there is a fear of providing incorrect product recommendations. Acceptance increases if these recommendations are accurate and thus reliable.

It can be concluded regarding the Indirect Revenue Potential (sc. 4, table no. 9) that banks can provide value-added services to attract and retain clients, creating opportunities for cross-selling and up-selling. Open banking and banking-as-a-service models can expand direct customer interactions, making indirect revenue sources more crucial for differentiation. Evidence supporting value-added services combined with enabling cross-selling and up-selling opportunities confirms experts 1, 4, 5, 7, 9, and 10 (sc. 4) to increase customer engagement. Another indication of increasing indirect revenue potential is the (automated) personalization of (BB) offers and targeted customer communication, which also facilitates forwarding to the bank's core business; in other words, the supplementary offer can serve as a lure to transition to the main business and thus boost it (experts 3, 4, 5, 7, 8, 9, 10). Additionally, the experts agree that the following indirect factors—such as increased customer retention, customer loyalty, customer activity, customer touchpoints, network effects, conversion rate, building new customer relationships, improving the customer experience, product retention, customer satisfaction, and differentiation through tailored (BB) offers—are success-enhancing. Furthermore, some expert feedback points to an expanded view of indirect revenues. These include, on the one hand, selecting the right partner who can enhance a positive image transfer (expert 1), as well as increasing interchange revenues through higher customer usage of bank products (expert 3), and creating new products and adapting the current product portfolio to changing customer needs (expert 10). Expert 6 from the group of regional banks mentions the specific situation in regions where information is often not yet digitally structured. The task here is to make this data available and accessible at a central location. This allows regional offerings and demand to be linked, enabling new insights from network effects and creating access to new customers.

Table 8. Expert Feedback on the Category “Revenue Potential Beyond Banking” (subcodes 4-7)

	Categories	Subcodes	Revenue Potential Beyond Banking			
			Indirect Revenue Potential	Data-driven Sales Opportunities	Diversified Beyond-Banking Services	Assessment
Expert						
German private and universal banks		Additional revenue through cooperation. Choosing the right partner can emphasize positive image transfer.	Based on transaction data and cash flow analysis (e.g., Starbucks voucher for morning coffee purchase in the shop).	Additional offers include partner integration in mobile banking, enabling customers to access favorite activities and partners from a central location with short distances. This includes a crowdfunding platform, the lifestyle app TEO, and the Beyond Banking Ecosystem for multibanking.		Rather low
	Expert 1 (SPM)					
	Expert 2 (CLBC)		Integrating various sales signals into CRM for different everyday use cases	The bank is an expert in cybersecurity and can sell this as a consulting service. Sale of customer data/API cases such as account movements to electricity providers for optimization of their offers; comparison platforms such as Check24		high
		Enhance loyalty and retention through added value; boost customer activity and appeal of daily needs post opt-in. Building profiles enables personalized offers and taps into partner commissions, transferring BB sales impulses to core business. Extend relationships for higher interchange revenues as customers use banking products more often.	Develop exciting sales use cases from empirical trials to keep banks competitive long-term. Enrich transaction data with demographics, then analyze to create profiles based on purchasing behavior and preferences. Use these profiles to offer targeted sales or shopping benefits.	A platform is being developed that connects only business customers with each other. Cooperation with e-commerce partners and insurance companies, travel providers, and brokerage via a banking platform. Focus on high-commission business such as the brokerage of telecommunications services.		very high
	Expert 3 (F+MD)					
		Establish and secure customer relationships, build new customer relationships, create relevance. Differentiation from the competition. Fueling the core business through BB Services. Offering customers relevant added value in their specific situation that goes beyond the actual core business. Cross-selling and upselling potential	There are no limits to the imagination. The basis is payment transaction analysis. Tracking customer behavior: who buys where, when, and how often. Is a child expected? A good example is Amazon. First, focus on sales impulses in core banking, learnings for BB sales signals.	Integration of tradesmen services in B2B sector includes Haspa's added value program, offering non-banking services such as bundled products like key insurance. It features a platform focused on aging independently at home amid demographic changes, providing secretarial services like document analysis for inheritances and powers of attorney. The emphasis is on specific BB services, avoiding multiple use cases simultaneously.		Differentiated view: monetary revenues questionable, but indirect revenues have potential.
Regional banks	Expert 4 (HPI)	Collect customer data to understand and foster loyalty. Use personalization for targeted approaches, boosting sales. Generate insights with BB Services to transition to core business. Recognize the data's potential. Explore cross-selling and upselling opportunities.	Analysis of data streams and account movements. Reasoning for a rejection or restriction of the contract can also lead to follow-up decisions. Address relevant issues that the customer was not yet aware of.	The contract manager recommends cheaper contracts for electricity, telecom, DSL, gas, etc., passing suggestions to customers via Wechselpilot. Digital household budget book; CO2Check shows CO2 footprint from transactions; property tax app assists with tax returns.		Potential exists
	Expert 5 (TLNBB)					
	Expert 6 (CEO)	Make this information, which is often not yet digitally structured in the region, available and findable in one place, thereby providing a good overview. Access to new customers. Identify sales impulses at an early stage.	Identify account transactions and generate impulses. Detect customer needs, click behavior, interests, and estimate purchase likelihoods. Ecosystem participants must actively create content to trigger network effects.	Cooperation with student associations that offer household-related services; support for local associations through offer placement, cooperation with news providers for regional and national news; comparison portals; consistent vision through to the end (e.g., real estate purchase, real estate agent, notary, moving company, car supplies, tradespeople).		High, but the potential for loss is even more important to counteract
		Access new customers with free value-added services like Finance Manager to boost loyalty, differentiation, and experience. Enables cross-selling, upselling, personalized financial literacy, targeted offers, rewards, and loyalty tracking, increasing conversion rates.	Deliver personalized insights based on individual needs. Reward shopping behavior with rewards. Develop patterns based on transactions and distribution analysis, but personalized offers must be accurate	Travel and mobile providers and other e-commerce services; app deals and vouchers; TWINT as an ecosystem example in Switzerland		Differentiated view. It depends on the case. Indirect revenue potential exists.
	Expert 7 (HP)					
		Fully digital, fully automated, user-friendly processes (self-care) save time and manual effort. Personalized offers and targeted marketing campaigns	Based on personal and transaction data, including other bank accounts, a scoring model using statistical methods and decision trees. External providers handle transaction categorization; prediction analytics are used for targeted marketing in multimedia, restaurants, etc.	All customer habits such as multimedia, restaurants, etc. are possible		
International banks	Expert 8 (CRO)					
		Understand customer needs and provide automated, personalized, data-driven offers. Cross-selling, increase product retention and customer experience	Create a super app for daily topics, using phone memory. Implement a loyalty program with cashbacks via different card types (e.g., luxury apps) and expand persona types. Boost retention to counter high churn rate.	Special offers for Turkish soccer fans for market shopping. Expand cashback brands and hotels worldwide. Treat specific customer groups such as Generation Z with savings plans on commodity markets and cryptos.		very high
	Expert 9 (DMM)					
		Boost customer engagement, retention, and cross-selling by offering tailored services aligned with life events. More services provide additional touch points, increased app use, and higher satisfaction. Understanding customers helps tailor products and direct them to core services, maintaining competitive advantage. Contextual banking uses customer data to expand product lines, like from loans to sales.	Partner with third parties and governments to offer value-added services by understanding customer needs and leveraging data. Develop AI-driven financial insights, personal finance tools, loyalty programs, and a super app covering daily topics. Implement loyalty cashbacks via various card types and expand persona profiles. Improve retention by providing valuable reminders and insights, reducing high churn rates and enhancing platform usefulness.	Using the e-government system to buy tickets, plan trips, get visas, buy bus tickets, check penalties, pay taxes, and access services like eSIM and car services on one platform. The marketplace also includes verticals like car management, home, travel, health, and transportation, such as parking and charging station maps.		Potential
	Expert 10 (VPOP)					

Banks possess valuable customer data that can be used to create effective sales use cases, as shown in Data-driven Sales Opportunities (sc. 5, table no. 9). Empirical evidence indicates significant revenue potential from data-driven sales efforts. The following process outlines the data and approaches used to generate these sales use cases. Experts agree that the data mainly comes from transaction records, followed by payment flow analysis (sc. 5). This data is then enriched with personal and demographic information and analyzed to create profiles and categories based on purchasing behavior and customer preferences (expert 8). Additional offers or shopping benefits can then be added to the CRM for sales or directly sent to customers automatically, based on data (expert 3). Next, reasons for rejection or restrictions are used to determine follow-up decisions for the recommender system (expert 5), and insights are applied to adjust or expand persona types (expert 9). If no leads are converted, reminders can be sent again to customers (experts 9 and 10).

In addition to the presented process for data-driven sales signals, the experts provide further recommendations and notes that should be taken into consideration. Expert 3 emphasizes that initial empirical trials are necessary to ensure sustainable competitive advantage. This is also confirmed by expert 4, who states that the focus should initially be on sales signals related to the core business in order to transfer the insights and learnings to beyond banking sales signals. Expert 5, in turn, says that especially relevant topics should be addressed to the customer—topics the customer was not previously aware of—to increase customer value. Furthermore, in an expanded view of an ecosystem, it is crucial that participants actively create content themselves to trigger network effects and increase overall utility (expert 6). To ensure that customers use the platform regularly and return, there must be sufficient value-added reminders and insights constantly available and addressed (expert 10). Certain activities and transactions by customers that increase the value of the ecosystem can be rewarded with incentives. However, the prerequisite is that the personalized offers align with customer benefits and are accurate (expert 7). This is especially important because the customer churn rate is very high (experts 9 and 10).

Experts list diversified beyond-banking services (sc. 6). Generating additional revenue streams is possible by monetizing customer data in a way that

preserves privacy and supports non-banking use cases. This mainly involves creating a Beyond Banking Ecosystem, which combines a wide range of offerings in areas such as favorite activities, preferred partners, lifestyle (expert 1), comparison platforms like Check24 (expert 2) and Wechselpilot for electricity, internet, gas, etc. (expert 5), e-commerce, travel providers, telecommunications brokerage, and eSIM orders due to high potential for earning commissions (experts 3 and 10), app deals and coupons (expert 7), multimedia, restaurant visits (expert 8), special offers for football fans (expert 9), travel and ticket purchases, as well as document management and requests like visas through integration with the e-government system, health, home services, and transportation such as car services (expert 10). Other approaches are also listed. For example, expert 1 suggests establishing a crowdfunding platform or integrating multi-banking into a BBE to get a more complete customer view and consider additional account types and payment flows. Expert 2 further explains that banks can leverage their expertise in areas like cybersecurity to offer new services beyond traditional banking. Additionally, data imports for internal analysis and offers, and data exports through APIs to partners such as electricity providers, are possible, where customer data is enriched and used for their purposes. Expert 3 talks about a platform currently being developed to connect business customers. This initially suggests a B2B model. But if the orchestrator is a bank, it could also be a C2C approach if both parties are customers of the bank. Expert 4 describes a similar model that involves integrating craftsman services in a B2B context. There is also mention of a platform aimed at helping people age happily and independently at home, considering demographic changes. This aligns with household-related services like secretarial services with document analysis for inheritances, powers of attorney, and everyday correspondence. Additionally, a successful value-added program by Hamburg Savings Bank is mentioned, where various non-banking services are integrated, such as key insurance in a product bundle.

Expert 5 introduces a digital household book and a CO2Check, which calculates the carbon footprint based on account transactions, in addition to the contract manager for mediating cheaper contracts and a basic tax app for handling property tax declarations. Expert 6 leads various ecosystem streams, including cooperation with a student association that offers household services, supporting local clubs through service placements, and partnerships with news providers for

regional and national news. Other examples listed include TWINT as a prominent ecosystem example in Switzerland (expert 7), the expansion of cashback brands worldwide (experts 9 and 10), and addressing specific customer groups with savings plans on commodity markets and cryptocurrencies for Generation Z (expert 9).

The following recommendations and thoughts from experts should be considered. Expert 4 explains that the initial focus should be on specific BB services and not on implementing many use cases simultaneously. Lastly, experts 6 and 10 emphasize that a consistent vision should be maintained until the end of a revenue stream (e.g., real estate purchase, real estate agent, notary, moving company, auto parts, craftsmen), and various verticals that are applicable to customers' lives are planned in a marketplace, such as car management (e.g., car services like parking, maps of charging stations).

In summary, under the subcode Assessment (sc. 7), it can be concluded that most experts see a (high) potential in BB. This means that four experts rate the potential as high to very high (experts 2, 3, 6, and 9). Two experts (no. 5 and 10) consider the potential to be present. Two experts (no. 4 and 7) have a more nuanced view, suggesting that the monetary return is questionable or depends on the use case, but the potential for indirect returns exists. One expert (no. 1) rated the potential as rather low, and another expert (no. 8) was unable to provide an assessment.

In the following section, the next questions related to RQ1 are continued with deductive analysis. For this purpose, three categories can be identified: "Developments Beyond Banking 2.0" with the subcodes "Observations," "Added values for customers and banks," and "Co-operations and offers" (Table 10); "Experiences Beyond Banking 3.0" with the subcodes "Yes/No," "C2C matching via BB 3.0," and "C2C matching via BB 2.0"; and "Acceptance and organizational effects" (Table 11). These categories are based on the theoretical foundation from the literature review (see Concept Matrix Table No. 6), primarily derived from RQ1. The same approach will be applied to the next sections for RQ2 and RQ3.

Table 9. Expert Feedback on the Category “Developments Beyond Banking 2.0”

	Expert	Categories Subcodes	Developments Beyond Banking 2.0		
			Observations	Added values for customers and banks	Cooperations and offers
German private and universal banks	Expert 1 (SPM)		Already partially functional, initial steps toward cooperation with non-banks; banks have recognized that other players are better equipped to develop these services	Banks focus on their core business; external experts should take over non-core areas; additional revenue; good reputation and branding with well-known partners.	Deutsche Bank with Friendsurance, a platform for offering customers additional insurance services. N26 and Allianz. Comeco with partner programs such as Verivox.
	Expert 2 (CLBC)		There is significant interest and growth in API cases and open banking. Customers already connect directly through third-party partners. For example, software providers refer wealthy clients like family offices for portfolio prep and visuals.	Banks are then visible where the customer is; offer the best possible service, retain customers, and generate business. Multibanking for customers	Forest management providers, comparison platforms such as Check24 and Smava
	Expert 3 (F+MD)		First attempts in the last 10 years with additional offers in the hope of inspiring customers. However, success was modest, both in monetary terms and in terms of customer loyalty. It was a must-have that everyone had.	Added value for customer consumption, such as shopping benefits or discounted admission fees; discounted financial and partner products. Appreciation and penetration among customers	Cashback offers with participating retailers. Everyday discounts, goodies such as tickets, reduced admission prices. Sometimes also discounted financial products, insurance
Regional banks	Expert 4 (HPI)		It requires very specific use cases tailored to specific customer groups that are extremely relevant in terms of profitability. Potential lies in the corporate customer segment due to relevance and volume sizes.	Address customer problems, customer-centric thinking with customer journeys; shortcut with cooperation from a long-established start-up that has identified the customer problem and thus exists longer thanks to product market fit.	Little to no meaningful (Germany-wide) collaborations and offers. The distribution problem is fundamental. The topic of bringing together everyday helpers from the region with people from the region can be advantageous.
	Expert 5 (TLNBB)		There is a variety of offerings and pressure to consolidate. Hygiene factors, like certain products, must be offered. Banks hope for differentiation. Their approaches vary from followers to digital-first. Willingness to change is vital for products for younger customers. The trend is shifting toward super apps.	Generally, customers get free additional services, tailored advertising, and better advice as they want to feel understood. The bank gains valuable data, fostering loyalty and follow-up business.	Wechselpilot for cheaper contract changes, Fino with property tax app. Raisin as an intermediary for interest-bearing investments, CO2Check with CO2 footprint calculation
	Expert 6 (CEO)		The topic is embedded finance. Demand does not reach the bank, but happens before that. Strong competition when comparing digital products.	Regional offers: what is happening in my area and when? Securing the customer interface and visibility potential.	Chicken-and-egg problem, weighing options and trying things out. The focus is on supporting associations with software and collaborating with news providers for regional and national news. Provides association events and network services like VR Meine Reise, digital care advisor, and MeinPlus, though much is confusing. Clear focus is crucial.
International banks	Expert 7 (HP)		Development of targeted customer approaches and personalized insights for individual needs. Offering rewards based on purchasing behavior. Moving towards a connected world with platform economies and ecosystems involving more players.	Better services and advice. Increasing financial literacy is still emerging in Europe but is vital in Africa. More holistic service can boost customer acquisition, retention, and new revenue streams. Switzerland has potential for monetizing data long-term, though still a distant goal.	Swiss Cantonal Bank has a reward program with vouchers for shops. Revolut has many BB services
	Expert 8 (CRO)			A powerful tool for structuring and categorizing data for subsequent personalization is important.	Cooperation with several external providers who supply customer data.
	Expert 9 (DMM)		The development is still there. Understanding customers even better and creating specific customer groups, but also expanding cashback brands and hotels.	Various unique loyalty cashback programs such as luxury or soccer account cards for different target groups, i.e., individualization for customers; simple and understandable interfaces.	Financial SuperApp allows bill payments for electricity, water, cell phone, and internet through collaborations with various telecom providers. It also offers scooter and influenza insurance, plus discounts on soccer team deals.
	Expert 10 (VPOP)		In Turkey, we are developing a BBE with better structuring. Banks are opening to data sharing but are limited by regulation. It will take time for customers to adopt these services.	Use banks' trust bonus to share customer data with partners. Offering tailored financial products and BB services within a customer-focused ecosystem boosts loyalty. Data collection helps understand customers' preferences, needs, and expand product options.	Partnerships with many (beyond) financial technology firms using their innovative services within this ecosystem; e-government services

Regarding the observations of developments in Beyond Banking 2.0 (cat. 2), the experts provide a mixed picture. While experts 1 and 3 state (table no. 10, sc. 1) that initial steps in collaborating with non-banks have been taken over the past 10 years, but the success has been modest and these products are declared must-haves, expert 5 argues with consolidation pressure and an expected differentiation through offerings, expert 6 points to intense competition when comparing digital products, and expert 4 highlights development in the corporate client sector due to high relevance and volume sizes. Experts 4, 7, and 9 emphasize the success of top use cases tailored to specific customer groups, which are extremely relevant in terms of profitability, as well as developments toward more targeted customer engagement, personalized insights tailored to individual needs, and a more interconnected world like platform economy and ecosystems with more players, such as the trend of super apps (expert 5). Expert 5 describes various facets of the development of BB 2.0. There are various banks, ranging from those that follow traditional banking services to digital-first approaches. Additionally, a willingness to change products for younger customers is crucial. Expert 6 also highlights the topic of embedded finance, indicating that the high demand does not reach the bank but is already being served by digital champions beforehand. Expert 10 refers to their bank, which is undergoing a development process. They have just begun serving this area and are initially facing structural challenges. The development process takes time, both for customers to utilize their BB services and because banks are hindered by regulations when opening up data sharing.

Added values for banks include: increased revenue, enhanced reputation and branding with well-known partners (exp. 1, sc. 2), acquiring new customers and generating additional business (expert 2), customer penetration (expert 3), creating a positive experience that fosters customer loyalty and leads to follow-up business (expert 5), securing the customer interface and visibility potential (expert 6), offering improved services and consulting (expert 7), providing tailored financial products and BB services within a customer experience ecosystem. This ecosystem boosts customer loyalty and helps build the banks' trust bonus, facilitating customer data sharing with partners (expert 10). Additionally, expert 4 states that product-market fit can be achieved when banks collaborate with startups that have already found this fit—identifying customer problems and thus maintaining a longer presence in the market with suitable solutions.

Added value for customers can be listed as follows: the best possible, holistic service; multibanking (expert 2); added benefits such as shopping advantages or discounted admission fees; discounted financial and partner products; appreciation (expert 3); free additional services; relevant, tailored advertising (expert 5); regional offers (expert 6); increased financial literacy (expert 7); various unique loyalty cashback programs; customization and personalization (experts 8 and 9); thus, customers feel better understood with their inclinations and needs (expert 10).

The cooperations and offers in the BB 2.0 (sc. 3) area can be divided by the experts into Near and Beyond Banking initiatives. Near-banking services include Deutsche Bank's partnership with Friendsurance, a platform that offers customers additional insurance services, and the collaboration between N26 and Allianz for insurance (expert 1). Other example offerings are the GrundsteuerApp from Fino, Raisin as an intermediary for interest investments, and a CO2Check for calculating the carbon footprint (expert 5). Additionally, expert 9 mentions a financial SuperApp through which bills such as electricity, water, mobile, and internet can be paid. This also includes collaborations with various telecommunications providers. Specific insurances, such as scooter insurance and flu insurance, complete the portfolio.

In the Beyond Banking sector, several experts mention loyalty programs connected to various regional and national retailers, offering customers shopping benefits in the form of discounts, vouchers, and cashbacks (including the MeinPlus program) (experts 1, 3, 6, 7, 9, and 10). Additionally, there is discussion about integration with comparison portals such as Verivox, Check24, Smava (experts 1 and 2), and Wechselpilot (expert 5). Lastly, various initiatives can also be highlighted, such as forest management providers (expert 2), bringing together regional everyday helpers (expert 4), digital care advisors (expert 6), Revolut as a mentioned flagship example of Beyond Banking (expert 7), soccer team deals (expert 9), and e-government services (expert 10).

Table 10. Expert Feedback on the Categories “Exp. BB 3.0” and “Acceptance and organizational effects”

	Categories		Experiences Beyond Banking 3.0		Acceptance and organizational effects
	Subcodes	Expert	Yes/No	C2C matching	B2C matching
German private and universal banks		Expert 1 (SPM)	Yes, establishment of crowdfunding platform		Matchmaking via transaction analysis. Derivation of purchasing behavior and recommendation of discounts and vouchers.
		Expert 2 (CLBC)	No		Not available. The customer approaches the provider. The bank does not market.
		Expert 3 (F+MD)	Yes, development of platforms based on B2C and B2B models	Own BBaaS connects to the banking ecosystem via data center or interfaces. A customer profile is created from personal and demographic data, then matched with transaction data based on purchasing behavior and preferences.	
Regional banks		Expert 4 (HPI)	There are many challenges. First, establish a relevant offering and distribution. Target high-demand industries like nursing care and trades. Marketplace logic may cause conflicts among providers, such as competition.	Use data analytics to determine which corporate customers exist, which are relevant, and which can be approached. Control via volume structures using Excel.	
		Expert 5 (TLNBB)	No		Payment flow analysis, recognizing recurring payments and patterns can reveal contractual obligations. It includes comparing contract and transaction data, analyzing transaction keywords, and creating customer subsets for targeted approaches with a reasoning process.
		Expert 6 (CEO)	Yes, and in implementation, which collaborations with commercial customers and opening up the user structure	No models available yet. Providers simply place their services on the marketplace. Customers decide whether the offer is relevant to them.	Recognition of account turnover data. Recognition of customer needs, click behavior, and interests is desirable.
International banks		Expert 7 (HP)	No, concepts for marketplaces and matching are known.	Develops service patterns from transaction data, derives recommendations, and tracks customers receiving, viewing, and redeeming discounts.	Develops service patterns from transaction data, derives recommendations, and tracks customers receiving, viewing, and redeeming discounts.
		Expert 8 (CRO)	No		A scoring model uses machine learning to categorize transaction data and derive decisions when high probability is reached.
		Expert 9 (DMM)	No		After collecting data, use tools like Amplitude to gather more information, track users' app usage, and create funnels. Analyze social media activities like TikTok. Perform segmentation, develop personas for CRM, and expand them with lifestyle data.
		Expert 10 (VPOP)	No, not yet. Ecosystem is being built up step by step.		Use in-house analytical models and financial technology companies' algorithms to generate insights from financial transactions. Expand databases with open banking and include credit card transactions to increase data.

In the next section (table no. 11, cat. 3), it will be explored to what extent experts have experience with BB 3.0 and which customer matching methodologies are used with Data Analytics (DA) and Machine Learning (ML). If no statements can be made about methodologies at level 3.0, then it will be questioned whether methodologies can be listed for level 2.0 with the B2C model.

Initially, 7 out of 10 experts (sc. 1) state that they have no experience with BB 3.0 and are unfamiliar with this concept. Expert 1 is familiar with the construct and has linked it to the creation of a crowdfunding platform, which is essentially a near banking platform. Experts 3 and 6 also understand the model and develop platforms in various forms such as B2B, B2C, and C2C approaches. Expert 4 critically argues that this type of ecosystem faces many challenges. These include the difficulties of developing relevant offerings and establishing them through traditional sales channels, as well as the risk that algorithm-driven marketplace logic could cause conflicts among participating providers by favoring certain matching decisions, which might spark a competitive dynamic. The question then becomes how much of this should be purposely controlled.

Few experts can make statements about the various methodologies of C2C data matching via BB 3.0 (sc. 2). It is noticeable that the methodologies and models can also be transferred and applied to those of BB 2.0. The approach of the three experts (3, 4, and 7) can be summarized as follows: the Data Analytics unit creates a profile from personal data and demographic data and compares this with transaction data based on customer purchasing behavior and preferences, bringing them together. From this, patterns and subsets can be created through categorization, which can then be used to generate recommendations for customers. A subsequent tracking of the customer—whether they only view the offers or also use them—can provide new insights into the customer profile and generate follow-up business. Expert 4 further explains that potential corporate customers can be identified and approached using DA methodologies. This can be managed through a volume framework via Excel. However, expert 6 states that there are no methodologies for a C2C model. Here, providers can place their offers on the marketplace based on a trial-and-error approach without prior evaluation, and customers decide for themselves whether these offers are suitable for them.

Compared to the C2C matching, the survey on the B2C model shows a similar picture. All experts (sc. 3) who are able to provide information agree that data matching occurs through payment flow analysis and that the derivation and recommendations for personalized offers are also based on this. Expert 5 goes into even more detail about which DA touchpoints approaches show promise. Here, recurring payments and patterns may indicate contractual commitments. Additionally, the inclusion and storage of contract data, along with the comparison of transaction data, can provide further clues. Text analysis can also be used to identify keywords or conditions in transactions, enabling matching of contracts and offering hints for their optimization. Expert 9 supplements the data analysis by incorporating social media activities, such as TikTok, to capture lifestyle behavior. This allows for the development of personas and adjustments in communication through CRM. Expert 10 additionally mentions the expanded expanding and aggregation database, utilizing open banking initiatives, such as considering and analyzing credit card transactions alongside checking account transactions.

In the last category 4 on acceptance and organizational effects, detailed and differentiated statements from experts can be recorded. Therefore, the insights from each expert are analyzed more closely.

Expert 1 explains that there is no high acceptance of BBEs (cat. 4) on the bank and customer side at level 2.0, because, based on their experience, the offerings have been designed too invasively. At level 3.0, acceptance is higher due to the voluntary participation of users in the marketplace. Due to the existing revenue and image potential, this will lead to increased acceptance among banks. Expert 2 states that acceptance at their bank even decreased to the point of complete loss. However, they see potential in the younger target group, as this group is more willing to share their data. Expert 3 supports the idea of high acceptance on the customer side, as within a short period, 30 to 35% of the target group was able to be motivated to activate opt-ins. This was especially true for price-sensitive customers who could save a little or receive additional services for free. It is essential to note that banks enjoy a high level of trust, which must not be compromised. Experts 4 and 5 explain that acceptance depends on the use case and the customer's level of knowledge. The bank must clearly and straightforwardly

communicate the added value and its associated partnership with the customer to raise awareness. Expert 6 also confirms through user research that acceptance among customers exists when there is genuine added value. Other factors influencing acceptance include changes in the living conditions of customers (expert 8) and the dependency on the decision-maker's minimum (expert 9). Finally, expert 10 demonstrates that acceptance among banks exists because competitors are already doing it, and they see the risk of losing competitive advantages.

The experts again provide a mostly uniform picture regarding the organizational effects and necessary changes in banks. In addition to retraining employees, purchasing external know-how, hiring new staff with the required mindset (experts 2, 3, and 7), and conducting empirical data collection to determine demand such as user surveys, adjustments and expansions of role concepts within the organizational structure are also necessary (expert 1). A mindset shift and the associated breaking away from traditional thinking patterns and business models are essential to advance the cultural and strategic embedding within upper management and employees (experts 2, 3, 5, and 10). At least one employee must be hired who is responsible for the entire BB business. Once a critical bank size is reached, a whole team is also necessary. This team should be a mix of communication experts and project management specialists, and due to its importance, a direct report to the board or an independent management area with experts in B2B and open banking models should be established for quick decision-making (experts 3, 4, 7, and 10). The person responsible for this area should be an active networker and, in the case of regional ecosystems, a regional networker who brings the concepts together. Social media can be used to increase reach by providing continuous content to create relevance (expert 6). Additionally, expanding the sales department or establishing a new sales unit with increased personnel in digital banking competencies is advisable (experts 2 and 7).

In the next interview section (RQ2) with categories 5-7, a deep understanding of Business Models for BB 2.0 and 3.0 (cat. 5, table no. 12) is emphasized, supported by a hypothesis for evaluation. Afterwards, various possibilities of dimensionalization and scaling of BBE (cat. 6, table no. 13) are considered, along with whether decision-makers are aware of these possibilities. Finally, sales signals

in BB (cat. 7) are discussed, focusing on the extent to which experts have experience with this topic and how the potential application and its prospects are utilized.

Table 11. Expert Feedback on the Category “Business Models”

	Categories Subcodes Expert	Business Models		
		Hypothesis evaluation	Use/Business Cases 2.0	Use/Business Cases 3.0
German private and universal banks	Expert 1 (SPM)	Confirmed: Banks focus on success, decision-makers hinder progress, products developed without market knowledge, and lack of structure and research. Providers are integrated without customer input.	TEO Super App for lifestyle for Sparda banks, DZ Bank multibanking app with ecosystem, N26 with Clark (insurance).	Crowdfunding platforms for Volksbanken in Switzerland and Lokalhelden for savings banks (during the coronavirus pandemic)
	Expert 2 (CLBC)	Confirmed. A technology is brought to market to solve an unprecedented problem. The problem is not considered, even though a solution already exists.	Software offering for wealth management	
	Expert 3 (F+MD)	Confirmed. Aside from technical skills, there's a lack of understanding of possibilities and vision to see potential. Internal skills are lacking. All parties—end customers and e-commerce partners—are further along, but the bank is the main slowing factor.	Gimmicks and benefits for private and business customers, with strong interest from retailers. Offers include shopping discounts from the toom hardware store chain and high-commission deals with telecom providers. Covers all e-commerce topics like travel and support for mediation in core business.	
Regional banks	Expert 4 (HPI)	Confirmed. No time or capacity available due to running the business. Short-sightedness in banks' use cases, long-term view necessary.	Analyze purchasing behavior, such as baby products at drugstores, and use this to generate offers and upselling opportunities.	There are no limits to the imagination when it comes to marketplace models. Relevant offers are crucial. Platforms for care or craftsmen referrals.
	Expert 5 (TLNBB)	Confirmed. No acceptance of the necessity. Too much monetary thinking and short-sightedness. Skills and support in digital solutions are lacking.	Contract manager, property tax app, and CO2Check	
	Expert 6 (CEO)	Different view. Business models are present, but skills are lacking. There are no specialists who can interpret data value. Preparing data for a provider is challenging and time-consuming (black box). Consultants struggle to identify patterns in CRM and address them properly.	All products that are easily comparable digitally, such as electricity, cell phones, insurance, etc., via comparison portals.	Bringing companies and customer needs together through living environments and journeys, such as home and housing, including real estate purchases, agents, notaries, moving companies, and tradespeople services.
International banks	Expert 7 (HP)	Banks haven't understood this because their core business still does well. There are successful and unsuccessful non-bank examples. The biggest hurdles are costs, especially marketing.	Insurance, taxes, financial advice, travel, mobile providers. These can be a wide variety of use cases.	
	Expert 8 (CRO)	Confirmed. The main challenge with open banking data is converting unstructured, large data into useful information, which is inefficient to read.		
	Expert 9 (DMM)	Confirmed. Many rules exist, making the process complex and lowering customer motivation. Customer onboarding should be simplified and shortened.	Pegasus has a loyalty system for investment providers.	
	Expert 10 (VPOP)	Confirmed. First steps have been taken, since the regulation and since the environments, the markets, and priorities.	AI-based, financial insights such as personal finance management services. Loyalty programs and campaigns.	Car management, house management, wealth, health management, various e-commerce, parking spot finder and sharing, holistic travel use cases, eSIM offerings

First, the experts were confronted with the hypothesis “There is still a lack of clear business models and the necessary skills to utilize the potential of Beyond Banking,” and asked for their assessment. Most experts fully confirm this statement, and the reasons are clear. In addition to a lack of knowledge (especially at the decision-maker level), technical skills, shortsightedness (experts 4 and 5), and the associated lack of vision and focus on current success (experts 1 and 3), there are offerings and technologies being introduced to the market for which there is no demand or attempts to solve a non-existent problem. Structure, preparation, and research on the demand side are missing to achieve product-market fit (experts 1 and 2). The bank is the decisive, inhibiting factor why such initiatives are not implemented (expert 3). The necessity of these use cases is not yet accepted (expert 5), and there is no time or capacity due to a focus on running the business (expert 4). Additionally, expert 9 points out that the current process is complicated, which reduces customer motivation to use these offerings. Customer onboarding must therefore be made simpler and quicker. Expert 8 also highlights the challenge of reading data efficiently and having the capacity to process, transform the unstructured data—this huge amount of data—into useful data. Expert 6 confirms that proper data preparation and analysis are challenging and involve a lengthy learning process. Specialists are needed who can assess the value of the data and take on the tasks. For salespeople, it is also difficult to identify patterns and hints in the CRM and to address them correctly with the customer. Here, the transfer of knowledge fails. Expert 7 adds that costs, especially marketing costs, are the biggest hurdles for banks.

The next sub-codes Use/Business Cases 2.0 (sc. 2) and Use/Business Cases 3.0 (sc. 3) do not present any new significant insights, as these have already been identified and addressed in the sections on diversification beyond banking services (Table 9, sc. 3) and on collaborations and offers (Table 10, sc. 3), and would just be repeating themselves here. Therefore, it can be summarized regarding Use/Business Cases 2.0 that all e-commerce topics or products are feasible within this model structure (expert 3, sc. 2) as well as all products that are easily comparable digitally (expert 6). These approaches can also be applied to Use/Business Cases 3.0 (sc. 3). Additionally, expert 4 emphasizes that relevant offers in demand are crucial. Connecting companies and customer needs through life worlds and customer journeys is of high priority (expert 6).

Table 12. Expert Feedback on the Categories “Possibilities of Dimensionalization and Scaling” and “BBSS”

	Categories Subcodes	Possibilities of Dimensionalization and Scaling		Beyond Banking Sales Signals		
		Expert	Decision-makers	Yes/No	If yes, utilizing potential and determining	Establishment and use
German private and universal banks						
	Expert 1 (SPM)	Act in a target group-specific way. Support customer surveys. Analyze customer structure to determine needed offerings, whether to go broad or deep, and which industries to include in the ecosystem.	Operationalization and scaling not available.	Yes	Advertising was targeted at customers based on their purchasing behavior, but it was too invasive and customers felt harassed.	Only temporary, then switched off again after customer complaints.
	Expert 2 (CLBC)		No PoC, no examples or individuals known.	Yes	More general display of BBSSs such as APIs alongside other BBSSs from core banking services.	Tried and it didn't work. Sales does not have the ability to truly understand and see digital business models.
Regional banks	Expert 3 (F+MD)	Customer activation, acceptance, and activity. A Federal Court of Justice ruling means activating many customers isn't possible anymore. Each customer must be individually convinced, slowing scaling. Find the right touchpoints. Consolidate data, increase customers, opt-ins, and transactions.	Decision-makers often overlook that scaling isn't automatic and is a difficult process. Transparent communication before implementation is crucial, as success isn't guaranteed.	Yes	One to two banks are using it, and initial sales campaigns are underway. The potential remains largely untapped, with no active data use or customer engagement.	Banks focus on attracting customers with basic offers to build a database, making meaningful sales signals unavailable. Much persuasion is needed.
	Expert 4 (HPI)	None known. Scaling is difficult due to the decentralization of regional banks, requiring significant persuasion and effort to manage customization and organize sales.	Alliance of the willing, with a small number of banks starting and convinced of the benefits.	No		Due to staff shortages and limited capacity, sales staff trained in financial products lack knowledge of BB services and need high empathy for sensitive topics like care. A data-driven, non-physical sales approach is more effective.
	Expert 5 (TLNBB)	Depends on potential; strategy and customer acceptance are crucial. Maintain customer interface. Example: Amazon offers inexpensive, fast service with convincing values.	Much knowledge still needs to be gained beforehand.	Yes	Potential not being exploited. First tentative examples are emerging, still in the learning phase.	
International banks	Expert 6 (CEO)	Scalability available, winner takes all principle. Cooperative group should act together. Large group with a lot of money is crucial.	Not everyone realizes that this is a great opportunity.	Yes	There are banks that offer something similar to a contract manager, where customers receive advice on better contracts.	Banks have not recognized the need, there is a degree of arrogance. Learning effect and experience/new insights about the customer are recognized.
	Expert 7 (HP)	Standardized technologies such as APIs are important. Fully integrated customer journeys and reusable technologies for other use cases. Use of cloud services	More common among digital and innovation representatives. Reservations stem from technological hurdles like migration and legacy IT systems, as well as board positioning. Neo-banks and non-banks benefit here due to modern IT infrastructures such as cloud services.	No	The assumption here is that the Swiss platform TWINT offers personalized offers through various partners. The extent to which this is based on automated sales signal processing is questionable.	
	Expert 8 (CRO)	Automated and efficient processes such as an automated decision-making process.		No		Signals are used in the back office but are unreliable. Without data categorization, the information is poor, but open banking data will be used in the future for targeted marketing campaigns in sales.
	Expert 9 (DMM)	Enrichment and processing of data on personas should be done using machine learning solutions for faster and automated processing and training of data. AI agent systems	CTOs and CEOs are experts in AI for products, with access to fast infrastructure and real-time or predictive monitoring. Other leaders share this vision.	No	Not fully utilizing the potential, but determining why using funnels and monitoring customer journeys, cross actions, and onboarding processes.	There is no physical sales department, only for the B2B part. The focus is on automated data-driven hints in the entire app design.
	Expert 10 (VPOP)	No scaling options known to date. Currently test and learn environments, later in 1 or 2 years more likely to be able to provide information based on learnings	Not everyone is aware of this. Learning still necessary.	No	Potential is there, but is not being utilized. Currently in planning.	Use will be expanded, but only once accuracy and consistency are right. It takes time to build the right infrastructure for this.

The insights from the sub-code Possibilities of Dimensionalization and Scaling (category 6) from BBEs can be divided into two main areas: strategic or conceptual approaches and measurable methodologies. Here, expert 1 depends on customer analysis, including an assessment of the current customer base and support through customer surveys. The offering should be clearly defined for target groups to ensure precise relevance. It can also be questioned whether the offering should be broader or more in-depth, or which industries should be represented within the ecosystem. Expert 5 argues that scaling possibilities depend on the potential. Here, aligning with strategy and gaining acceptance from customers are essential. Expert 6 mentions the principle “the winner takes it all,” previously discussed in chapter 3.3.2.10. case studies by Fasnacht (2023), which suggests an overarching ecosystem that greatly increases overall value through network effects and appears unavoidable. The expert refers to merging the cooperative banking group to build such an ecosystem, due to their large customer base and available financial resources. Meanwhile, expert 4 currently dismisses the idea of scaling because of the decentralized nature of regional banks. Collaborative initiatives, even nationwide ones, toward ecosystems could be key to success, as they would reduce the effort needed for persuasion and implementation caused by customization for individual banks, which would otherwise need to be managed through sales.

The following quantifiable methodologies are considered by experts regarding scaling possibilities: customer onboarding, customer acceptance, and customer activity, as well as identifying relevant touchpoints. Afterwards, combining all data and increasing the number of customers, opt-ins, and transaction data are crucial (expert 1). The customer interface must also be maintained. Amazon is mentioned as an example here, which was able to convince with attributes such as affordability, speed, and a compelling concept with values (expert 5). Furthermore, expert 7 cites standardized technologies like APIs and cloud services. Fully integrated customer journeys and reusable technologies for other use cases are listed here as promising for success. Experts 8 and 9 refer to automated and efficient processes, such as automated decision-making processes and the use of machine learning, which should accelerate the enrichment and processing of data into personas for faster and automated data processing and training.

However, the extent to which these scaling possibilities are known to decision-makers is shown by subcode 1. Many experts agree that the relevant decision-makers lack the necessary knowledge. Either they lack operationalization ideas (expert 1) and proof of concepts (PoCs) (expert 2), or they are unaware that the desired scaling effect does not occur immediately after project initiation and requires time (expert 3). Additionally, they overlook that this is a great opportunity (expert 6). Only expert 7 demonstrates awareness among digital banking representatives or innovation representatives and among neo- and non-banks due to their modern IT infrastructures. This is precisely what blocks decision-makers in banks and makes them hesitant due to technological hurdles such as migration and legacy IT systems. Furthermore, traditionally organized banks must be accountable through their positions on supervisory boards. Smaller companies and startups can make faster decisions with their typically leaner ownership structures. Expert 9 stands out from the overall group, showing that from the board's CTO and CEO to lower management and leaders, the same visions are shared, and they possess sufficient know-how about AI systems for product backgrounds. This is supported on a technical level by almost infrastructure, real-time, and even predictive monitoring systems. However, experts 5 and 10 say that many insights and learnings still need to be gained beforehand. One idea, as suggested by expert 4, is to form an alliance of willing participants, where a small number of banks start, are convinced of the initiative, and thus can act as multipliers and storytellers for potentially new banks.

In the next section, the interview focuses on Beyond Banking Sales Signals (BBSS) (category 7), specifically on how well Sales Signals are known for Beyond Banking, whether their potential is fully exploited, and the extent to which they are established and utilized. The first question (sc. 1) aims to determine whether experts are aware of the use of BBSSs within their own company or at other banks. A heterogeneous picture emerges here, with half of the experts answering yes and the other half answering no.

The additional sub-codes related to utilizing potential and determining (sc. 2) as well as establishing and using (sc. 3) can be summarized as follows: initial steps have been taken toward potential, and first sales signals have been issued, but the potential is not fully exploited. Usage has not been fully established and

has been partially discontinued. These outcomes have various reasons. While expert 1 states that overly invasive recommendations annoyed customers and led to the initiative being stopped after customer complaints, expert 2 mentions that too general BBSSs were issued alongside core banking sales signals, which offered little relevance and benefit to customers, and this attempt was also discontinued. It is also criticized that the sales department is unable to genuinely understand and recognize digital business models. Experts 8 and 10 also see no confirmed use of these BBSSs, as reliable sales signals with consistent accuracy and reliability must be ensured before wide-scale deployment. Experts 5, 6, and 10 see untapped potential, but banks are still in the learning phase, and new insights about customers are only beginning to emerge. Expert 3 reports initial use by 1 to 2 banks for early sales campaigns, but the potential remains underutilized due to a lack of active data utilization. Currently, banks focus on providing everyday relevant customer rewards to attract customers into the system, which is a prerequisite for building a database. Therefore, meaningful sales signals cannot be used at this time. Significant work remains to be done.

Examples of using BBSSs include the contract manager, where customers receive tips for better contracts (expert 6). Another example is the Swiss platform TWINT, which offers personalized deals through various partners. However, whether there is an automated Sales Signals Processing behind this is questionable (expert 7).

To increase the establishment and use of BBSSs, experts 4 and 9 recommend a targeted focus on data-driven recommenders without the deployment of physical staff, meaning directly delivering these suggestions to customers through the app. This approach can bypass the lack of resources such as personnel and time, as well as the limited knowledge in BB services and the high need for empathy when dealing with sensitive and specific topics like care in sales.

In the next interview section (RQ3), the focus will be on the use of a guide/concept/framework for creating a scalable BBE and to what extent experiences have been gained with it (cat. 8), as well as which key influencing factors and criteria (cat. 9) can determine the value of a successful BBE (Table 14).

Table 13. Expert Feedback on the Categories “Concept for creation of BBE” and “Key factors and criteria”

	Categories Subcodes Expert	Guideline/Concept/Framework for creation of BBE		Key influencing factors and criteria
		Yes/No	Concepts and frameworks	
German private and universal banks	Expert 1 (SPM)	No		Valuation of the ecosystem includes customer numbers, active usage, recurring customers, customer satisfaction (NPS), and revenue metrics like partner revenue, total ecosystem revenue, and factors such as number, duration, enjoyment, and satisfaction.
	Expert 2 (CLBC)	Yes	Joint development of models in several iteration cycles with colleagues from the Business Engineering Institute St. Gallen. Reference to its concepts.	Not just monetary metrics like reputation, customer loyalty, and market penetration. When does it break even? Consider scaling, growth potential, market positioning, and acquiring new customers.
	Expert 3 (F+MD)	No		Empirical, number-driven KPIs focus on scaling via total user opt-ins and activity to boost customer penetration and relevance. Activate customers from day 1, keeping them engaged through tailored offers based on their needs. Customer focus is key followed by monetization and campaigns. Countries like the UK, with different regulations, are further ahead in BBE.
Regional banks	Expert 4 (HPI)	No		Regional banks have high customer penetration, strong brand, local knowledge, and trust. Recognize customer problems. Use trial and error in regions, deriving a framework from bottom-up guidelines, classified into political and technical dimensions. Scale via technical dimension with a central IT provider, modern infrastructure, interfaces, and cloud services. Be open to third-party services.
	Expert 5 (TLNBB)	No		Satisfaction, churn, retention, bank account analysis (e.g., multibanking), number of accounts, new customer acquisition sources, ecosystem usage rate, offered and used services, performance, availability, reliable partner.
	Expert 6 (CEO)	No		Revenue, usage patterns (frequency, type, duration), initial number of providers and users, and the count of services and areas.
International banks	Expert 7 (HP)	No	Take classic concepts from business administration or ecosystem theory and build on them.	Primarily focuses on revenue and internal KPIs like cost reduction through cloud services. Tracks product success via engagement, interactions, conversion, and customer retention. Measures customer loyalty, uses standardized APIs, cloud for flexibility and scaling, and compliance. Enriches customer data from various sources to improve profiling and generate new insights.
	Expert 8 (CRO)	No		Data quality is key and successful categorization of the transaction is crucial, i.e., a well-trained machine learning model.
	Expert 9 (DMM)	Yes	Guideline for brand reputation and app design. Design guidelines for CRM or social media, everything for interactions	Active customer numbers increase the customer base and maintain activity through the product.
	Expert 10 (VPOP)	No	using global examples like Uber, Airbnb, platform economies who have already embraced BB strategies with learnings from successes and mistakes.	Understanding new customers through digital onboarding. Analyze product use and customer behavior in micro-segments, assess financial potential via market analysis, and evaluate trustworthy partners aligning with your strategy, regulations, and reputation.

First of all, it should be noted that only 2 out of 10 experts are familiar with such concepts for creating a BBE (category 8, sc. 1). Here, expert 2 refers to the concepts (sc. 2) developed through joint modeling in multiple iteration cycles with colleagues from the Business Engineering Institute St. Gallen. The expert cannot specify exactly which concepts or frameworks are meant. Expert 9 also has experience with such concepts and supports this statement with guidelines for brand reputation and app design, as well as design guidelines for CRM or social media—essentially everything related to interactions. Additionally, expert 7 mentions classical concepts from business administration or ecosystem theory, and expert 10 shares practical insights from using global examples, such as Uber, Airbnb, and platform economies, which have already adopted BBE strategies, drawing lessons from successes and failures. However, no further details or specifics about the concepts were provided.

The key influencing factors and criteria for determining the value of a successful BBE (category 9) are primarily interpreted in technically quantifiable attributes, but also in strategic dimensions. The technical attributes on the customer side can be ordered as follows: relative and absolute number of customers, active usage rate, recurring customers and increasing customer baseline, overall customer satisfaction via NPS (experts 1 and 9), reputation, customer retention, and new customer acquisition (expert 2), scaling in terms of the total user base, i.e., opt-ins from customer registrations and customer activity to increase customer penetration and relevance, keeping customers active (expert 3), churn rate, analysis of the number of bank accounts, e.g., via multi-banking, channel management, e.g., through which channels and from where the customer comes to the ecosystem, ecosystem usage rate (expert 5), usage behavior, e.g., how often, what, how long, and time spent (expert 6). On the provider side, the following KPIs and attributes can be recorded: number, duration, revenue, and satisfaction of connected partners, total revenue within the ecosystem (expert 1), break-even analysis, scaling, growth potential, market penetration (expert 2), how many and which services are offered and used, performance and availability (experts 5 and 6), and product success such as engagement, interaction with the platform, conversion, stickiness, e.g., how many transactions, how many customers return (expert 7).

Indirect and predominantly strategic concepts regarding the valuation of a successful BBE can include generalist approaches such as the question of market positioning (expert 2) and the development of relevant offerings based on customer needs (expert 3). The relevant customer added value can be determined through trial and error in specific (geographical) regions, which can be extracted through bottom-up development and derivation of an overarching framework from bottom-up approach guidelines (expert 4).

Another strategic approach could be analyzing newly acquired customers and their behavior through digital onboarding facilities. By analyzing product usage, insights can be gained into customer behavior within the microsegment. Another method could involve a preliminary analysis of the financial potential of customers and industries through intra- and market analysis, combined with an evaluation of integrable, trustworthy, and reliable partners (experts 5 and 6) that align with the company's strategy, regulatory requirements, and reputation (expert 10). Throughout this process, maintaining openness to third-party services (expert 4) should always be a priority.

Regarding IT and data strategic elements, scalability and flexibility can be ensured through a central provider of IT services, modern infrastructure with standardized interfaces (APIs), and cloud services, thereby enabling the establishment of internal operational KPIs for cost reduction. Enriching data from various sources improves profiling, and new information is generated about customers (experts 4 and 7). Because data quality is key, successful categorization of transactions for a well-trained machine learning model (expert 8) is necessary. Lastly, these strategies should meet current compliance standards and be continuously measured (expert 7).

The last section of the interview addresses the challenges and risks (Table 15), divided into subcodes: challenges for BB 2.0 and 3.0 (sc. 1), legal risks (sc. 2), IT risks (sc. 3), and other risks (sc. 4).

Table 14. Expert Feedback on the Category “Challenges and Risks”

	Categories		Challenges and Risks			
	Subcodes		Challenges for BB 2.0 and 3.0	Legal risks	IT risks	Other risks
Expert						
German private and universal banks	Expert 1 (SPM)	Regulatory requirements, data protection, ecosystem knowledge gaps, technical challenges like scalability, development opportunities, partner integration, all while maintaining user-friendliness.		GDPR and compliance conformity, performance and liability risks in the ecosystem construct	Cybersecurity, especially partners in the ecosystem. Security dependent on partners, security risk from external fraud risk, technological risk such as failures	Market risks include interest rate, strategic, reputational risks from wrong partners, connections, structure, and geopolitical issues.
	Expert 2 (CLBC)	Acceptance and empowerment of banks to adopt ecosystem thinking and collaborate with partners, along with rethinking and restructuring sales in digital business models and ecosystems.		Consortium contracts increase with more participants and obligations monitoring. Customer data, PSD (2,3) with PSR and FIDA rules, expands data to nearly all product classes, raising potential expenses and uncertainties.	More open and outward-facing data streams must be secured.	Reputational risk
	Expert 3 (F+MD)	Lacks relevance and benefit, affecting acceptance by banks and customers, prompting banks to rethink. Regulations hinder opportunities, worsening the product. Data standards are necessary.		Clear opt-in consents and their monitoring. Outsourcing with service providers involves considerable effort and monitoring. Data handling raises uncertainty and regulatory concerns, with complex contracts.	Highest data and IT security standards, data transfer between parties. IT data procurement	Reputational risk, uncertainty, and lack of know-how in BB and ecosystems create the risk of incorrect evaluation of expert knowledge.
Regional banks	Expert 4 (HPI)	Entering uncharted territory, no experience, no capacity, outcome is open, no blueprint, advance payment, building intellectual bridges, bringing organizations together is difficult, governance decision		GDPR and regulatory requirements for data matching and sharing with third parties.	The core banking system should operate separately from the ecosystem to prevent infection or feedback loops, given risks like hacking, data misuse, and high ecosystem availability. How integrated are partners technically? Consider partners' security needs, especially for startups with limited experience and funds.	Operational risks as a market orchestrator, dissatisfaction of customers and partners falls back on the platform, reputation risk
	Expert 5 (TLNBB)	Clarification of roles for all partners, make or buy decisions, possible loss of customer interface		Reliable partner held liable with damages, fair contracts, SLAs, compliance, data protection, strict regulations, delivery promises, and IP protections.	Performance, availability, data storage location, fail-safe and replicable measures, access rights and restrictions, and data breach response processes.	Reputational risk, dependent on expert knowledge and programming language
	Expert 6 (CEO)	Competition, especially supranational due to tech giants, challenges banks' innovation as they lack understanding to try new things. Loss risks and relinquishing independence in the ecosystem are concerns. Support includes new products, processes, and data protection audits.		Data protection involves regulating permissible activities like transfer, use, storage, and access, with uncertainties. Questions include bank liability for partner services, warnings, recourse claims, insolvency risks for partners, and advance payment of development costs.	Potential for attacks increases with higher data volumes, participants, and external openness with multiple entry points. Data theft	Reputational risk, loss of relevance if further development is lacking
International banks	Expert 7 (HP)	Strategic risk requires new culture, structures, and mindset with change management. Market entry is challenging due to inexperience and competition. Financial benefits may take time to monetize and scale.		Data protection laws like GDPR change rapidly, with different rules for international activities, especially between the EU and Switzerland. Switzerland has stricter banking secrecy laws. Where is consent required? A compliance expert is needed.	Agreeing on an API standard in Switzerland is challenging due to system integration issues, data provision, security, and regulatory compliance. Key concerns include data formats, rapid response, cloud adoption, and IT security risks for partners.	Loss of trust/reputation risk possible if mobile phone subscriptions are suddenly sold. Negotiating power and integration risk
	Expert 8 (CRO)	Large amount of data to control and analyze		Tracking consents, paying attention to how data is used, data protection, and data must be deleted after a certain period of time	Performance loss due to excessive data volumes and streams. IT infrastructure is not sufficiently secured.	Sending incorrect offers to customers. Reputational risk
	Expert 9 (DMM)	Changing mindsets remains too traditional with excessive regulations, rules, and data collection challenges. Finding suitable analytics and AI tools that comply with regulations and data policies is difficult.			Technical scaling, like new data space, is difficult due to on-premise setup and limited human resources for quick IT responses.	Brand reputation, current global economic situation
	Expert 10 (VPOP)	Data sharing is limited; partners lack insight into customer needs. Consulting takes time and resources. Internal departments like legal are unorganized, uninformed, and unregulated.		No platform approach by authorities; concrete infrastructure needed. Regulations favor startups and non-banks, but banks face restrictions.	Partners do not have mature infrastructures like banks do, including in cybersecurity. Banks want them to apply our standards.	After-sales risks such as reputational risk

For the first subcode challenges for BB 2.0 and 3.0 (sc. 1), the experts agree that the lack of knowledge and mindset, and thus the upcoming change in mindset, acceptance, and cultural shift in BB and ecosystems on the banking side (experts 1, 2, 3, 4, 6, 7, 9, and 10) represent one of the biggest challenges. This also requires a shift in sales towards digital business models and ecosystems (expert 2). Additionally, other departments, such as Legal, need to be equipped with the necessary knowledge for BB and ecosystems. Furthermore, experts 5, 6, and 10 emphasize that roles, responsibilities, and power structures within the ecosystem must be clearly defined among all partners and participants, and the right partners must be selected in advance to ensure the optimal customer benefit. Another aspect is the overwhelming or sometimes unsuitable regulation, which can block or limit opportunities, thereby negatively impacting the product (experts 1, 3, 6, 9, and 10).

Another common theme in the responses is the technical hurdles. These include questions about the scalability and development potential of the ecosystem (expert 1), the lack of blueprints and governance structures making implementation difficult (expert 4), the challenge of controlling and analyzing large amounts of data (experts 8 and 9), as well as the ongoing support banks need for new products, processes, and data protection reviews (expert 6).

Possible legal risks (sc. 2) are listed: performance and liability risks within the ecosystem construct and recourse claims (experts 1, 5, and 6), consortial and complex contractual relationships due to increased participant numbers and monitoring of obligations (experts 2 and 3), uncertainties due to the multitude of rapidly changing regulations such as customer data and GDPR regarding data transfer, usage, storage, access, PSD2/3 with PSR and potentially FIDA and compliance conformity (experts 1, 2, and 6), SLAs and delivery promises, intellectual property (expert 5), insolvency risk with partners and pre-financing of development efforts (expert 6), and the necessity and tracking of consents (experts 7 and 8).

Additionally, expert 10 criticizes that if the legal authority provides no platform approach, a concrete compliance infrastructure is still needed. The current regulations favor startups and non-banks, but banks are restricted in their options. Lastly, it is also important to consider that different laws apply when operating internationally, particularly between the EU and Switzerland (expert 7).

Regarding IT risks (sc. 3), particular attention is paid to IT security within the partner network of the ecosystem. Several aspects are listed here: dependence of IT security on partners, cybersecurity, security risks from external fraud, technological risks such as outages (expert 1), data sharing between partners and externally must be traceable and secured (experts 2 and 3), attack potential with large data volumes and external access points, data theft (expert 6), high availability and performance in the ecosystem with large data volumes and flows (experts 4, 5, and 8). Experts 4, 7, and 10 emphasize the necessary security requirements for partners. Startups or companies with little banking experience and limited funds often lack the mature, secure IT infrastructure and standards required for the highly regulated banking environment. Therefore, banks want these partners to adhere to their standards to minimize risks (expert 10). Expert 4 suggests a separate ecosystem infrastructure, detached from the core banking system, to avoid infection risks and potential feedback loops. While expert 5 addresses data management issues such as ensuring data is fail-safe and replicable, managing access rights and restrictions, and procedures in case of data breaches, experts 7 and 9 highlight the advantages of cloud usage over on-premises solutions, which provide a quick, reactive, adaptable, flexible, and thus technically scalable data management environment.

Regarding the other risks (sc. 4), reputational risk is the most frequently mentioned type of risk by all experts. This can result from customer and partner dissatisfaction affecting the platform (expert 4), if the bank is no longer considered confidential due to the arbitrary and sudden sale of mobile subscriptions (expert 6), or from sending incorrect offers to customers (expert 8). Other examples include collaborating with the wrong partners or selecting an incorrect technical connection, development approach, or ecosystem structure (expert 1).

Another important aspect is the uncertainty and lack of know-how in BB and ecosystems on the banking side, which creates the risk of incorrect evaluations and insufficient questioning of expert knowledge. This can lead banks into dependencies (experts 3 and 5). Other risks assessed by experts include operational risks as a market orchestrator (expert 4), loss of relevance due to lack of further development (expert 6), and the bargaining power and integration risk posed by partners (expert 7).

3.3.3.5. *Role-based Expert Analysis using Cross-tabulation Analysis*

In the next chapter, experts are divided into three groups: "German private and universal banks (GPUB)," "Regional banks (RB)," and "International banks (IB)." Their statements are then compared across these groups. The frequency of subcodes within each group is analyzed to evaluate the informative value of their responses, with a focus on matches and deviations.

Table 16 displays the role-based expert analysis of the revenue potential category. At first glance, there is an uneven distribution of subcodes, with experts primarily focusing on and responding to the subcodes "Indirect Revenue Potential," "Data-driven Sales Opportunities," and "Diversified Beyond Banking Services," which account for about 76%. Meanwhile, the subcodes "Customer Adoption Barriers," "Ecosystem Integration Limitations," and "Provider Impatience" make up only roughly 24% of the total codes (excluding the subcode "Assessment"). Notably, experts 3, 5, 7, and 10 stand out with the most references. Another observation is that only four experts can provide information on "Provider Impatience," and only expert 7 has references for the group of International banks. Experts 2 and 8 offer the fewest insights into this category. Additionally, the group of International banks provides the fewest references for the first three subcodes, followed closely by German private and universal banks, which also show gaps and limited references. Particularly, the groups of Regional banks and International banks offer many indications of revenue potential for subcodes 4-6, confirming their expertise and support for BB.

Table 15. Code Matrix Browser for "Revenue Potential Beyond Banking"

Code System	Expert 1...	Expert 2...	Expert 3...	Expert 4...	Expert 5...	Expert 6...	Expert 7...	Expert 8...	Expert 9...	Expert 10...	SUM
▼ RQ1:											0
▼ Revenue Potential Beyond Banking											0
> Customer Adoption Barriers	7		7	2	2	3				1	22
> Ecosystem Integration Limitations	6	1	7	2	4	1	3			4	28
> Provider Impatience	2			3		2	2				9
> Indirect Revenue Potential	4		13	7	10	7	9	4	5	11	70
> Data-driven Sales Opportunities	2	2	2	2	10	6	6	7	4	8	49
> Diversified Beyond-Banking Services	5	3	11	7	10	6	9	2	7	12	72
> Assessment	1	1	1	3	1	1	1		1	2	12
Σ SUM	27	7	41	26	37	26	30	13	17	38	262

Table 17 presents the role-based expert analysis for the categories Developments Beyond Banking 2.0, Experiences Beyond Banking 3.0, and Acceptance and Organizational Effects. It quickly becomes clear that the main focus areas for the subcodes are added value for customers and banks, collaborations and offers, and acceptance and organizational effects. At the same time, experts 3, 4, 6, and 10 stand out with the most references. When directly comparing categories 1 and 2 between BB 2.0 and 3.0, it becomes evident that the experts mainly possess knowledge about BB 2.0 and can support this with many examples, whereas for level 3.0 and the technical implementation and possibilities with data analytics (DA) and machine learning (ML) methodologies, only a few indications provide insight. This is because more evidence is provided through B2C data matching (BB 2.0) than through C2C data matching (BB 3.0). This clearly shows the knowledge and experience gap between BB 2.0 and BB 3.0, but also the fact that technical knowledge of DA and ML procedures is generally at a low level. The group of RB with expert 3 from the GPUB group, which provides the most evidence and reflects solid knowledge of these categories, is particularly noteworthy.

Table 16. Code Matrix Browser for “Developments BB 2.0”, “Experiences BB 3.0”, and “Acceptance/effects”

Code System	Expert 1...	Expert 2...	Expert 3...	Expert 4...	Expert 5...	Expert 6...	Expert 7...	Expert 8...	Expert 9...	Expert 10...	SUM
▼ RQ1:											0
> Developments BB 2.0	1	2	2	1	1	1	1		2	2	13
> Added values for customers and banks	5	4	14	6	11	9	1	3	7	10	70
> Cooperations and offers	5	2	9	6	1	9	1	1	6	7	47
> Experiences BB 3.0	1	1	1	1	1	1	1	1	1	2	11
> C2C matching	1	1	1	2	1	2	1	1	1	1	12
> B2C matching	2	2			1	4	3	1	2	1	16
> Acceptance and organisational effects	2	3	8	11	1	10	9	2	3	3	52
Σ SUM	17	15	35	27	17	36	17	9	22	26	221

The following Table 18 presents the role-based expert analysis for the categories “Business Models”, “Possibilities of Dimensionalization and Scaling”, and “Beyond Banking Sales Signals”. No clear pattern emerges among the categories; however, there is a higher number of hits for the subcode “Use/Business Cases 2.0” compared to other subcodes. This aligns with the developments related to BB 2.0, as shown in the previous table, and supports the experts' insights in this area. Anomalies are also visible in the lower half of the subcodes, mainly indicating many gaps in evidence for the subcodes “Decision-makers” and “If yes, utilizing potential and determining”. This can be explained by the fact that these subcodes

are sub-questions of the main questions and categories of Dimensionalization and BBSS. In conclusion, only a few experts indicated that decision-makers are aware of or at least recognize the need for scaling possibilities for BBE. Furthermore, the experts confirmed their responses with limited evidence, highlighting a lack of full utilization of potential and the underutilization of BBSSs.

Table 17. Code Matrix Browser for "Business Models", "Dimensionalization and Scaling", and "BBSS"

Code System	Expert 1...	Expert 2...	Expert 3...	Expert 4...	Expert 5...	Expert 6...	Expert 7...	Expert 8...	Expert 9...	Expert 10...	SUM
▼ RQ2:											0
> Business Models	1	2	1	1	1	1	1	1	1	1	11
> Use/Business Cases 2.0	1	2	3	1	4	2	1	1	1	2	18
> Use/Business Cases 3.0	1	1	1	2	1	1	1	1	2	2	13
> Possibilities of Dimensionalization and Scaling	1	2	1	2	1	1	1	1	1	2	13
> Decision-makers	2		2		1	1	1		1		8
> Beyond Banking Sales Signals	2		1	1	1	1	2	2	2	1	13
> If yes, utilizing potential and determining		2	1		2				1		6
> Establishment and use	1	2	1	1		1		2	1	1	10
Σ SUM	9	11	11	8	11	8	7	8	10	9	92

The following Table 19 shows the role-based expert analysis for the categories "Guideline/Concept/Framework for creation of BBE" and "Key influencing factors and Criteria." Due to the low overall frequency of hits, there is limited room for interpretation. The category, especially the associated subcode "Concepts and frameworks," indicates that only experts 2 and 9 confirm the existence of such concepts for creating a successful BBE, which was also confirmed by the single-based expert analysis. Expert 6 from the RB group has also provided the most evidence for "Key influencing factors and Criteria." No further cluster formations are present.

Table 18. Code Matrix Browser for "Concept for creation of BBE" and "Key factors and criteria"

Code System	Expert 1...	Expert 2...	Expert 3...	Expert 4...	Expert 5...	Expert 6...	Expert 7...	Expert 8...	Expert 9...	Expert 10...	SUM
▼ RQ3:											0
> Guideline/Concept/Framework for creation of BBE	1	2	1	1	1	2	1	1	1	1	12
> Concepts and frameworks		1							2		3
> Key influencing factors and criteria	1	1	2	2	2	4	1	2	2	2	19
Σ SUM	2	4	3	3	3	6	2	3	5	3	34

The last Table 20 summarizes the role-based expert analysis for the category "Challenges and Risks." Here, a nearly identical distribution of the codes can be observed, with the focus, indicated by multiple hits, on the subcodes "Legal risks"

and “IT risks.” This supports the idea that experts see the most diverse and heterogeneous risk environment in Ecosystems initiatives in these two areas. The “Other risks” mainly refer to the reputational risk mentioned by each expert, which suggests a homogeneous interpretation of the subject matter. The IB group has identified several risks, particularly legal and IT risks; however, this increased value is only marginal when considered overall. Essentially, all the hits across the groupings are almost evenly distributed.

Table 19. Code Matrix Browser for “Challenges and Risks”

Code System	Expert 1...	Expert 2...	Expert 3...	Expert 4...	Expert 5...	Expert 6...	Expert 7...	Expert 8...	Expert 9...	Expert 10...	SUM
▼ Challenges and Risks											0
> Challenges for BB 2.0 and 3.0	1	2	1	1	1	1	2	2	1	1	13
> Legal risks	1	2	2	1	2	2	2	1	1	3	17
> IT risks	1	2	2	1	2	2	3	2	1	2	18
> Other risks	1	1	2	1	1	1	1	2	2	1	13
Σ SUM	4	7	7	4	6	6	8	7	5	7	61

3.3.4. Market Research: Bank Customers

After expert interviews provided qualitative data and insights on BB 2.0 and 3.0, this chapter focuses on surveying bank customers to provide quantitative and representative evidence (Watson, 2015) that a scaled Beyond Banking Ecosystem, including various expansion stages, is in demand or needed in the market and that a significant customer benefit is emerging from this (H1.4). Customers can ask themselves, among other things, whether they would like to receive non-banking offers from the bank at all and whether they are willing to allow the banks to use and transmit more data in exchange for improved, targeted, and personalized marketing measures (H1.5 and H1.6). This section analyzes and compares the acceptance of both expansion stages. The evaluation and visualization will primarily be carried out using descriptive and quantitative statistical methods (Chapter 3.3.4.2.). However, existing studies on the acceptance of BB services for overall evaluation will also be referenced. Taken together, this chapter aims to provide additional attributes and elements from the customer's perspective for designing BBEs.

3.3.4.1. *Studies*

This chapter examines the acceptance and the preferred added values of BB services from the customer's perspective. The criteria or variables for acceptance to be studied are supported by various studies using the methodology of the Technology Acceptance Model (TAM) (Aboelmaged & Gebba, 2013; Lin et al., 2007) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) to explain customer adoption or usage intention of Open Banking (Dowers, 2023) as attributes and elements. In this context, the explicit added value (areas) from a professional customer perspective represent another dimension to explicit BB services, namely, which industries and product solutions should be targeted and developed.

An initial understanding of the criteria or variables to be examined regarding acceptance is provided by Dowers (2023) through a survey of 222 participants from Canada. It becomes clear that 70% of customers want to use open banking and “are motivated to share their account information and transaction data with other service providers, including banks and Fintechs, to access the benefits of Open Banking” (p. 104, para. 2). “The findings further indicate that the statistically significant variables that influence customers’ usage intention were performance expectancy, effort expectancy, and social influence” (p. 105, para. 3).

In another Indonesian survey study with 360 clean responses by Iman et al. (2023), the Technological Readiness Acceptance Model (TRAM) is examined by analyzing consumers’ intention to use open banking applications. Here, in contrast to previous studies, it is shown “that stickiness to traditional banking positively moderates the relationship between customer value and intention to use. This finding indicates that customers’ preference for their bank strengthens their perceived value of open banking and thus strengthens their intention to use it” (p. 1540, para. 3). Another variable is financial literacy, which contributes to a potential increase in the use of Open Banking Services but is not significant. Regarding policy implications, the study suggests that open banking technology should be user-friendly, and the financial literacy of open banking consumers also needs to be improved.

The study by Chan et al. (2022), using a dataset of 456 Australian survey respondents, confirms the findings of Dowers (2023), where performance

expectancy, effort expectancy, and social influence are significant factors affecting consumers' usage intentions. Among these, performance expectancy is the primary driver.

In contrast to most UTAUT studies, which usually show some but not all factors are significant, these results suggest that as Open Banking is new, consumers form their judgment based on multiple factors to make an informed decision, even though they still largely rely on the rational, utilitarian justification of performance expectancy (p. 904, para. 1).

But also the variables initial trust, perceived risk, and the financial literacy, which was previously mentioned by Iman et al. (2023), are factors influencing customers' use of open banking.

Another survey study (Marzouk, 2021) with 601 Dutch participants, supported by the TRAM model, "the study has shown that usefulness and ease of use are important predictors for the consumer adoption of open banking services" (p. 42, para. 1). Further supports the study that external factors such as personality traits are also important in predicting the adoption of a new technology.

It has demonstrated that psychological ownership of data plays an important role in this new environment. Although it has a negative effect on the intention to use, this effect is pacified by the perception of the usefulness and ease of use of the services. The research also highlighted the need for banks and financial organizations to raise awareness around the ownership and control of the data (p. 42, para. 2).

A very representative paper "analyzes factors that affect the adoption of open banking services among consumers based on a pan-European survey of over 5,500 respondents from 22 countries" (Polasik & Kotkowski, 2022, p. 2, para. 1). A significant number of consumers in Europe (approximately ranging from 28.5% to 35.9%) show interest in Open Banking Services. "The results also suggest that attitudes towards privacy and trust in financial institutions are among the key factors determining consumers' interest in adopting open banking service" (p. 24, para. 3). "Further, the results confirm that both the general preference for anonymity along with the reluctance to share data and trust being reposed only in banks have a negative impact, in particular, on consumers' interest in open banking" (p. 25, para. 2).

This will now address the BB services or areas where customers show preferences and interest. There are various studies by consulting firms regarding this.

The most recent study on Beyond Banking with 1,966 German residents is by Deloitte (Möller et al., 2024). The “consumer research indicates strong preference for banking products and services integrated with daily life” (p. 28, para. 1). In summary, from the customer's perspective, the top 3 opportunity areas for Beyond Banking that customers would adopt are the Ecosystem sectors of Security, Necessities, and Home. 47% of participants find cashback beneficial for their daily routines. The study also points out that consumer needs vary by persona profile and customer segmentation. There “necessities and security are considered priority ecosystems showing a similar pattern across nearly all generation segments [and by income classes]” (p. 29, para. 2) and “the healthcare ecosystem is beneficial for Gen Z [(18–24 years)] and the baby boomer 1 group [(65–74 years)]” (p. 29, para. 2). “While home is considered beneficial by the low-income class [(≤€1.49k)] and the upper middle class [(€5k–€6.9k)], it is considered relatively less beneficial by the lower middle class [(€1.5k–€2.9k)] and the high-income class [(>€7k)]” (p. 30, para. 2). The willingness of users to participate in cashback programs or offered discount codes is also supported by an Austrian survey study with 61.82% of 165 respondents (Schwarzenberger, 2023).

Another study by Arthur D. Little (Mariani et al., 2021) surveyed approximately 2,000 UAE customers of traditional banks from July 2021 to August 2021. Here are two key observations from the study:

A vast majority (61%) of clients are ready to turn to their primary bank for a beyond banking proposition. There is an amplified appetite (70%) for young customers (ages 25–44 years) with annual revenues over US \$40k, making this space ripe for all UAE retail banks. In the overall UAE market, clients found some complementary services to be more attractive; at the top of the list were entertainment, education, retail, and food (p. 7, para. 2–3).

Another study involving 1,800 participants (Au et al., 2022) identified obtaining digital vouchers as the most relevant customer need. “55% of participants are interested in receiving vouchers with special price advantages” (p. 505, para. 2). “The second most important customer need is directly connected to the current

policy of low interest rates in Europe. 51% of the survey participants stated, that they are interested in a marketplace for deposits” (para. 3). 49% of the participants are interested in the idea of providing a service to manage the different digital identities of an individual. Other relevant customer needs deal with digital tax services (48%) and investment guidance in the form of social trading (48%). However, it is worth questioning to what extent all customer needs except the first can be assigned to beyond banking or near banking content.

Finally, it should be noted that the first section pertains to acceptance analysis and the identification of variables related to open banking services, which indeed includes beyond banking but also other services such as near banking, etc. Another limitation of the study is that many TAM and UTAUT models in the literature review are based on survey feedback from participants within banking circles or from the perspectives of financial sector specialists, such as the examination of open banking (Gonçalves & de Araujo, 2023) and beyond banking (Abbott et al., 2023) implementation. This restricts the selection of studies that are based on responses from bank customers.

3.3.4.2. *Survey*

After bank experts have been surveyed as providers, this chapter now examines the acceptance of BB Services from the perspective of national (across Germany) and international bank customers (Appendix 13 and 14). The primary goal is to validate the following hypotheses of RQ1:

H1.4: The market accepts a scaled Beyond Banking Ecosystem and the associated customer data matching (from level 2.0).

H1.5: Customers want to receive non-banking offers from the bank and, in return, allow extended data analysis and sharing for better, targeted, and personalized marketing efforts.

H1.6: Incentives encourage customers to decide on extended data evaluation and transmission.

In addition, further data and insights can be gained from the survey.

Before focusing on the survey analysis approach, the quantity structure and thus a representative sample must first be determined. “In order to generalize from a random sample and avoid sampling errors or biases, a random sample needs to

be of adequate size” (Taherdoost, 2017, p. 237, para. 2). Unlike other models for determining the sample, the much-cited literature by Taherdoost (2016) states that the proportion of the research population included in the sample is not critical “but the absolute size of the sample selected relative to the complexity of the population, the aims of the researcher and the kinds of statistical manipulation that will be used in data analysis” (Taherdoost, 2017, p. 237, para. 2). The variables are to be understood as follows (see Equation no. 1):

n is the required sample size.

p represents the percentage occurrence of a state or condition.

e is the maximum percentage error required.

z is the value representing the required confidence level.

Bartlett et al. (2001) recommend using 50% as an estimate for p , as this maximizes variance and yields the largest sample size. In management research, the standard confidence level is 95% ($p = .05$, with a z -value of 1.96 from the z -table) (Taherdoost, 2017). In statistics, the (critical) z -value (or standard score) represents the number of standard deviations a data point is from the population mean, with 2.5% of the data on each tail. Because the z -value is based on the (symmetric) standard normal distribution (Z -distribution) (Arifin, 2013), $P(Z \leq z) = .975$, since on one side there is $95\% / 2 + 2.5\% = 97.5\%$ of the area. To calculate the z -value, the inverse cumulative distribution function of the standard normal distribution is used, which is the function that gives the corresponding z -value for a probability p . Thus, z is calculated $z = \Phi^{-1}(.975) = 1.96$. For an exploratory study, a margin of error of $\pm 10\%$ is acceptable (Conroy, 2015). To ensure that feasibility and scientific accuracy are aligned, a margin of error of 7% is chosen.

Equation 1. Formula for Representative Sample Determination

$$n = \frac{p(100 - p)z^2}{e^2} \quad (1)$$

If the values mentioned above are substituted into the formula, the following result is obtained:

$$196 = \frac{50 (100 - 50) 1.96^2}{7^2}$$

The representative sample size determined without considering the total population must therefore be at least 196 participants. Due to the survey's goal of questioning both national and international customers and comparing them, a representative sample size of 196 participants is required for each of the German and international participant groups.

To verify the initial sample size without accounting for the total population, the sample size was recalculated including the entire population and compared to the previous result. This refers to the whole group of individuals being studied, who share one or more common traits (Brosius et al., 2022).

Using the available data, we can estimate the absolute numbers for both populations as follows:

Around 54.4 million German bank customers aged 18 and above use online banking. This estimate derives from the following data:

- 81% of all Germans use online banking (bitkom, 2024).
- Germany's total population was approximately 83.2 million as of 2023.
- Calculation: 83.2 million * 0.81 = 67.4 million

Since this figure also includes minors, the estimate drops to 54.4 million for those aged 18 and above. Precise data on the global population of banking customers aged 18 and older who use online banking is unavailable. The following is a rough estimate based on available information.:

- The world population is approximately 8 billion people.
- Assuming the global average of online banking usage is around 30% (based on the EU average of 54% in 2018 (Statistisches Bundesamt (Destatis), n.d.) and the assumption that the global rate is lower).
- Rough estimate: 8 billion * 0.30 = 2.4 billion

This estimate is quite imprecise and should be interpreted cautiously, since actual global online banking usage varies significantly based on factors like technological infrastructure, internet access, and cultural preferences across

countries. Because the total populations for both groups are large and difficult to define internationally, a smaller, structurally similar sample of each population is analyzed through sampling and partial surveys are carried out accordingly (Brosius et al., 2022).

To ensure the partial surveys accurately reflect the entire population, simple random sampling is used as the sampling method (Beller, 2016). During this process, a statistical random mechanism decides which characteristic carriers from the full population are selected for the sample.

Using inferential statistics, the following simplified and minimally adjusted formula is employed, based on detailed calculations from Scharnbacher & Holland (2013). The same variables from the previous sample calculation are used, supplemented with the variable of population size N , which is 54,400,000 (German) and 2,400,000,000 (international).

Equation 2. Formula for Representative Sample Determination (with N)

$$n = \frac{\frac{z^2 \times p (1 - p)}{e^2}}{1 + \left(\frac{z^2 \times p (1 - p)}{e^2 N} \right)} \quad (2)$$

Result from the calculation (sample "German"):

$$196 = \frac{\frac{1.96^2 \times 0.5 (1 - 0.5)}{0.07^2}}{1 + \left(\frac{1.96^2 \times 0.5 (1 - 0.5)}{0.07^2 54,400,000} \right)}$$

Result from the calculation (sample "international"):

$$196 = \frac{\frac{1.96^2 \times 0.5 (1 - 0.5)}{0.07^2}}{1 + \left(\frac{1.96^2 \times 0.5 (1 - 0.5)}{0.07^2 2,400,000,000} \right)}$$

Thus, the same sample sizes are obtained for both subsets, considering the total population N of 196 participants each, confirming that both calculation bases are consistent.

The methodologies and procedures for analyzing the survey include initially collecting and gathering the survey data via the online questionnaire tool soSci. Subsequently, the data are processed, responses are coded according to the analysis tool, and variables are prepared and validated for later analysis purposes. During the course of the process, the following events occurred: On August 13, 2024, four questions (S103, S104, S203, and S204) were changed to optional. Cases No. 957, 958, 961, and 962 were deleted after the survey period because the author of the thesis also wanted to test the survey using various devices. Additionally, 27 cases were filtered out of the dataset because they had served as internal admin and test objects in the meantime.

The data export is embedded as an Excel file into the analysis platform MAXQDA, where the main data analysis also takes place. When analyzing some other interview responses, the data analysis and visualization functions of Excel are also used.

The analysis process looks as follows:

1. Compilation of demographic data through descriptive statistics such as mean, maximum, minimum, standard deviation, and frequencies of individual values. Distributions of responses are visualized using histograms and simple frequencies of individual values, both as absolute and relative frequencies through pie charts or bar charts. A heatmap along a world map can also illustrate the distribution of nationalities in the survey.
2. Preliminary tests for normal distribution, outlier removal, and determination of dependent variables based on relevance (inferential statistics). After these tests, the identification of relationships and predictions of future values can be carried out through correlation and regression analyses (predictive statistics), incorporating demographic data as predictor variables.
3. In the exploratory analysis section, it can be determined which customer groups show interest or preferences for certain services. This should be

done for both Services BB 2.0 and 3.0. This can be achieved through cluster analyses based on demographic data, for example, Cluster A, which has the characteristic X (age and income), prefers specific service Y. An association analysis can also explain relationships between preferred services, create comparisons, and thus generate new insights, such as Customer Group A preferring Service A and Service B.

- 4. Analysis of customers' willingness and motivation to permit extended data analysis and transmission in order to receive BB services. Comparative analysis between BB 2.0 and 3.0.
- 5. Analysis for intensification for extended data evaluation and transmission on the part of the customers. Comparative analysis between BB 2.0 and 3.0.
- 6. Satisfaction and recommendation analysis using BB Services through distribution calculations of two sample groups (German/international) via Mann-Whitney U test and by calculating the NPS (Net Promoter Score).

The return statistics can be summarized as follows: 1,060 participants clicked the participation link, of whom 806 started the survey and 584 completed it, referred to as valid cases (Table 21).

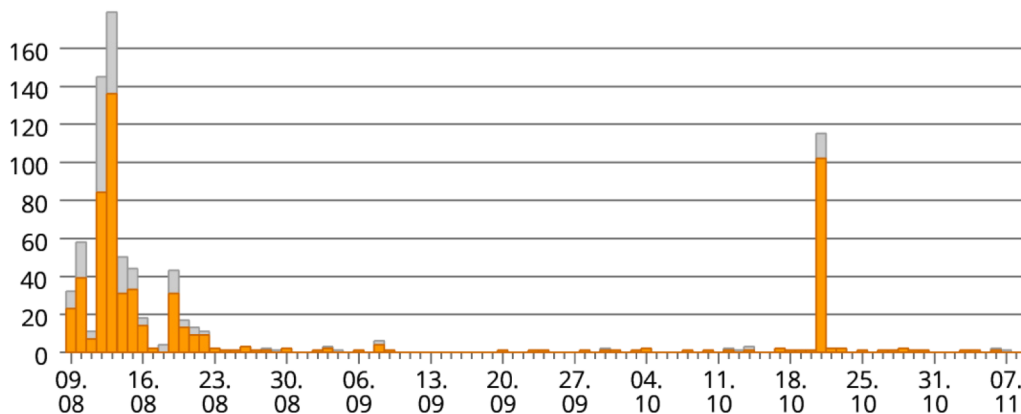
Table 20. Return Statistics for Valid Cases

	Clicks	Total interviews	Records completed
Questionnaire BB2024	1060	806	584

The following figure No. 16 shows the three-month period from August 9, 2024, to November 8, 2024. Large numbers of participants are already recorded in the first two weeks. This momentum can be attributed to the fact that the author had already made the survey available to many communities and channels, such as employers and social media channels. The second increase on October 21 is due to the survey being provided to a market research institute to specifically reach more international (outside of Germany) participants, as the representative sample

size for the “international” participant group had not yet been achieved at that time.

Figure 16. Response Statistics over the Period



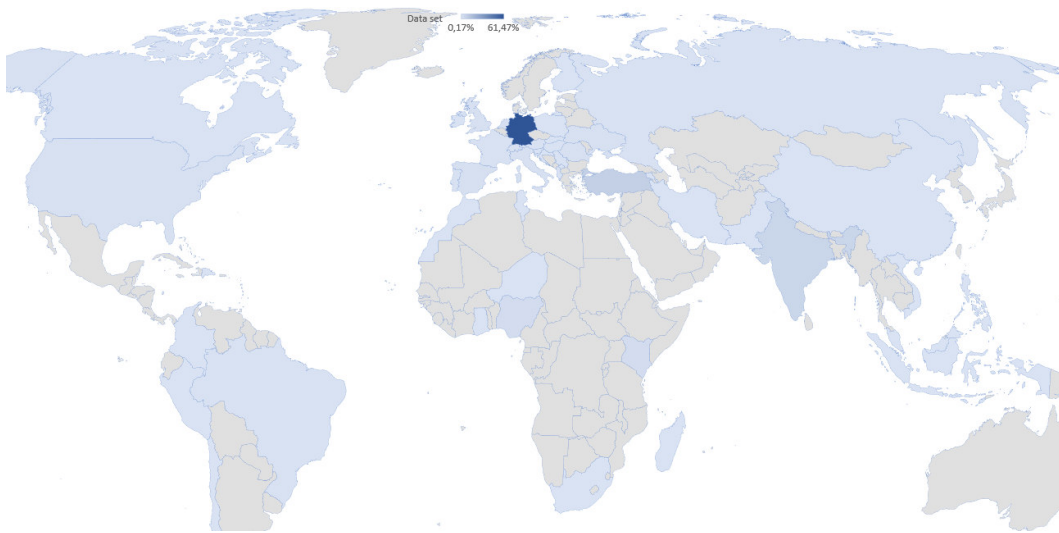
This section now presents the compilation of demographic data through descriptive statistics and appropriate visualizations. The following describes the data on nationality, age, education, gender, marital status, number of children, income, place of living, digital literacy level, and bank affiliation for the overall sample of all participants ($n = 584$).

The first demographic data set is the “nationality.” The area cartogram, in the form of a world map (Figure 17), illustrates the distribution of participants' responses by nationality. The nationality data set ranges from one participant ($=.17\%$ of the total sample of 584), which is represented by a light bluish color, to 359 participants ($=61.47\%$) with a dark blue color in one country (Germany). All other nations, which have a grayish coloring, do not have entries in the database. The sub-sample groups are thus divided into the national entity (Germans) with 359 participants ($=61.47\%$) and the international entities with a total of 225 participants ($=38.53\%$). Both sub-samples meet the minimum number of 196 participants, so both are considered representative.

The frequencies can thus be read as follows: The largest group is of German nationality at 61.47% ($n=359$), followed by the Turkish group at 8.56% ($n=50$), then the Indian group at 5.99% ($n=35$), the Kenyans at 2.74% ($n=16$), the Nigerians at 2.57% ($n=15$), the Spaniards at 1.37% ($n=8$), Americans, Britons, and Italians each at

1.20% (n=7), Romanians and Ukrainians each at 1.03% (n=6), the Dutch and Swiss each at 0.86% (n=5), Austrians, Brazilians, and Russians each at 0.68% (n=4), French and Portuguese each at 0.51% (n=3), and the groups from Canadians, Indonesians, Nigeriens, Pakistanis, and Slovaks each at 0.34% (n=2). A total of 52 different nationalities participated in the survey, with 28 nationalities each having only one survey participant (=0.17%).

Figure 17. Distribution of Nationalities



As for “age,” the data for the arithmetic mean, standard deviation, minimum, and maximum are shown in Table 8. The formulas for the arithmetic mean and standard deviation are mentioned for the first time as sample formulas and are exemplified and demonstrated using the variable “Age.” The arithmetic mean is calculated by adding all observed values together and dividing the total by the number of observations (Fahrmeir et al., 2023). The following formula is used for this, taking all participants (n=584) into account:

Equation 3. Formula for the Arithmetic Mean

$$\bar{x} = \frac{1}{n}(x_1 + \dots + x_n) = \frac{1}{n} \sum_{i=1}^n x_i \quad (3)$$

Result of the calculation:

$$\bar{x} = \frac{1}{584}((4 \times 18 + \dots + (1 \times 104)) = 38.62$$

The arithmetic mean is therefore 38.62 years.

“Die bekannteste Maßzahl für die Streuung einer Verteilung ist die Standardabweichung bzw. ihr Quadrat, die Varianz. Sie misst die Streuung der Daten um ihr Mittel $\bar{x}$ und ist deshalb nur für metrische Merkmale zusammen mit $\bar{x}$ sinnvoll einsetzbar.” [The most well-known measure of a distribution's dispersion is the standard deviation or its square, the variance. It quantifies how spread out the data is around its mean $\bar{x}$ and can therefore only be meaningfully used for metric characteristics in conjunction with $\bar{x}$.] (Fahrmeir et al., 2023, p. 69, para. 1). Since the standard deviation $\tilde{s}$ is derived from the square root of the variance, the variance must first be calculated from the values $x_1, \dots, x_n$.

Equation 4. Formula for the Variance

$$\tilde{s}^2 = \frac{1}{n}[(x_1 - \bar{x})^2 + \dots + (x_n - \bar{x})^2] = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2 \quad (4)$$

Result of the calculation:

$$\tilde{s}^2 = \frac{1}{584}[(72 - 38.62)^2 + \dots + (104 - 38.62)^2] = 182.442$$

Thus, the standard deviation $\tilde{s}$ can be calculated with:

Equation 5. Formula for the Standard Deviation

$$\tilde{s} = +\sqrt{\tilde{s}^2} \quad (5)$$

Result of the calculation:

$$\tilde{s} = +\sqrt{182.442^2} = 13.507$$

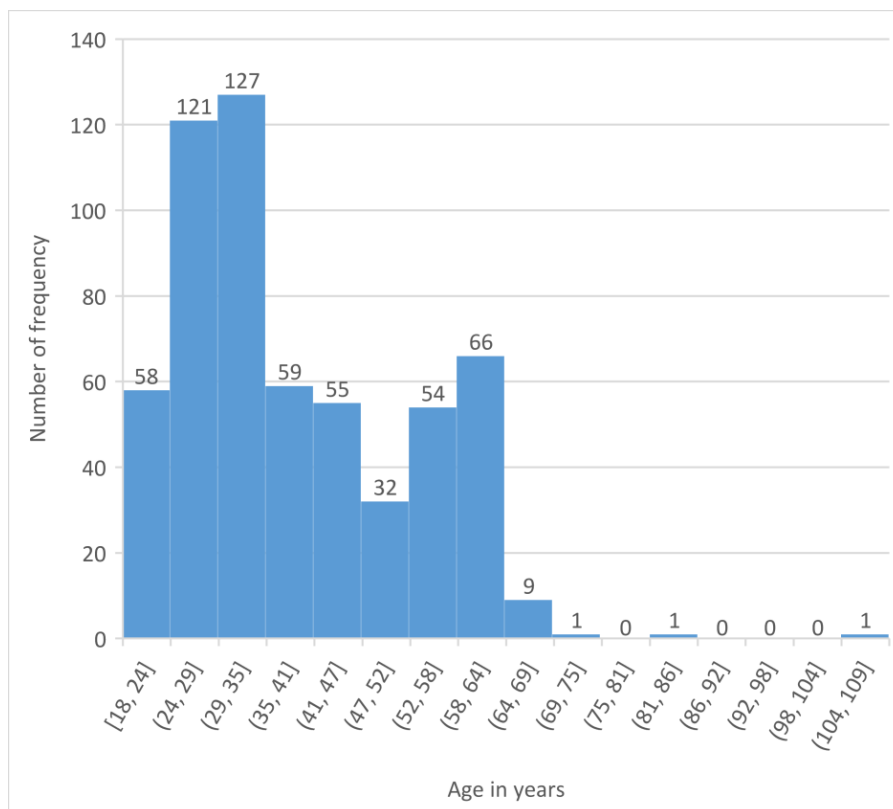
The standard deviation $\tilde{s}$ is thus 13.507 years.

Table 21. Descriptive Statistics for Age

N	Arithmetic mean	Standard deviation (sample)	Minimum	Maximum
584	38.62	13.507	18.00	104.00

Of the 584 participants who completed the survey, the average age is 38.62 years, with a standard deviation of 13.507 years around the mean, and ages range from a minimum of 18 to a maximum of 104 years. The distribution of responses concerning age is shown as follows (Figure 18).

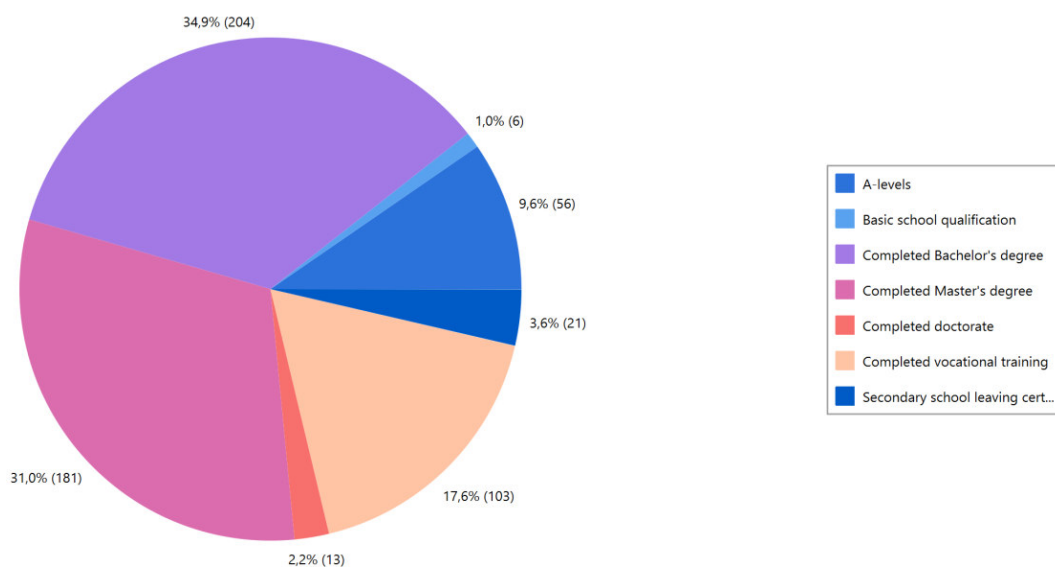
Figure 18. Distribution of Frequencies by Age



This figure clearly shows that most participants belong to the age groups 24-29 years, with 121 participants, and 29-35 years, with 127 participants. The next largest groups are 18-24 years, with 58 participants, and the other age groups from 18-24 years and from 35 to 64 years, each with an average of about 54 participants. After the 58-64 years age group, the number of participants drops sharply. There are a few outliers, each with only one participant, in the age groups 69-75, 81-86, and 104-109 years.

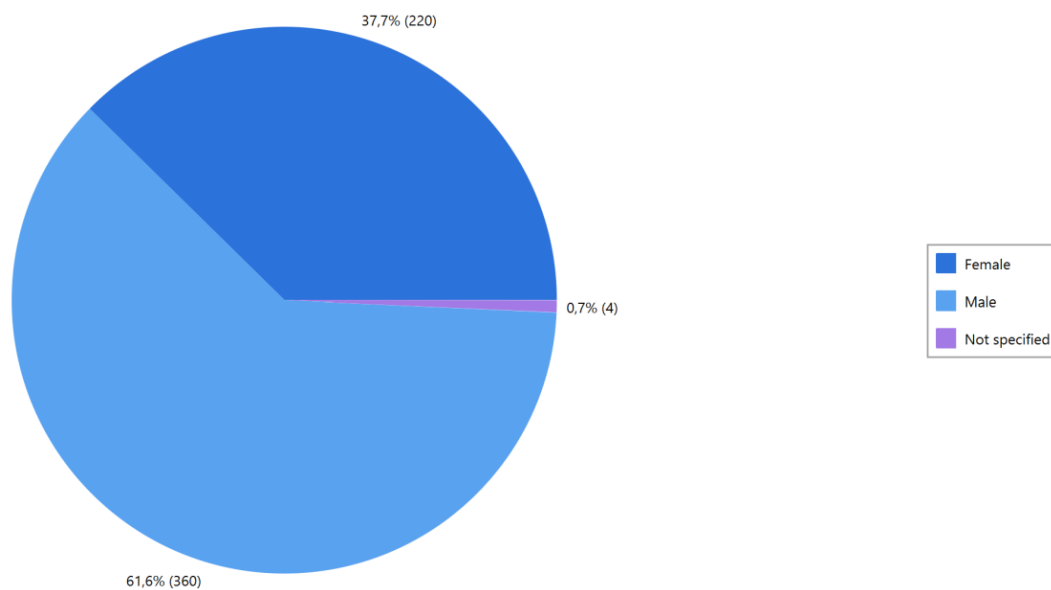
The next demographic variable, “Education,” displays the following picture (Figure 19). It shows that more than two-thirds (68.1%) of the participants hold academic degrees. Among these, the largest group, at 34.9% (n=204), has a completed Bachelor's degree, followed by a Master's degree at 31% (n=181), and a completed Doctorate at 2.2% (n=13). In addition, 17.6% (n=103) of the participants have completed vocational training. The group without any educational or academic qualification, meaning only a school qualification, accounts for 14.2% of the total. Of these, 9.6% (n=56) have an A-levels qualification, 3.6% (n=21) have a secondary school leaving certificate, and 1% (n=6) have only a basic school qualification.

Figure 19. Distribution of the Education Variable

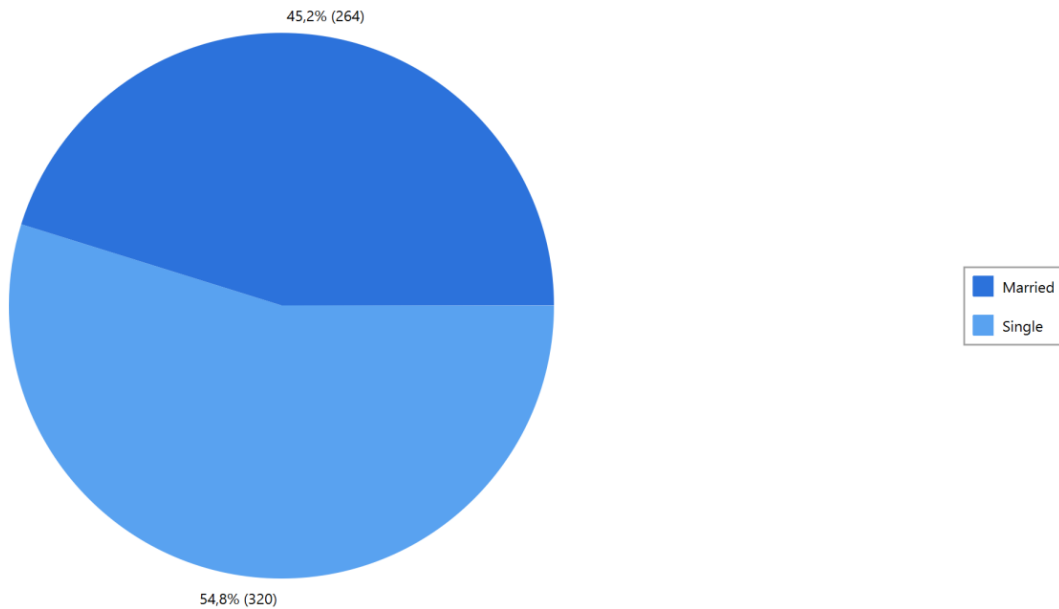


In the variable “Gender,” the group of men, comprising 61.6% (n=360), is the largest (see Figure 20). Women make up 37.7% (n=220) of the participants. Only 4 participants (0.7%) out of 584 respondents did not provide any gender information.

Figure 20. Distribution of the Gender Variable



When the variable “marital status” is examined, Figure 21 shows that 45.2% (n=264) of the participants are married and 54.8% (n=320) are single. It was not specified whether single individuals live alone or with partners.

Figure 21. Distribution of the Marital Status Variable

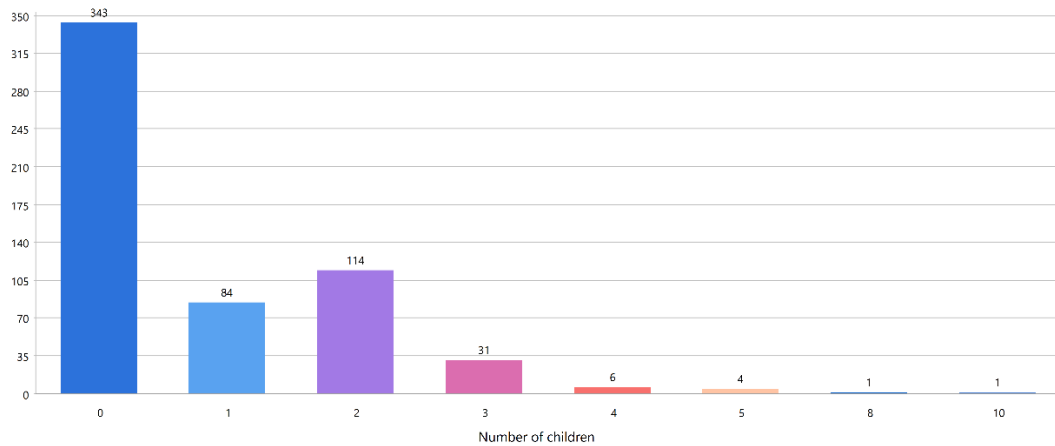
The statistics for the variable “number of children” can be determined as follows. Table 23 shows a calculated arithmetic mean of 0.8 children per participant and a standard deviation of 1.174 children around the mean. The minimum is 0, and the maximum is 10 children.

Table 22. Descriptive Statistics about the Number of Children

N	Arithmetic mean	Standard deviation (sample)	Minimum	Maximum
584	0.80	1.174	0.00	10.00

The distribution of responses is shown in the next Figure 22. The largest group, with 58.7% (n=343), has no children, followed by the group with 19.5% (n=114) who have 2 children, and the group with 14.4% (n=84) who have 1 child. Then, decreasing, are participants with 3 children (n=31=5.3%), participants with 4 children (n=6=1%), and participants with 5 children (n=4=0.7%). There are outliers at 8 and 10 children.

Figure 22. Distribution of the Number of Children Variable



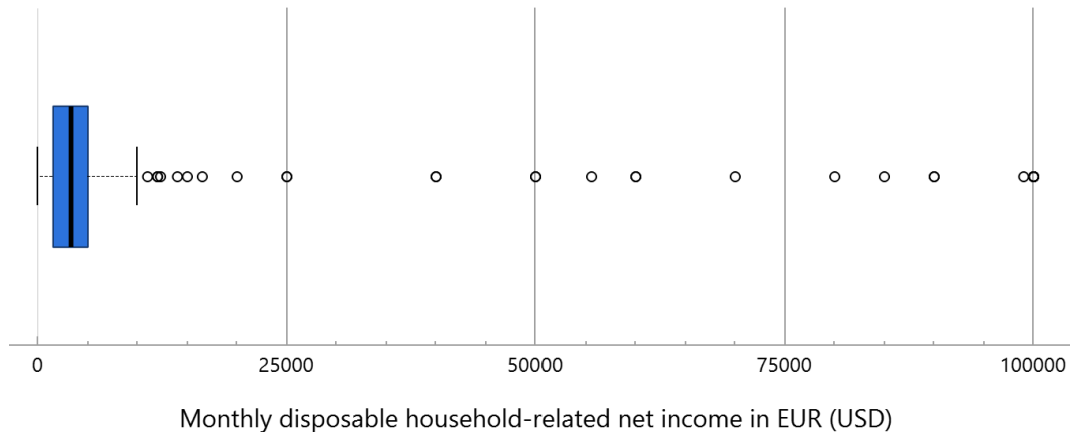
For the next variable “Monthly disposable household-related net income in EUR (USD),” the value in EUR and USD is approximately equal due to the near parity of the current EUR/USD exchange rate of 1 to 1.0466 (European Central Bank, 2025). When the same statistics are calculated for this, the next table clearly shows that the range from 0 to 100,000 EUR is very large, and the standard deviation of 13,977 EUR deviates significantly from the arithmetic mean of 5,986 EUR.

Table 23. Descriptive Statistics on Income

N	Arithmetic mean	Standard deviation (sample)	Minimum	Maximum
584	5,986.52	13,977.666	0.00	100,000.00

“Box plot whiskers show the range of the data set. All reasonably “extreme” data are contained between the 2 ends of the whiskers” (Nuzzo, 2016, p. 270, para. 3). The boxplot (Figure 23) of the determined values clearly shows many outliers, with 29 data points beyond the upper extreme whisker (Hubert & Vandervieren, 2008), at the mark of 10,000 EUR. The median is at 3,300 EUR. The interquartile range, which contains the middle 50% of all data, starts at the first quartile q1 with 1,500 EUR and ends at the third quartile q3 with 5,000 EUR. The arithmetic mean is therefore outside the interquartile range and indicates that it is clearly sensitive to extreme values or outliers in the data (Fahrmeir et al., 2023).

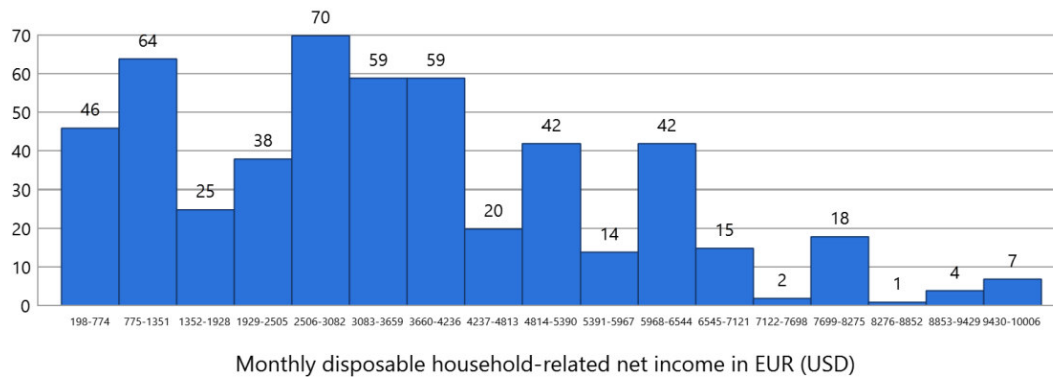
Figure 23. Distribution of the Income Variable With Outliers



It is therefore advisable to switch to a more resistant measure of location here. The trimmed mean $\bar{x}_g$ (Fahrmeir et al., 2023) can help here by, in this case, excluding the lowest 5% of the values and the highest 5% of the values (a total of 10%) and then calculating the arithmetic mean of the remaining data, since the 29 outliers make up about 5% of the total number of participants. The trimmed mean after removing the outliers is 4,068.55 EUR. The standard deviation, including the trimmed mean, then amounts to $\tilde{s}_g = 2,505.24$ EUR.

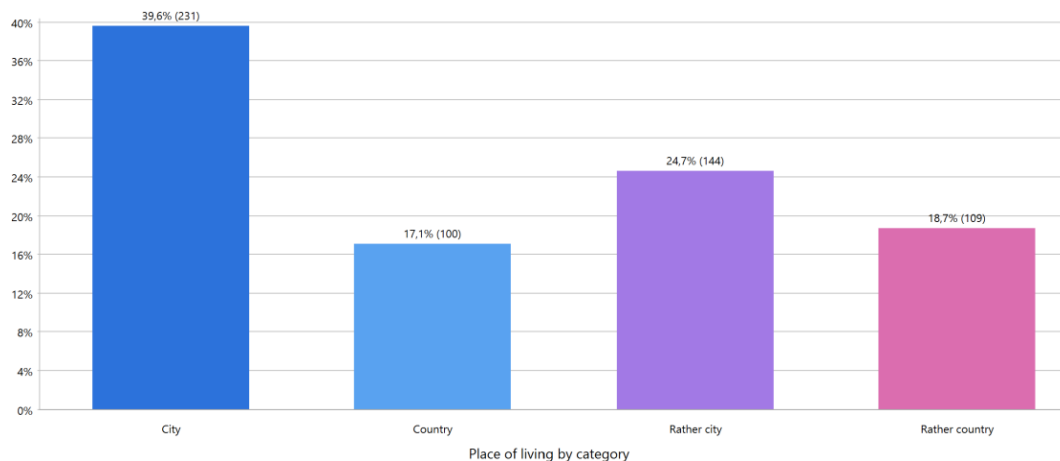
After removing outliers ($n=526$) using the 5% trimmed mean, the following income level histogram is presented (see Figure 24). Overall, the income class distribution appears more balanced. From the group earning 198-774 EUR up to the group earning 3,660-4,236 EUR, the seven groups, which include a total of 361 participants (61.8% of the original $n=584$), have an average of about 52 participants per income category. Starting from the income bracket of 4,237-4,813 EUR up to 8,276-8,852 EUR, with 154 participants (26.4% of the original $n=584$), a negative trend is clear. The frequencies generally decrease, with the average number of participants per income category falling to around 19. In the two highest income brackets, 8,853-9,429 EUR ($n=4$) and 9,430-10,006 EUR ($n=7$), there is a slight increase in frequencies again.

Figure 24. Distribution of the Income Variable Without Outliers



The distribution of frequencies for the variable “place of living” is shown in the next figure. The largest group of participants, 39.6% (n=231), live in a city, and 24.7% (n=144) live in a more urban area. Combined, 65% (n=375) of the participants live in an urban environment. In contrast, 17.1% (n=100) of the participants live in the countryside, and 18.7% (n=109) live in a more rural area. Altogether, a smaller group of about 35% (n=209) of the participants live in rural areas.

Figure 25. Distribution of the Place of Living Variable



The variable “digital literacy level” treats participants' digital affinity as scale values ranging from 1, indicating not at all, to 10, indicating very high. The descriptive statistics in Table 11 show a range from a minimum of 1 to a maximum of 10. The sample participants demonstrate an overall high level of digital literacy,

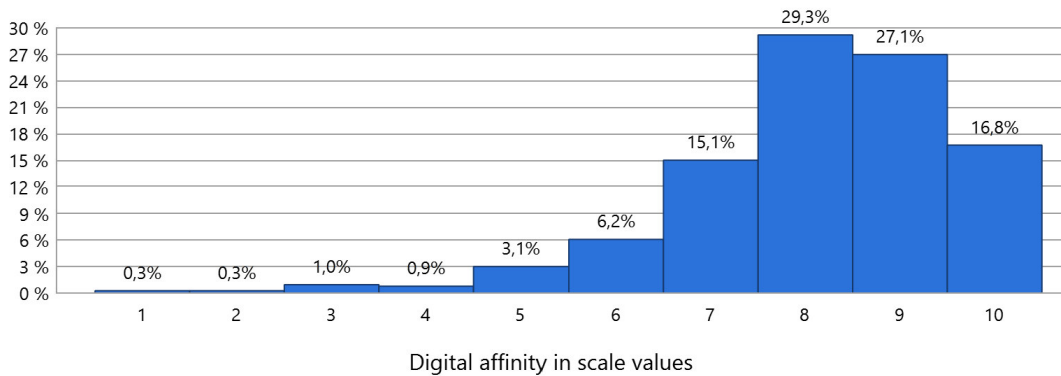
with an average score of 8.11 points. The standard deviation is 1.513, indicating a moderate degree of variation around the mean.

Table 24. Descriptive Statistics about the Digital Literacy Level

N	Arithmetic mean	Standard deviation (sample)	Minimum	Maximum
584	8.11	1.513	1.00	10.00

In the distribution of responses (see Figure 26), it becomes clear that the majority of 73.2% (n=427) of participants can demonstrate a high to very high digital level of 8 to 10. The arithmetic average is 8.11, meaning that 26.8% (n=157) of respondents fall below this average. Between the arithmetic average of 8.11 and the lower T-shaped whisker down to the value of 4, there is a group of 25.2% (n=147) of participants who perceive themselves to have a medium to good digital affinity. Only 10 respondents (1.6%) selected a low level of 1 to 3.

Figure 26. Distribution of the Digital Level Variable



The variable “bank affiliation” illustrates how many participants are customers of the bank groups: private banks, cooperative banks, public-law banks, or direct banks. The question is structured with a multiple-answer function, meaning that a participant can potentially be a customer of all four bank groups.

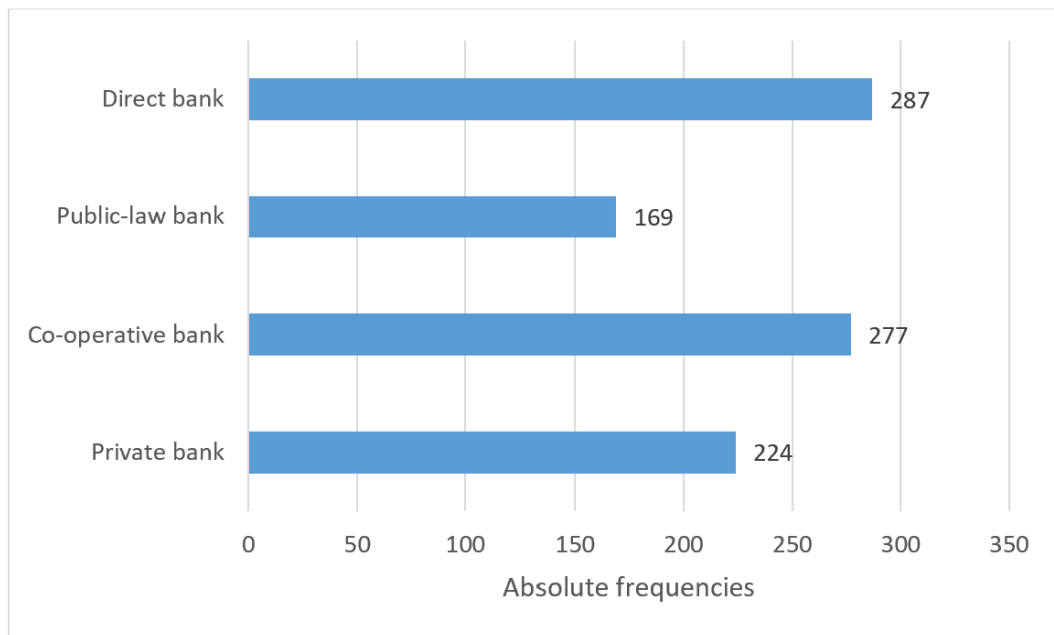
Of the 584 respondents, the arithmetic average is 1.64 different bank groups, with a standard deviation of 0.743 bank groups (Table 26). The minimum is 1, and the maximum is 4.

Table 25. Descriptive Statistics of Bank Customers' Affiliations

N	Arithmetic mean	Standard deviation (sample)	Minimum	Maximum
584	1.64	.743	1.00	4.00

When the values with =true are summed for each answer option, the following absolute frequencies are obtained for each banking group (Figure 27). Thus, among all participants, 49.1% (n=287) are customers of a direct bank (e.g., N26, Trade Republic, Revolut, Tomorrow, ING, Comdirect, etc.), followed by 47.4% (n=277) of cooperative banks (e.g., Crédit Mutuel, Rabobank, Banco Cooperativo Español, etc.), then 38.4% (n=224) of private banks (e.g., Deutsche Bank, UBS, HSBC, BNP Paribas, UniCredit, Santander, İşbank, etc.), and finally 28.9% (n=169) of public-law banks (e.g., savings banks, national/state banks, etc.).

Figure 27. Absolute Frequencies for Different Bank Groups



After the demographic data has been described, the next section is dedicated to exploratory data analysis to identify structures, peculiarities, and relationships within the datasets. This process considers not only the entire sample but also the two sub-samples "German" and "International," which are compared with each

other. To evaluate hypothesis H1.4, the focus is placed on the following questions for BB 2.0 and 3.0:

- S101 with “How important are such offers to you in principle?”
- S102 mit “If you receive benefits from these offers (e.g. discounts, cashback, wider choice of offers, availability, etc.), are you considering using or purchasing these offers?”
- und S104 mit “Which offers from the following areas would interest you?”
- For the consideration of BB 3.0, there are similarly the questions S201, S202, and S204. Finally, the three questions regarding BB 2.0 are compared with the three questions regarding BB 3.0.

The following procedure includes the determination of relationships and predictions, correlation and regression analyses in dependency analysis and grouping of customers (Eckey et al., 2002), cluster analyses and identification of dependencies, as well as association analyses in interdependence analysis. However, before each analysis can be conducted, various prerequisites must first be established and verified.

To conduct the hypothesis test for H1.4, the necessary prerequisites must first be verified (Kronthaler, 2016). A common prerequisite is that the data follow a specific distribution, often a normal distribution. When data are normally distributed, parametric tests are typically appropriate; if not, non-parametric tests are usually employed (Becker et al., 2016). The powerful normality test for checking data for normal distribution is the Shapiro-Wilk test (Razali & Wah, 2011). The Shapiro-Wilk test (Shapiro & Wilk, 1965) is a statistical method used to assess whether a sample originates from a normally distributed population. It is especially effective for checking normality because data in a normal distribution follow a very specific order. Deviations from this pattern are reflected in the test statistic. Moreover, this test is highly sensitive to skewness (asymmetry) and kurtosis (distribution peakedness), making it particularly useful for identifying non-normal data. The null hypothesis H0 assumes that the data are normally distributed. Therefore, it is important to check each of the 10 demographic variables, which serve as independent variables influencing the dependent variables as target measures (=results from the above questions), for normal distribution individually.

Equation 6. Formula for the Shapiro-Wilk Test

$$W = \frac{(\sum_{i=1}^n a_i y_i)^2}{\sum_{i=1}^n (y_i - \bar{y})^2} \quad (6)$$

Using the Shapiro-Wilk formula, the normal distribution can now be checked for each dependent variable. To confirm a normal distribution, a significance level (α) expressed through p-value greater than .05 is necessary. After calculation, the results (Table 27) show that all variables, both in the overall sample and in the sub-samples "German" and "international," have a value less than or equal to .05, indicating that they do not follow a normal distribution. Values including and excluding outliers were determined. For example, for income, a 5% trimmed mean (n=526) and a 6.16% trimmed mean with the removal of 14 additional outliers (n=512, complete elimination of outliers) still yield a p-value of 1.421e-9.

Furthermore, it should be noted that for the variables gender, marital status, number of children, place of living, and bank affiliation, a too low level of distribution is present with a maximum metric of 10. The variable nationality is also not valid, as it is defined through sub-samples and compared to all other variables. For the variables age, education, income, and digital literacy level, p-values outside of 0 were determined; however, these values are always far too distant from the significance level of .05. Therefore, the focus of further research will be on the three independent variables: age, education level, and income. The null hypothesis H0 is thus rejected. Due to the non-distribution of data, non-parametric testing procedures will be used for further research.

Table 26. Results of the Shapiro-Wilk Test Shown in p (incl./excl. Outliers "O")

No.	Independent variable as demographic data	entire sample n=584		"German" sub-sample n=359		"international" sub-sample n=225	
		incl. O	excl. O	incl. O	excl. O	incl. O	excl. O
1	Nationality	0	0	0	0	9.246E-08	9.246E-08
2	Age	1.221E-12	1.554E-12	1.119E-09	1.119E-09	2.291E-09	.00003353
3	Education	0	0	7.916E-11	7.916E-11	0	1.221E-12
4	Gender	0	0	0	0	0	0
5	Marital status	0	0	0	0	0	0
6	Number of children	0	0	0	0	0	0
7	Income	0	3.296E-08	0	.00005472	0	5.503E-09
8	Place of Living	0	0	0	0	0	0
9	Digital literacy level	0	0	1.776E-12	2.576E-11	1.511E-10	1.064E-06
10	Bank affiliation	0	0	0	0	0	0

The three selected independent parameters are now being examined to determine how they relate to the dependent variables. The target variable in question S101 is the “importance” variable, which is measured on an ordinal scale from not important to important. For validation of the question, the categories “important” and “rather important” are completely sufficient.

In the next step, the dependent variable is clarified, or the likelihood of its categories occurring is estimated. To achieve this, logistic regression (Kronthaler, 2021) is employed because the dependent variable, “importance,” is on a nominal scale. However, logistic regression requires the dependent variable to be dichotomous (0 or 1), and thus it estimates the probability that the categories “important” and “rather important” are assigned the value 1. The independent variables are metric, except for the level of education, for which the ordinal education level must also be coded into binary dummy variables (0 or 1). Additionally, for logistic regression, it is less important that the independent variables are normally distributed, since it is a generalization of linear regression that focuses on probabilities (Sauer, 2019). Therefore, linear regression would be unsuitable. If the target variable is not continuous but takes on values like 0 or 1, linear regression can produce nonsensical values (e.g., >1 or <0). Logistic regression expresses the results through the logistic function, which operates within the range of 0–1. In this case, the following question is answered: How likely is it that these BB offers (2.0) are important, given that the person in question has a certain age, income, or level of education?

However, logistic regression is also subject to additional requirements beyond the dummy coding of categorical variables (Backhaus et al., 2023). In addition to eliminating outliers, multicollinearity among the independent variables must also be ruled out. This can be checked using the VIF (Variance Inflation Factor) (Bayman & Dexter, 2021). Here, a linear regression is performed with each independent variable in place of the dependent variable and related to the other independent variables.

Equation 7. Formula for the Variance Inflation Factor

$$VIF_i = \frac{1}{1 - R_i^2} \quad (7)$$

For the predictor variable “Age,” the VIF is therefore $1 / (1 - 0.005518) = 1.01$. For the predictor variable “Education,” the VIF is therefore $1 / (1 - 0.011591) = 1.01$. For the predictor variable “Income,” the VIF is therefore $1 / (1 - 0.016119) = 1.02$.

Since these questionable calculations did not eliminate outliers, a more robust model is being sought here to reduce the distortion of the calculations. The Spearman correlation (de Winter et al., 2016) is suitable for this purpose, as it is applied to non-parametric and non-linear data, examining the relationship between two rankings or non-linear but monotonic relationships, and is robust against outliers. Due to the heterogeneous scale properties (metric and ordinal) of the independent variables under investigation, the examination of monotonic relationships, robustness against outliers through consideration of the ranking order, and the absence of normal distribution, the Spearman correlation is the appropriate statistical measure, as the Pearson correlation assumes normality and linearity. This allows for the calculation of bivariate correlations between the factor pairs age-education, age-income, and education-income. The following formula and calculations result from this:

Equation 8. Formula for Spearman's Correlation

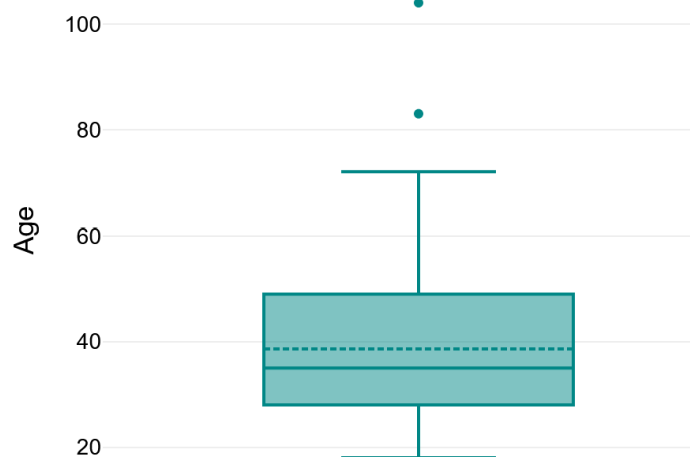
$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)} \quad (8)$$

Cohen (2013) establishes conventions for effect sizes in correlations and proposes the following rough classification: $|\rho| \approx 0.10$: small effect, $|\rho| \approx 0.30$: moderate effect, and $|\rho| \geq 0.50$: significant effect. The calculation of the age-education pair yields a Spearman rank correlation coefficient of $\rho = 0.101$, indicating a low correlation. The calculation of the pair of variables age-income results in a Spearman rank correlation coefficient of $\rho = 0.438$, indicating a moderate correlation. The calculation of the pair of variables education-income results in a Spearman rank correlation coefficient of $\rho = 0.231$, indicating a low correlation. Therefore, the robust Spearman correlation confirms that there is no high multicollinearity among the predictor variables, and all three variables can be used for the further calculation of the logistic regression.

In the following, outliers will be addressed. Accordingly, the two metric variables “Age” and “Income” are checked for outliers. Outliers can be visually identified using boxplots.

The outliers for “Income” have already been cleaned using the 5% trimmed mean ($n=526$), so that all 29 outliers above the T-shaped whisker of 10,000 EUR have been eliminated (see Figures 23 and 24 in comparison). Additionally, this modified sample is supplemented by cleaning the “Age” variable. The boxplot (Figure 28) for the “Age” variable shows two outliers, 83 and 104. These two highest values are replaced with the two lowest age values ($n=522$). As a result, the final cleaned sample size is $n=522$ with a 5.3% trimmed mean.

Figure 28. Boxplot of Age



Before the logistic regressions for the dependent variables “Important” and “Rather important” for the questions S101, S102, S201, and S202, and thus for the entire sample as well as the “German” and “International” sub-samples, appropriate hypotheses should be formulated for the three predictor variables that evaluate the central hypothesis H1.4. A Mastercard (2021) survey indicates that open banking skeptics are generally older and less educated, showing little interest in open banking services. Conversely, younger, more educated, and digitally savvy consumers, referred to as “fans,” are highly interested in open banking and willing to pay for related services. Thus, this survey supports the following hypothesis formulation:

For “Age” H1.4.1: The acceptance of Beyond Banking services occurs among young participants.

For “Education” H1.4.2: The acceptance of Beyond Banking services occurs among educated participants.

H1.4.3: The acceptance of Beyond Banking services occurs among participants with higher income (based on the assumption that a higher level of education suggests higher income).

The following formula is used for calculating multiple (using several independent variables) logistic regression according to Backhaus et al. (2023):

Equation 9. Formula for Multiple Logistic Regression

$$\pi(x) = \frac{1}{1 + e^{-(\alpha + \beta_1 x_1 + \dots + \beta_J x_J)}} \quad (9)$$

with

$$\pi(x) = P(Y = 1 | x_1, x_2, \dots, x_J)$$

The Chi-squared test is a suitable procedure for determining the quality of the regression model (Waldi, 2019). It demonstrates the difference between the full model (including predictors) and the null model (excluding predictors). A higher value shows that the predictors enhance the model. The p-value reveals the probability that a high Chi-squared value could happen by chance if the independent variables have no effect. Typically, a p-value below .05 is regarded as statistically significant.

Equation 10. Formula for the Chi-squared Test

$$\hat{\chi}_{min}^2 = \sum_{i=1}^N \frac{(x_i - \hat{x}_i)^2}{\sigma_i^2} \quad (10)$$

In the following table summaries, the results of the multiple logistic regression are compared for the target variables “Important” and “Rather Important” (for S101 and S201) and “Yes” and “Rather Yes” (S102 and S202) with

the three predictor variables across the three sample sizes “entire sample” (n=522), “German sample” (n=338), and “international sample” (n=184). If the hypothesis that higher education leads to greater acceptance is followed, then the lowest education level “Basic school qualification” (No. 1 of 7) serves as the reference category to measure differences between the education levels. The other education levels, in increasing relevance, are “Secondary school leaving certificate” (No. 2), “A-levels” (No. 3), “Completed vocational training” (No. 4), “Completed Bachelor's degree” (No. 5), “Completed Master's degree” (No. 6), and “Completed doctorate” (No. 7). Additionally, variables are only interpreted and included in the overall analysis if they show significant p-values.

The logistic regression analysis for S101 (Table 28) for the entire sample with the target variable “Important” shows that the model as a whole is significant ($\chi^2(8) = 48.31, p < .001, n = 522$). The coefficient for the variable Age is $b = -.05$ and is thus negative. In principle, the regression coefficient b in binary logistic regression is unbounded and can take any real value $b \in (-\infty, +\infty)$ (Hosmer Jr et al., 2013). In practice, $b=0$ indicates no effect on the logit (Odds Ratio = 1). With $b>0$, an increase in the explanatory variable implies an increase in the logit probability (Odds Ratio > 1), and $b<0$ indicates that an increase in the explanatory variable implies a decrease in the logit probability (Odds Ratio < 1). This means that an increase in age is associated with a decrease in the probability that the dependent variable is „Important“. The odds ratio of .95 means that an increase of one unit in the variable Age increases the likelihood that the dependent variable “Important” is by a factor of .95. The decreasing probability with higher educational level also applies to the variable Education. Here, the constant for A-levels is $b = -2.77$ and the odds ratio is .06; for completed vocational training, $b = -3.11$ and the odds ratio is .04; and for a completed Master's degree, $b = -2.29$ and the odds ratio is .1.

Table 27. Results of Multiple Logistic Regression Analyses for the Target Variable "Important" (S101)

S101		Target value "Important"								
	Predictor variables	Coefficient B	Standard error	z	p	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	2.42	1.23	1.97	.049	11.21	1.02 - 123.69	48.31	<.001	.78
	Age	-.05	.02	2.85	0	.95	.91 - .98			
	Education 2	-.9	1.21	.75	.46	.41	.04 - 4.34			
	Education 3	-2.77	1.15	2.42	.02	.06	.01 - .59			
	Education 4	-3.11	1.16	2.67	.01	.04	0 - .44			
	Education 5	-1.8	1.03	1.74	.08	.16	.02 - 1.25			
	Education 6	-2.29	1.06	2.16	.03	.1	.01 - .81			
	Education 7	-19.93	8,344.77	0	1	0	0 - ∞			
german sample	Income	0	0	2.51	.01	1	1-1	14.38	.072	.91
	Constant	-18.8	78,242.99	0	1	0	0 - ∞			
	Age	-.08	.06	1.39	.17	.92	.82 - 1.04			
	Education 2	17.45	78,242.99	0	1	4E+07	0 - ∞			
	Education 3	18.55	78,242.99	0	1	1E+08	0 - ∞			
	Education 4	-1.42	78,610.45	0	1	0.24	0 - ∞			
	Education 5	16.8	78,242.99	0	1	2E+07	0 - ∞			
	Education 6	20.53	78,242.99	0	1	8E+08	0 - ∞			
	Education 7	-1.56	85,308.41	0	1	.21	0 - ∞			
	Income	0	0	.02	.99	1	1-1			
international sample	Constant	1.46	1.16	1.27	.205	4.33	.45 - 41.7	18.94	.015	.71
	Age	-.06	.03	2.3	.02	.94	.9 - .99			
	Education 2	-.9	1.39	.65	.52	.41	.03 - 6.17			
	Education 3	-2.24	1.36	.65	.1	.11	.01 - 1.53			
	Education 4	-1.77	1.3	1.36	.17	.17	.01 - 2.19			
	Education 5	-1.09	1.08	1.01	.31	.34	.04 - 2.79			
	Education 6	-1.76	1.11	1.6	.11	.17	.02 - 1.5			
	Education 7	-18.19	8,053.77	0	1	0	0 - ∞			
	Income	0	0	1.5	.13	1	1-1			

The logistic regression analysis for S101 with the target variable "Rather important" (Table 29) shows that the model as a whole is significant ($\chi^2(8) = 17.16$, $p = .028$, $n = 522$). The variable Age is just above the threshold of $p = .053$ and is not

statistically significant; however, it has a b-value of -.02 and an odds ratio of .98, indicating a decreasing probability with increasing age. All other variables are not significant.

Table 28. Results of Multiple Logistic Regression Analyses for the Target Variable “Rather important” (S101)

S101		Target value "Rather important"								
	Predictor variables	Coefficient B	Standard error	z	p	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	-.74	1.18	.63	.531	.48	.05 - 4.84	17.16	.028	.604
	Age	-.02	.01	1.94	.05	.98	.96 - 1			
	Education 2	-20.55	8,853.07	0	1	0	0 - ∞			
	Education 3	-.37	1.2	.31	.75	.69	.07 - 7.17			
	Education 4	.15	1.16	.13	.9	1.16	.12 - 11.15			
	Education 5	.1	1.14	.09	.93	1.1	.12 - 10.36			
	Education 6	.18	1.14	.16	.87	1.2	.13 - 11.29			
	Education 7	-20.68	15,741.17	0	1	0	0 - ∞			
	Income	0	0	.51	.61	1	1-1			
german sample	Constant	21.79	21,749.37	0	.999	3E+09	0 - ∞	15.9	.044	.64
	Age	-.02	.01	1.75	.08	.98	.95 - 1			
	Education 2	-22.87	21,749.37	0	1	0	0 - ∞			
	Education 3	-23.44	21,749.37	0	1	0	0 - ∞			
	Education 4	-23.45	21,749.37	0	1	0	0 - ∞			
	Education 5	-23.15	21,749.37	0	1	0	0 - ∞			
	Education 6	-43.87	25,185.83	0	1	0	0 - ∞			
	Education 7	-44.13	29,223.98	0	1	0	0 - ∞			
	Income	0	0	1.91	.06	1	1-1			
international sample	Constant	-21.6	16,270.41	0	.999	0	0 - ∞	9.9	.271	.59
	Age	-.01	.02	.38	.7	.99	.95 - 1.03			
	Education 2	.03	20,395.08	0	1	1.03	0 - ∞			
	Education 3	20.85	16,270.41	0	1	1E+09	0 - ∞			
	Education 4	21.08	16,270.41	0	1	1E+09	0 - ∞			
	Education 5	20.86	16,270.41	0	1	1E+09	0 - ∞			
	Education 6	21.23	16,270.41	0	1	2E+09	0 - ∞			
	Education 7	.11	36,386.79	0	1	1.12	0 - ∞			
	Income	0	0	.17	.87	1	1-1			

Next, the logistic regression analysis for the “German sample” with the target variable “Important” shows that the model as a whole is not significant ($\text{Chi}^2(8) = 14.4$, $p = .072$, $n = 338$). However, for the target variable “Rather important,” the

model is considered significant overall ($\chi^2(8) = 15.9$, $p = .044$, $n = 338$). Although the p-value for the variable Age is borderline significant at .081, the coefficient $b = -.02$ and thus an odds ratio of .98, indicating a 2% reduction in the likelihood with each increase in age by one unit. All other variables are insignificant due to a lack of significance.

Compared to the “German sample,” the “international sample” for the target variable “Important” shows a logistic regression analysis, where the model as a whole is significant ($\chi^2(8) = 18.94$, $p = .015$, $n = 184$). Here, the variable Age is also negative with $b = -.06$, and the odds ratio is .94. For the target variable “Rather important,” however, the model as a whole is not considered significant ($\chi^2(8) = 9.91$, $p = .271$, $n = 184$). The variable “Income” does not yield usable results across all sample sizes.

In direct comparison, the logistic regression analysis for the question S201 is examined using the same parameters in the matrix model. Only the target variable changes from importance to BB 2.0 to importance to BB 3.0 services. In this case, the logistic regression for the target variable “Important” and the entire sample (Table 30) yields a significant model ($\chi^2(8) = 15.93$, $p = .043$, $n = 522$). However, the p-values of all independent variables are not significant. This shows a similar picture, where the calculation with the target variable “Rather important” (Table 31) does not show a significant overall model or significant variables ($\chi^2(8) = 12.14$, $p = .145$, $n = 522$).

Table 29. Results of Multiple Logistic Regression Analyses for the Target Variable “Important” (S201)

S201		Target value "Important"								
	Predictor variables	Coefficient B	Standard error	z	p	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	-.62	1.24	.5	.618	.54	.05 - 6.14	15.93	.043	.668
	Age	-.01	.01	.75	.45	.99	.96 - 1.02			
	Education 2	-.1	1.3	.08	.94	.9	.07 - 11.53			
	Education 3	-1.56	1.29	1.21	.23	.21	.02 - 2.63			
	Education 4	-.95	1.19	.8	.42	.39	.04 - 3.99			
	Education 5	-.41	1.15	.36	.72	.66	.07 - 6.37			
	Education 6	-1.16	1.18	.98	.33	.31	.03 - 3.19			
	Education 7	-19.18	8,247.96	0	1	0	0 - ∞			
	Income	0	0	1.5	.13	1	1-1			
german sample	Constant	-20.82	16,244.86	0	.999	0	0 - ∞	2.17	.975	.594
	Age	0	.02	.2	.84	1	.97 - 1.04			
	Education 2	17.85	16,244.86	0	1	6E+07	0 - ∞			
	Education 3	17.98	16,244.86	0	1	6E+07	0 - ∞			
	Education 4	17.57	16,244.86	0	1	4E+07	0 - ∞			
	Education 5	17.79	16,244.86	0	1	5E+07	0 - ∞			
	Education 6	17.14	16,244.86	0	1	3E+07	0 - ∞			
	Education 7	-.06	17,794.32	0	1	.94	0 - ∞			
	Income	0	0	.45	.65	1	1-1			
international sample	Constant	.44	1.47	.3	.764	1.55	.09 - 27.84	15.73	.046	.717
	Age	-.03	.03	1.3	.19	.97	.92 - 1.02			
	Education 2	.18	1.47	.12	.9	1.2	.07 - 21.54			
	Education 3	-20.7	7,895.65	0	1	0	0 - ∞			
	Education 4	-.07	1.36	.05	.96	.93	.07 - 13.31			
	Education 5	-.19	1.21	.16	.87	.83	.08 - 8.83			
	Education 6	-1.05	1.26	.84	.4	.35	.03 - 4.11			
	Education 7	-19.59	25,086.11	0	1	0	0 - ∞			
	Income	0	0	1.29	.2	1	1-1			

Compared to the “German sample” for the target variable “Important” ($\text{Chi}^2(8) = 2.17$, $p = .975$, $n = 338$) as well as for the target variable “Rather important” ($\text{Chi}^2(8) = 5.84$, $p = .665$, $n = 338$), both calculated models are not significant. The “international sample” for the target variable “Important” does show a significant model ($\text{Chi}^2(8) = 15.73$, $p = .046$, $n = 184$), but none of the variables are significant in individual consideration. In contrast to the target variable “Rather important,” the entire model is not significant ($\text{Chi}^2(8) = 13.55$, $p = .094$, $n = 184$). Therefore, no conclusions or relationships can be drawn regarding the question S201 and BB 3.0, nor can a comparison be made with the question S101 and BB 2.0.

Table 30. Results of Multiple Logistic Regression Analyses for the Target Variable "Rather important" (S201)

S201		Target value "Rather important"								
	Predictor variables	Coefficient B	Standard error	z	p	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	-20.84	8,768.31	0	.998	0	0 - ∞	12.14	.145	.571
	Age	0	.01	.35	.73	1	.98 - 1.01			
	Education 2	20.01	8,768.31	0	1	5E+08	0 - ∞			
	Education 3	20.23	8,768.31	0	1	6E+08	0 - ∞			
	Education 4	19.83	8,768.31	0	1	4E+08	0 - ∞			
	Education 5	19.82	8,768.31	0	1	4E+08	0 - ∞			
	Education 6	20.1	8,768.31	0	1	5E+08	0 - ∞			
	Education 7	-.04	11,876.36	0	1	.96	0 - ∞			
	Income	0	0	1.01	.31	1	1-1			
german sample	Constant	-21.14	20,307.41	0	.999	0	0 - ∞	5.84	.665	.551
	Age	.01	.01	.54	.59	1.01	.99 - 1.03			
	Education 2	20.17	20,307.41	0	1	6E+08	0 - ∞			
	Education 3	20.12	20,307.41	0	1	5E+08	0 - ∞			
	Education 4	20.04	20,307.41	0	1	5E+08	0 - ∞			
	Education 5	19.8	20,307.41	0	1	4E+08	0 - ∞			
	Education 6	20.11	20,307.41	0	1	5E+08	0 - ∞			
	Education 7	.08	22,245.05	0	1	1.08	0 - ∞			
	Income	0	0	.04	.97	1	1-1			
international sample	Constant	-20.68	9,196.48	0	.998	0	0 - ∞	13.55	.094	.64
	Age	-.02	.02	.79	.43	.98	.95 - 1.02			
	Education 2	20.25	9,196.48	0	1	6E+08	0 - ∞			
	Education 3	21.38	9,196.48	0	1	2E+09	0 - ∞			
	Education 4	19.29	9,196.48	0	1	2E+08	0 - ∞			
	Education 5	20.09	9,196.48	0	1	5E+08	0 - ∞			
	Education 6	20.37	9,196.48	0	1	7E+08	0 - ∞			
	Education 7	.27	20,712.8	0	1	1.31	0 - ∞			
	Income	0	0	1.73	.08	1	1-1			

Next, the regression analysis addresses the question S102, which concerns the acquisition and use of offers related to BB 2.0. The target variables "Yes" and "Rather yes" are important for validating the question. For this purpose, the logistic regression for the target variable "Yes" and the "entire sample" (Table 32) demonstrated a significant model ($\text{Chi}^2(8) = 39.38$, $p < .001$, $n = 522$). The coefficient for the variable Age is $b = -.04$, indicating a negative relationship. The odds ratio of .96 means that an increase of one unit in the Age variable increases the likelihood that the dependent variable is „Yes“ by a factor of .96. The probabilities for

Education generally trend negatively. However, the reduction diminishes with increasing education level, e.g., an odds ratio of .1 for secondary school leaving certificate and .16 for a completed master's degree. In contrast, the logistic regression analysis for the target variable “Rather yes” (Table 33) shows that the model as a whole, as well as all variables, are not significant ($\chi^2(8) = 6.35$, $p = .608$, $n = 522$).

Table 31. Results of Multiple Logistic Regression Analyses for the Target Variable “Yes” (S102)

S102		Target value "Yes"								
	Predictor variables	Coefficient B	Standard error	z	p	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	2.41	1.06	2.28	.023	11.17	1.4 - 88.99	39.38	<.001	.688
	Age	-.04	.01	3.01	0	.96	.94 - .99			
	Education 2	-2.34	1.23	1.91	.06	.1	.01 - 1.06			
	Education 3	-2.72	1.05	2.6	.01	.07	.01 - .51			
	Education 4	-2.29	1	2.29	.02	.1	.01 - .72			
	Education 5	-1.96	.97	2.01	.04	.14	.02 - .95			
	Education 6	-1.84	.98	1.89	.06	.16	.02 - 1.08			
	Education 7	-20.32	6,115.9	0	1	0	0 - ∞			
	Income	0	0	2.64	.01	1	1-1			
german sample	Constant	-20.05	33,179.25	0	1	0	0 - ∞	14.6	.067	.684
	Age	-.02	.02	1.19	.23	.98	.95 - 1.01			
	Education 2	.33	34,517.6	0	1	1.4	0 - ∞			
	Education 3	19.57	33,179.25	0	1	3E+08	0 - ∞			
	Education 4	19.32	33,179.25	0	1	2E+08	0 - ∞			
	Education 5	19.36	33,179.25	0	1	3E+08	0 - ∞			
	Education 6	19.42	33,179.25	0	1	3E+08	0 - ∞			
	Education 7	.06	36,328.95	0	1	1.06	0 - ∞			
	Income	0	0	1.62	.1	1	1-1			
international sample	Constant	2.82	1.4	2	.045	16.7	1.06 - 261.86	13,96	.083	.641
	Age	-.04	.02	1.84	.07	.96	.92 - 1			
	Education 2	-2.02	1.46	1.38	.17	.13	.01 - 2.35			
	Education 3	-3.91	1.61	2.43	.01	.02	0 - .47			
	Education 4	-1.57	1.31	1.2	.23	.21	.02 - 2.72			
	Education 5	-1.89	1.2	1.58	.11	.15	.01 - 1.57			
	Education 6	-1.83	1.2	1.52	.13	.16	.02 - 1.69			
	Education 7	-19.25	6,876.96	0	1	0	0 - ∞			
	Income	0	0	1.27	.2	1	1-1			

For the “German sample” and the target variable “Yes,” the logistic regression analysis shows that the model as a whole and all variables are not

significant ($\chi^2(8) = 14.6$, $p = .067$, $n = 338$). The same applies to the logistic regression analysis for the target variable "Rather yes" ($\chi^2(8) = 7.85$, $p = .448$, $n = 338$).

Table 32. Results of Multiple Logistic Regression Analyses for the Target Variable "Rather yes" (S102)

S102		Target value "Rather yes"								
	Predictor variables	Coefficient B	Standard error	z	p	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	-.99	1.15	.86	.39	.37	.04 - 3.56	6.35	.608	.554
	Age	-.01	.01	1.36	.17	.99	.97 - 1			
	Education 2	1.18	1.22	.97	.33	3.25	.3 - 35.19			
	Education 3	1.48	1.16	1.28	.2	4.41	.46 - 42.58			
	Education 4	1.28	1.14	1.12	.26	3.58	.38 - 33.36			
	Education 5	1.22	1.13	1.08	.28	3.4	.37 - 31.14			
	Education 6	1.49	1.13	1.31	.19	4.42	.48 - 40.69			
	Education 7	.74	1.42	.52	.6	2.1	.13 - 33.87			
	Income	0	0	.1	.92	1	1-1			
german sample	Constant	20.3	9,576.04	0	.998	7E+08	0 - ∞	7.85	.448	0.576
	Age	-.02	.01	2.14	.03	.98	.96 - 1			
	Education 2	-19.5	9,576.04	0	1	0	0 - ∞			
	Education 3	-19.88	9,576.04	0	1	0	0 - ∞			
	Education 4	-19.75	9,576.04	0	1	0	0 - ∞			
	Education 5	-19.57	9,576.04	0	1	0	0 - ∞			
	Education 6	-19.65	9,576.04	0	1	0	0 - ∞			
	Education 7	-20.09	9,576.04	0	1	0	0 - ∞			
	Income	0	0	.72	.47	1	1-1			
international sample	Constant	-20.81	8,199.65	0	.998	0	0 - ∞	17.22	.028	.652
	Age	.02	.02	.81	.42	1.02	.98 - 1.0			
	Education 2	19.33	8,199.65	0	1	2E+08	0 - ∞			
	Education 3	21.85	8,199.65	0	1	3E+09	0 - ∞			
	Education 4	20.09	8,199.65	0	1	5E+08	0 - ∞			
	Education 5	19.99	8,199.65	0	1	5E+08	0 - ∞			
	Education 6	20.69	8,199.65	0	1	1E+09	0 - ∞			
	Education 7	-.08	18,374.91	0	1	.92	0 - ∞			
	Income	0	0	.93	.35	1	1-1			

For the "international sample" and the target category "Yes," the logistic regression analysis shows that the model as a whole is not significant ($\chi^2(8) = 13.96$, $p = .083$, $n = 184$). With this borderline overall significance, the coefficient for the variable Age ($b = -.04$) indicates a negative relationship, even though the p-value for Age of .066 is also borderline significant. This means that an increase in

Age is associated with a decrease in the probability that the dependent variable is “Yes.” This is also reflected in the odds ratio of .96. In contrast, the results for the target category “Rather yes” show a significant model ($\chi^2(8) = 17.22$, $p = .028$, $n = 184$). However, all variables in the individual analysis have significance values beyond the acceptance threshold, making the results unusable.

Similar to the question S102 regarding BB 2.0, the question S202 for the acquisition of BB 3.0 services is now being examined. In this context, the logistic regression analysis for the “entire sample” and the target variable “Yes” as a whole (Table 34) is considered significant ($\chi^2(8) = 35.96$, $p < .001$, $n = 522$).

Table 33. Results of Multiple Logistic Regression Analyses for the Target Variable “Yes” (S202)

S202		Target value "Yes"								
	Predictor variables	Coefficient B	Standard error	z	P	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	1.49	1.04	1.43	.154	4.44	.57 - 34.42	36	<.001	.689
	Age	-.04	.01	3.27	0	.96	.94 - .98			
	Education 2	-.93	1.15	.81	.42	.39	.04 - 3.75			
	Education 3	-2.14	1.06	2.03	.04	.12	.01 - 0.93			
	Education 4	-1.5	.99	1.51	.13	.22	.03 - 1.56			
	Education 5	-.98	.96	1.02	.31	.38	.06 - 2.49			
	Education 6	-1.11	.97	1.14	.25	.33	.05 - 2.22			
	Education 7	-19.55	6,170.97	0	1	0	0 - ∞			
german sample	Income	0	0	1.75	.08	1	1-1	9.55	.298	.633
	Constant	-18.55	18,592.42	0	.999	0	0 - ∞			
	Age	-.04	.02	2.42	.02	.96	.93 - .99			
	Education 2	17.97	18,592.42	0	1	6E+07	0 - ∞			
	Education 3	17.7	18,592.42	0	1	5E+07	0 - ∞			
	Education 4	17.86	18,592.42	0	1	6E+07	0 - ∞			
	Education 5	17.89	18,592.42	0	1	6E+07	0 - ∞			
	Education 6	18.02	18,592.42	0	1	7E+07	0 - ∞			
international sample	Education 7	-.75	20,332.93	0	1	.47	0 - ∞	18.8	.016	.698
	Income	0	0	.44	.66	1	1-1			
	Constant	2.25	1.32	1.71	.087	9.52	.72 - 126.26			
	Age	-.05	.02	2.24	.03	.95	.91 - .99			
	Education 2	-.94	1.38	.68	.5	.39	.03 - 5.81			
	Education 3	-3.02	1.52	1.99	.05	.05	0 - .96			
	Education 4	-1.25	1.24	1.01	.31	.29	.03 - 3.23			
	Education 5	-.79	1.07	.74	.46	.45	.06 - 3.68			
	Education 6	-1.19	1.08	1.1	.27	.3	.04 - 2.54			
	Education 7	-18.06	7,323.49	0	1	0	0 - ∞			
	Income	0	0	1.75	.08	1	1-1			

Here, the variable Age shows the same coefficient of $b = -.04$ and an odds ratio of .96, similar to BB 2.0 Services. The odds ratio for A-levels is .12, which is higher than .07 for BB 2.0. A significant model is also calculated for the target variable "Rather yes" ($\chi^2(8) = 16.01$, $p = .042$, $n = 522$), but all variables have p-values beyond significance (Table 35). This may also be due to a low AUC value of .579 (50% is the threshold), indicating low performance of the binary classification model across all classification thresholds (Hernández-Orallo, 2013).

Table 34. Results of Multiple Logistic Regression Analyses for the Target Variable "Rather yes" (S202)

S202		Target value "Rather yes"								
	Predictor variables	Coefficient B	Standard error	z	p	Odds Ratio	95% Confidence interval	Chi2	p	AUC
entire sample	Constant	-20.41	7,333.68	0	.998	0	0 - ∞	16.01	.042	.579
	Age	0	.01	0	1	1	.98 - 1.02			
	Education 2	20.3	7,333.68	0	1	7E+08	0 - ∞			
	Education 3	20.73	7,333.68	0	1	1E+09	0 - ∞			
	Education 4	20.33	7,333.68	0	1	7E+08	0 - ∞			
	Education 5	19.95	7,333.68	0	1	5E+08	0 - ∞			
	Education 6	20.38	7,333.68	0	1	7E+08	0 - ∞			
	Education 7	18.8	7,333.68	0	1	1E+08	0 - ∞			
	Income	0	0	.02	.98	1	1-1			
german sample	Constant	-18.17	5,911.88	0	.998	0	0 - ∞	3.96	.86	.534
	Age	0	.01	.29	.77	1	.98 - 1.02			
	Education 2	18.06	5,911.88	0	1	7E+07	0 - ∞			
	Education 3	18.4	5,911.88	0	1	1E+08	0 - ∞			
	Education 4	18.35	5,911.88	0	1	9E+07	0 - ∞			
	Education 5	18.18	5,911.88	0	1	8E+07	0 - ∞			
	Education 6	18.24	5,911.88	0	1	8E+07	0 - ∞			
	Education 7	16.97	5,911.88	0	1	2E+07	0 - ∞			
	Income	0	0	.22	.83	1	1-1			
international sample	Constant	-21.31	8,529.95	0	.998	0	0 - ∞	22.16	.005	.688
	Age	.02	.02	1.1	.27	1.02	.98 - 1.06			
	Education 2	20.68	8,529.95	0	1	1E+09	0 - ∞			
	Education 3	22.11	8,529.95	0	1	4E+09	0 - ∞			
	Education 4	19.84	8,529.95	0	1	4E+08	0 - ∞			
	Education 5	19.73	8,529.95	0	1	4E+08	0 - ∞			
	Education 6	20.6	8,529.95	0	1	9E+08	0 - ∞			
	Education 7	-.25	19,091.01	0	1	.78	0 - ∞			
	Income	0	0	.18	.86	1	1-1			

The “German sample” shows no significant logistic regression model for both the target variable “Yes” ($\text{Chi}^2(8) = 9.55$, $p = .298$, $n = 338$) and for the target variable “Rather yes” ($\text{Chi}^2(8) = 3.96$, $p = .86$, $n = 338$). In contrast, the “international sample” exhibits a significant logistic regression model for the target variable “Yes” ($\text{Chi}^2(8) = 18.8$, $p = .016$, $n = 184$). The coefficient for the variable Age is $b = -.05$, with an odds ratio of .95. For Education, the coefficient for A-levels is $b = -3.02$, which is negative, and the odds ratio (OR) is .05. Although a significant regression model is identified for the target variable “Rather yes” ($\text{Chi}^2(8) = 22.16$, $p = .005$, $n = 184$), the p-values of all variables are beyond a valid significance level.

In summary, it can be said that H1.4.1 regarding age can be verified. In nearly all samples, a trend can be observed that with increasing age, the likelihood of accepting both BB 2.0 and 3.0 services decreases. For H1.4.2 concerning the questions S101 and S102 and the entire sample, a V-shaped probability trend with increasing education level can be observed for the target variable “Important” with constant A-levels (No. 3) $b = -2.77$ and $\text{OR} = .06$, Completed vocational training (No. 4) $b = -3.11$ and $\text{OR} = .04$, and Completed Master's degree (No. 6) $b = -2.29$ and $\text{OR} = .1$. For S102 regarding the target variable “Yes,” similar values are $b = -2.34$ and $\text{OR} = .1$ (No. 2), $b = -2.72$ and $\text{OR} = .07$ (No. 3), $b = -2.29$ and $\text{OR} = .1$ (No. 4), $b = -1.96$ and $\text{OR} = .14$ (No. 5), and $b = -1.84$ and $\text{OR} = .16$ (No. 6). However, the degree of comparison with BB 2.0 and BB 3.0 can only be assessed conditionally, as the significance varies across different samples and target variables, which is mainly due to the variables “Education” and consistently applies to the variable “Income.” Therefore, H1.4.2 regarding “Education” can only be conditionally verified, and no usable results can be provided for H1.4.3 regarding “Income” that would verify the hypothesis. This requires further examination using appropriate statistical methods.

Due to the absence of constant necessary significance levels across all sample sizes and the stratified and more complex target variable analyses, logistic regression is probably not the most suitable choice of methodology. The Mann-Whitney U test (Mann & Whitney, 1947; Nachar, 2008) is useful for assessing differences between two independent groups—“German” and “International” samples—especially when the data are not normally distributed or are ordinal. It

helps determine if one group generally has a higher rank for a specific variable than the other.

The U-value indicates how often a score from one group ranks higher than a score from the other group in the overall ranking of all scores. A smaller U-value suggests that the ranks of one group are generally lower than those of the other group, indicating a difference in the distribution of the two groups. If the observed U is significantly lower than $\mu U = n_1 n_2 / 2$, then a group has predominantly higher (or lower) ranks and 'wins' most pair comparisons. If U is significantly above μU , then the other group is more dominant. For the calculation of the test statistic U, the larger of the two rank sums is used:

Equation 11. Formula for the Mann-Whitney U Test

$$U = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1 \quad (11)$$

with

n_1 = Sample size of the group with the larger rank sum

n_2 = Sample size of the group with the smaller rank sum

R_1 = larger of the two rank sum values

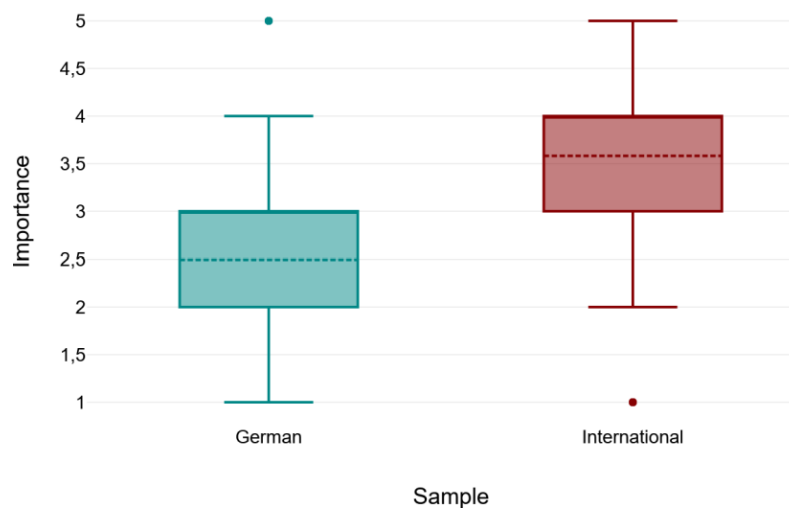
For questions S101 (BB 2.0) and S201 (BB 3.0), the following null hypothesis is formulated: There is no difference between the "German" and "International" groups regarding the variable "Importance". This test with $r = .43$ indicates a moderate effect of the difference between the two groups. The most significant finding from Table 36 is that the German group tends to have a lower value for the variable "Importance" than the International group, as indicated by their lower average rank.

Table 35. Results for S101 (BB 2.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	2.49	3	1.04	214.6	72,548	15,257	-9.9	<.001	<.001	.43
int	184	3.58	4	1.1	347.6	63,956					

Furthermore, it should be noted that the mean of the German sample is 2.49, and that of the international sample is 3.58, indicating that the international sample is more than one ordinal value higher. This difference is also clearly shown in the next boxplot (Figure 29). Therefore, the international sample considers the importance of such BB 2.0 services to be generally “Rather important.” For the German sample, the value falls between “Rather not important” and “Neutral.” Due to the clear distinction between the two groups, the null hypothesis is rejected.

Figure 29. Importance According to the Sample (BB 2.0)



In contrast, the results for question S201 (BB 3.0) with an $r = .23$ indicate a small effect of the difference between the two groups. The most significant finding from Table 37 is that the German group tends to have a lower value for the variable “Importance” than the international group, as indicated by their lower average rank.

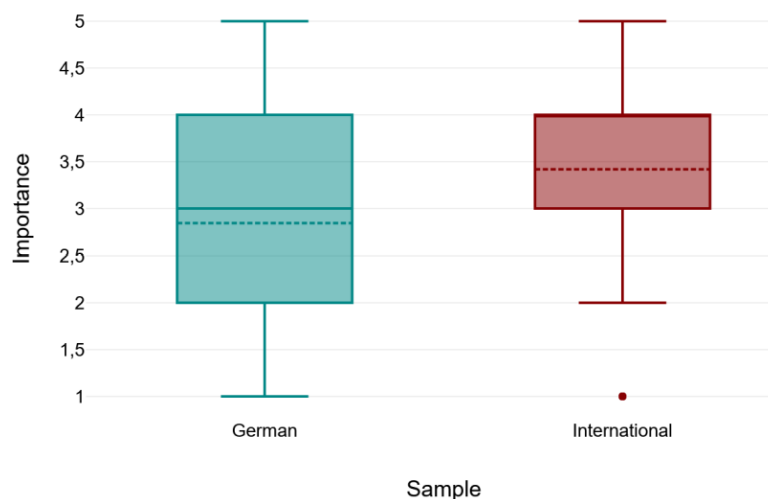
Table 36. Results for S201 (BB 3.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	2.84	3	1.18	237.14	80,153	22,862	-5.2	<.001	<.001	.23
int	184	3.42	4	1.16	306.25	56,350					

While the German sample here has an average value of 2.84 and a wide interquartile range from 2 to 4, the international sample has an average value of

3.42 with an interquartile range between 3 and 4, and a higher ordinal value of .58. This range is also reflected in the next boxplot (Figure 30). Therefore, the international sample group considers the importance of such BB 3.0 services to be generally between “Neutral” and “Rather important,” and slightly lower compared to the BB 2.0 services. For the German sample, the value tends to be around “Neutral,” which is higher compared to the BB 2.0 services. Although the distinction between the two groups is moderate to small, the null hypothesis is rejected.

Figure 30. Importance According to the Sample (BB 3.0)



For the questions S102 (BB 2.0) and S202 (BB 3.0), after customers are willing to purchase such BB services, the following null hypothesis is formulated: there is no difference between the groups “German” and “International” regarding the variable “Purchase offer.”

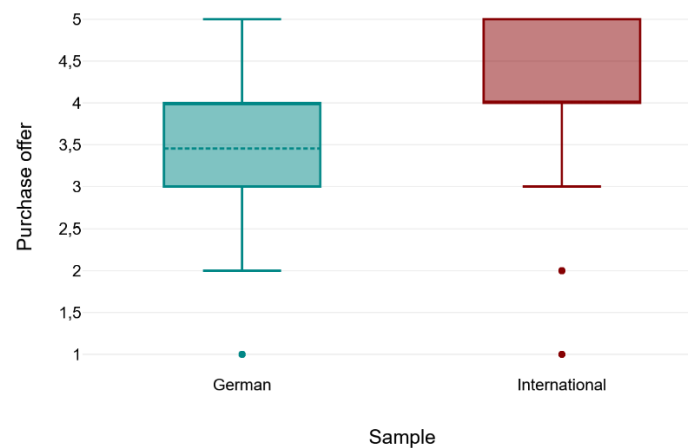
This test with an $r = .28$ indicates a small effect of the difference between the two groups. The most important finding from Table 38 is that the German group tends to have a lower value for the variable “Purchase offer” than the International group, as shown by their lower average rank.

Table 37. Results for S102 (BB 2.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	3.46	4	1.01	232.6	78,632	21,341	-6.3	<.001	<.001	.28
int	184	4	4	1	314.5	57,871					

Both groups show a tendency to acquire BB 2.0 services. The German group has an average score of 3.46, which falls between “Neutral” and “Rather yes,” whereas the international group has an average score of 4, corresponding to “Rather yes.” The ordinal mean difference is 0.54 higher for the international group. This difference is also reflected in the next boxplot (Figure 31). Although the distinction between the two groups is also moderate to small, the null hypothesis is rejected.

Figure 31. Purchase Offer According to the Sample (BB 2.0)



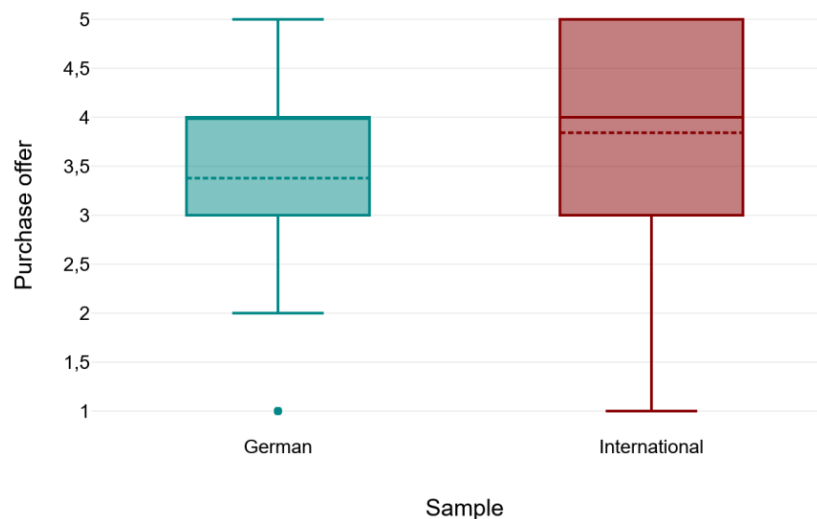
The results for question S202 (BB 3.0) with an $r = .2$ also indicate a small effect of the difference between the two groups. The most significant finding from Table 39 is that the German group tends to have a lower value for the variable “Purchase offer” than the International group, as indicated by their lower average rank.

Table 38. Results for S202 (BB 3.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	3.38	4	1.15	240.5	81,297	24,006	-4.6	<.001	<.001	.2
int	184	3.84	4	1.06	300	55,207					

Both groups tend to acquire BB 3.0 services, although the mean values of 3.38 (German sample) and 3.84 (international sample) are somewhat lower than those for BB 2.0 services. Therefore, the German sample is generally closer to the “Neutral” value, while the international sample leans more toward “Rather yes.” The ordinal mean difference is .46 higher, and the interquartile range extends from 3 to 5 in the international group. This difference is also reflected in the next boxplot (Figure 32). The distinction between the two groups is also moderate to small here, so the null hypothesis is rejected.

Figure 32. Purchase Offer According to the Sample (BB 3.0)



It could thus be demonstrated that there are differences in the importance and purchase intention of customers between the German sample and the international sample concerning BB 2.0 and BB 3.0 services. However, it has not yet been significantly proven to what extent the variables Education, which could only be evaluated to a limited extent through logistic regression, and Income, which

could not provide usable results through logistic regression, can explain the target variables “Important” and “Rather important” (S101 and S201) and “Yes” and “Rather yes” (S102 and S202). To explain the variable Education for the different target variables, the Kruskal-Wallis test is used (Ostertagová et al., 2014). Unlike the Mann-Whitney U test, this is used with more than two samples. For this, the ordinal variable Education is considered and transformed as a categorical variable with multiple groups (1 to 7). To calculate the test statistic H , these rank sums are used:

Equation 12. Formula for the Kruskal-Wallis Test

$$H = \frac{12}{N(N+1)} \sum_{i=1}^k \frac{R_i^2}{n_i} - 3(N+1) \quad (12)$$

with

R_i = Total sums for each group

N = Total sample size

n_i = Size of each group

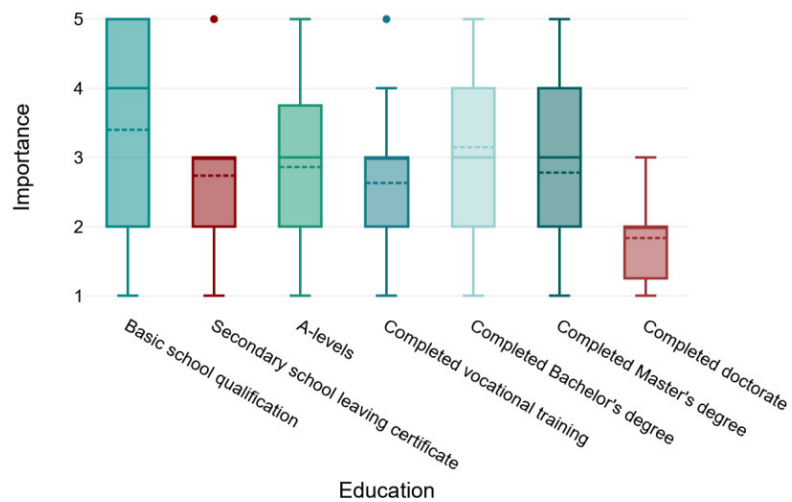
First, calculations were performed for questions S101 and S201, as well as S102 and S202, for both the German and international sample groups. However, at least one group has fewer than 2 cases, so no analysis can be conducted. And this applies to all calculation scenarios. Therefore, the overall sample ($n=522$) is used to gather significant data regarding the variable Education. Thus, for questions S101 and S201, the following null hypothesis is formulated: There is no difference between the 7 categories of the independent variable “Education” concerning the dependent variable “Importance.”

For the responses to question S101 regarding BB 2.0 Services, it can be summarized that participants with a Basic school qualification (Group 1) have the highest Middle rank of 317.8 and a median of 4 (Table 40 and Figure 33). Following that, with increasing education level, there is a fluctuating Middle rank, but a robust median of 3 up to a Completed Master's degree (Group 6). With a Completed Doctorate, the Middle rank drops to 127.92 with a median of 2. It should be noted that only a small number of participants are present in both groups 1 ($n=5$) and 7 ($n=6$). Based on the available data, the null hypothesis is rejected.

Table 39. Kruskal-Wallis Test Results: Importance According to Education (BB 2.0)

Group	n	Median	Middle rank	Chi2	df	p
Basic school qualification	5	4	317.8	19.05	6	.004
Secondary school leaving certificate	19	3	238.53			
A-levels	50	3	259.52			
Completed vocational training	100	3	234.35			
Completed Bachelor's degree	178	3	293.27			
Completed Master's degree	164	3	250.01			
Completed doctorate	6	2	127.92			
Total	522	3				

Figure 33. Boxplots: Importance According to Education (BB 2.0)



Compared to BB 3.0 Services for the question S201, the statistical test with a p-value of .172 is not significant (Table 41). Therefore, the null hypothesis is not rejected.

Table 40. Kruskal-Wallis Test Results: Importance According to Education (BB 3.0)

Group	n	Median	Middle rank	Chi2	df	p
Basic school qualification	5	2	162.7	9.02	6	.172
Secondary school leaving certificate	19	3	293.55			
A-levels	50	3	257.71			
Completed vocational training	100	3	254.87			
Completed Bachelor's degree	178	3	275.03			
Completed Master's degree	164	3	255.56			
Completed doctorate	6	2	145.25			
Total	522	3				

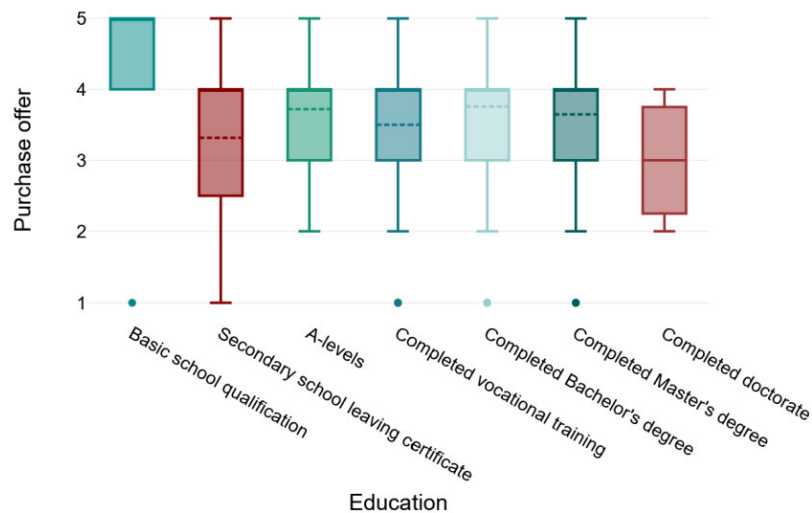
For questions S102 and S202, the following null hypothesis is formulated: There is no difference between the 7 categories of the independent variable "Education" concerning the dependent variable "Purchase offer".

For question S102, unlike question S101, there is a similar trend with increasing education level, but the median here is on average at 4, and the sum of all middle ranks is also higher (Table 42 and Figure 34). Although the significance test with $p = .054$ is just above the threshold, the null hypothesis cannot be rejected.

Table 41. Kruskal-Wallis Test Results: Purchase Offer According to Education (BB 2.0)

Group	n	Median	Middle rank	Chi2	df	p
Basic school qualification	5	5	346.5	12.38	6	.054
Secondary school leaving certificate	19	4	215.89			
A-levels	50	4	266.6			
Completed vocational training	100	4	237.97			
Completed Bachelor's degree	178	4	278.93			
Completed Master's degree	164	4	261.71			
Completed doctorate	6	3	162			
Total	522	4				

Figure 34. Boxplots: Purchase Offer According to Education (BB 2.0)



For question S202 regarding BB 3.0 Services, the statistical test with $p = .172$ is not significant, similar to question S201 (Table 43). Therefore, the null hypothesis is not rejected.

Table 42. Kruskal-Wallis Test Results: Purchase Offer According to Education (BB 3.0)

Group	n	Median	Middle rank	Chi2	df	p
Basic school qualification	5	2	212.3	9.03	6	.172
Secondary school leaving certificate	19	4	268.39			
A-levels	50	4	264.86			
Completed vocational training	100	4	243.03			
Completed Bachelor's degree	178	4	276.92			
Completed Master's degree	164	4	260.27			
Completed doctorate	6	2,5	136.75			
Total	522	4				

After the target variables have been explained by the variable Education, the relationship between the variable Income and the target variables is now being examined. The Spearman correlation (de Winter et al., 2016) is used here. The two null hypotheses are: there is no relationship between "Income" and "Importance" (S101 and S201). There is no relationship between "Income" and "Purchase offer" (S102 and S202).

The summarized results in the table below generally indicate no ($r = .0 < .1$) to small ($r = .1 < .3$) correlation between income and the target variables. All significant calculations show a negative correlation, meaning that as income increases, the likelihood that “Importance” and “Purchase offer” are chosen as “Rather important” or “Important” and “Rather yes” or “Yes,” respectively, decreases. The international group exhibits the highest negative correlation compared to the German sample, where the relationship is only minimal and the calculations are not significant except for S102. Each sample group or each pair of target variables S101/S201 and S102/202 can demonstrate at least an r-value of $> .1$, allowing the null hypotheses to be rejected.

Table 43. Spearman Correlation Results: Target Variables According to Income

	entire sample		german sample		international sample	
	r	p	r	p	r	p
Income and Importance (S101)	-.22	<.001	-.08	.169	-.26	<.001
Income and Importance (S201)	-.07	.119	.04	.52	-.13	.074
Income and Purchase offer (S102)	-.23	<.001	-.15	.006	-.2	.006
Income and Purchase offer (S202)	-.16	<.001	-.06	.312	-.25	.001

After the independent variables were able to explain the target variables, it is of interest from the bank's perspective to identify which target groups can be recognized as willing to purchase BB 2.0 and 3.0 services. For this purpose, the responses to questions S102 and S202 (Purchase offer) are used. The k-means clustering method is emphasized for identifying and classifying target groups into clusters, as highlighted by Ikotun et al. (2023). This method aims to reduce the total squared deviations of data points from their respective cluster centers (Loog et al., 2023), as illustrated by the following formula:

Equation 13. Formula for the K-Means Clustering Algorithm

$$V = \sum_{i=1}^k \sum_{x \in S_i} (x - \mu_i)^2 \quad (13)$$

with

k = number of clusters

S_i = represents the obtained clusters

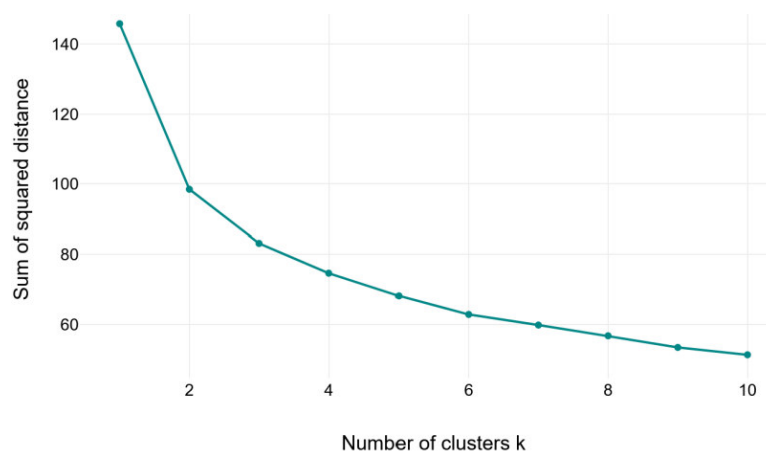
x = the coordinates of the points

μ_i = the coordinates of the cluster center

For the clustering process, metric data is a prerequisite. The two predictor variables, Age and Income, are used because they are metric and this information is typically available to the banks. Furthermore, the dependent ordinal-scaled variable from S102 and S202 is transformed into metric-scaled data. Here, the two sample groups “German” and “International” are compared again.

For the German sample ($n=338$) with the target variable S102 (Purchase offer), an initial partition into k clusters (a predefined number) is first created as an example. Here, $k=4$ (Figure 35) is selected (DATAtab, 2025). According to Syakur et al. (2018), the Elbow method is crucial in determining at which cluster the Sum of Square Error calculations for each cluster experience the greatest decrease. Since the decrease between $k=2$ and $k=3$ is still significant and only flattens rapidly after $k=3$, $k=3$ is selected as the optimal number of clusters, which is justified in the subsequent analysis.

Figure 35. Elbow Method for Purchase Offer S102 (German sample, $k=4$)



Then, with $k=3$, the process begins by calculating Euclidean distances from each object to all cluster centroids, starting with the first object in the first cluster.

If any object is closer to a centroid of another cluster than to its current one, it is reassigned to that cluster. After moving objects, the centroids of the affected clusters are updated to reflect the new memberships. This procedure repeats until all objects are in clusters where they are closest to the respective centroids, reaching an optimal configuration. The repetitions of the algorithm are a maximum of 10 runs, and all data are normalized.

Thus, from $k=3$ ($n=338$), Cluster 1 (turquoise) with 151 cases, Cluster 2 (dark red) with 84 cases, and Cluster 3 (green) with 103 cases are formed (Figure 36). The data points can be most easily visualized by the reader when the values on the z-axis (Purchase offer) are presented in a layered manner, value by value (1-5 as integers).

Figure 36. 3D Point Clustering According to Purchase Offer (S102, $n=338$ =German, $k=3$)

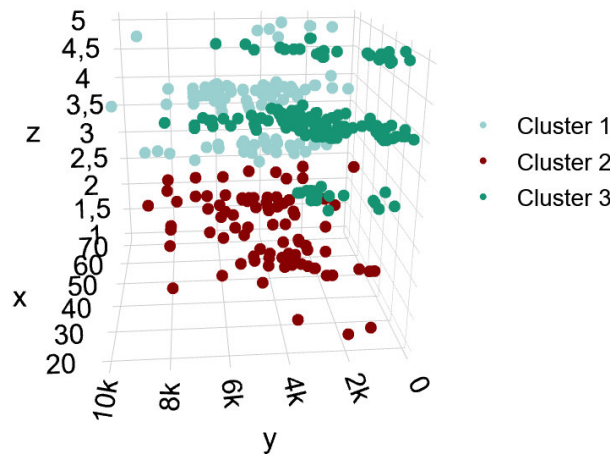


Table 45 below shows the cluster centers. Since only the target groups that indicate their intention to purchase BB 2.0 services with “Rather yes” (=4) or “Yes” (=5) are considered, Cluster 2 with a value of 2 is not included. Therefore, the following target groups are interpreted for the German sample: In Cluster 1, there is a group of German participants ($n=151=44.67\%$) with a high average age of 56.34 years, a high average monthly net income of 4,807.29 EUR, and a tendency to want to purchase BB 2.0 services with a value of 3.79, leaning towards “Rather yes.” In Cluster 3, there is a group of German participants ($n=103=30.47\%$) with a middle average age of 29.11 years, a moderate average net income of 2,943.72 EUR, and a

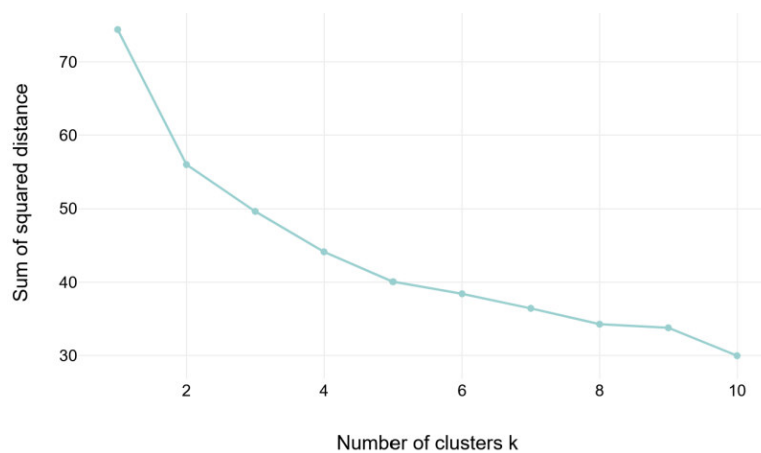
tendency to want to purchase BB 2.0 services with a value of 4.04, also leaning towards “Rather yes.”

Table 44. Cluster Centers for Purchase Offer (S102, $n=338$ =German, $k=3$)

Cluster	Age	Income	Purchase offer (S102)
1	56.34	4,807.29	3.79
2	44.07	4,337.82	2
3	29.11	2,943.72	4.04

Now, the same procedure is applied to the international sample ($n=184$) group. Based on previous experiences, $k=3$ is initially chosen. Accordingly, Figure 37 shows the Elbow Method, where a similarly strong negative trend is observed up to $k=4$. Only after $k=4$ does the decrease level off. Therefore, $k=4$ is considered the optimal number of clusters.

Figure 37. Elbow Method for Purchase Offer S102 (international sample, $k=3$)



Thus, from $k=4$ ($n=184$), Cluster 1 (turquoise) with 60 cases, Cluster 2 (dark red) with 31 cases, Cluster 3 with 61 cases (green), and Cluster 4 with 32 cases (petrol) are formed (Figure 38).

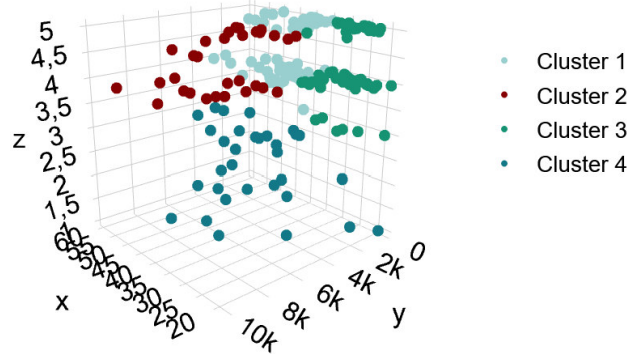
Figure 38. 3D Point Clustering According to Purchase Offer (S102, $n=184=$ International, $k=4$)

Table 46 below shows the cluster centers. Cluster 4, with a value of 2.28, is not considered. Therefore, the following target groups are interpreted for the international sample: In Cluster 1, there is a group of international participants ($n=60=32.61\%$) with a moderate average age of 39.48 years, a low average monthly net income of 2,134.85 EUR, and a score of 4.42, which tends toward “Rather yes” and “Yes,” indicating an interest in purchasing BB 2.0 services. In Cluster 2, there is a group of international participants ($n=31=16.85\%$) with an average age of 35.61 years, a high average monthly net income of 6,754.84 EUR, and a score of 4.48, also leaning toward “Rather yes” and “Yes.” In Cluster 3, there is a group of international participants ($n=61=33.15\%$) with a young to middle-aged average of 26.21 years, a low average monthly net income of 1,161.51 EUR, and a score of 4.25, generally leaning toward “Rather yes.”

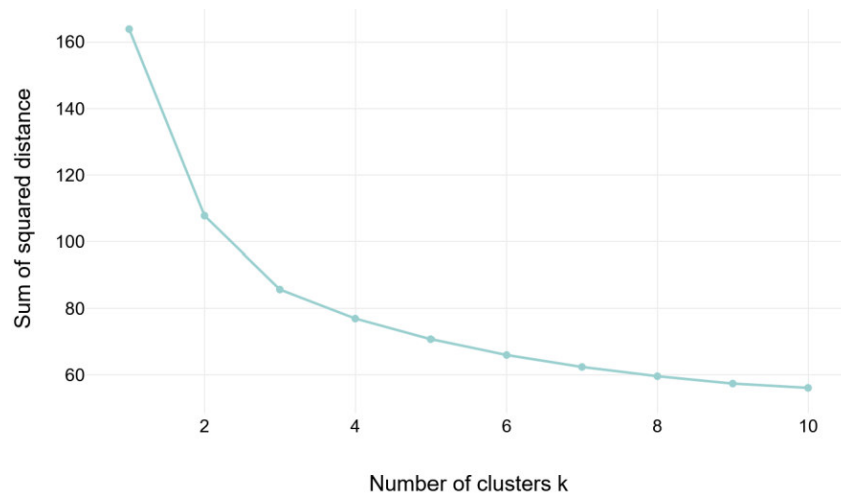
Table 45. Cluster Centers for Purchase Offer (S102, $n=184=$ International, $k=4$)

Cluster	Age	Income	Purchase offer (S102)
1	39.48	2,134.85	4.42
2	35.61	6,754.84	4.48
3	26.21	1,161.51	4.25
4	37.91	4,420.31	2.28

Now the focus is on the clustering for the acquisition of BB 3.0 services. For the German sample ($n=338$) with the target variable S202 (Purchase offer), an initial partition with $k=3$ is chosen. Based on the next Elbow method figure, the reduction

of the negative trend decreases significantly and flattens out at $k=3$. Therefore, $k=3$ is already the optimally chosen number of clusters.

Figure 39. Elbow Method for Purchase Offer S202 (german sample, $k=3$)



Thus, from $k=3$ ($n=338$), Cluster 1 (turquoise) with 141 cases, Cluster 2 (dark red) with 83 cases, and Cluster 3 (green) with 114 cases are formed (Figure 40).

Figure 40. 3D Point Clustering According to Purchase Offer (S202, $n=338$ =German, $k=3$)

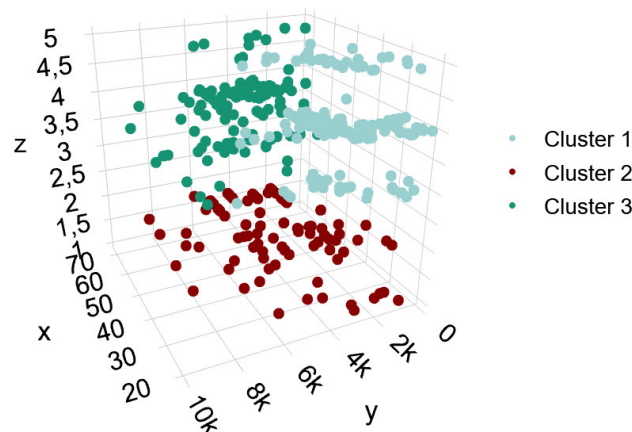


Table 47 below shows the cluster centers. Cluster 2 with a value of 1.64 is not considered. Therefore, the following target groups are interpreted for the German sample: In Cluster 1, there is a group of German participants ($n=141=41.72\%$) with

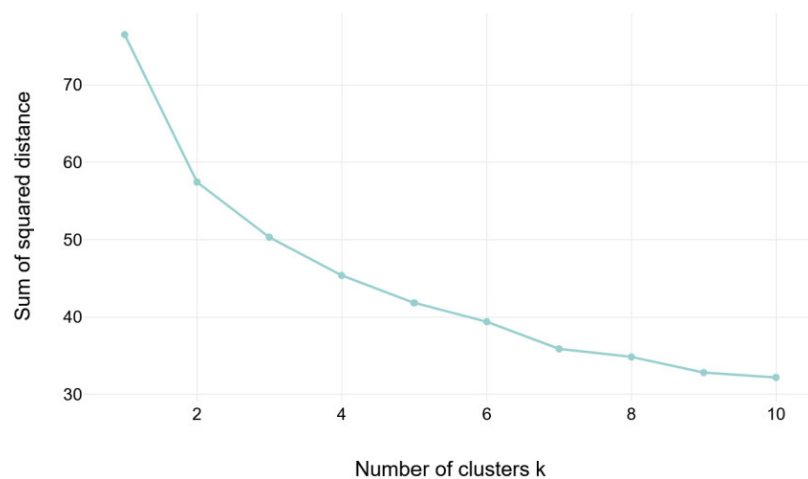
a young to middle-aged average of 28.58 years, an average monthly net income of 2,865.16 EUR, and a tendency towards “Rather yes” with a value of 4.02, indicating an interest in acquiring BB 3.0 services. In Cluster 3, there is a group of German participants ($n=114=33.73\%$) with an older average age of 54.18 years, a high average net income of 4,925.01 EUR, and a tendency towards “Rather yes” with a value of 3.85.

Table 46. Cluster Centers for Purchase Offer (S202, $n=338$ =German, $k=3$)

Cluster	Age	Income	Purchase offer (S202)
1	28.58	2,865.16	4.02
2	44.51	4,079.42	1.64
3	54.18	4,925.01	3.85

Now, the same procedure is applied to the international sample ($n=184$) group. Based on the previously optimal number of clusters, a $k=4$ is initially chosen. The next Elbow method figure clearly shows that $k=4$ has already been selected as the optimal number of clusters, as the decrease in the sum of squared distances only becomes less pronounced starting at $k=4$.

Figure 41. Elbow Method for Purchase Offer S202 (international sample, $k=4$)



Thus, from $k=4$ ($n=184$), Cluster 1 (turquoise) with 39 cases, Cluster 2 (dark red) with 38 cases, Cluster 3 with 59 cases (green), and Cluster 4 with 48 cases (petrol) are formed (Figure 42).

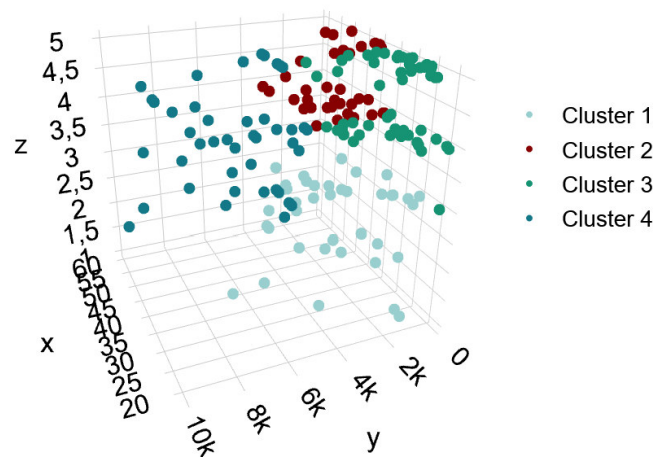
Figure 42. 3D Point Clustering According to Purchase Offer (S202, $n=184=$ International, $k=4$)

Table 48 below shows the cluster centers. Cluster 1 with a target value of 2.28 is not considered. Therefore, the following target groups are interpreted for the international sample: In Cluster 2, there is a group of international participants ($n=38=20.65\%$) with an average age of 41.97 years, a low average monthly net income of 1,692.05 EUR, and a tendency towards “Rather yes” with a value of 4.32, indicating an interest in purchasing BB 3.0 services. In Cluster 3, there is a group of international participants ($n=59=32.07\%$) with a young average age of 27.03 years, a low average net income of 1,357.56 EUR, and a value of 4.53, which falls between “Rather yes” and “Yes.” In Cluster 4, there is a group of international participants ($n=48=26.09\%$) with an average age of 35.92 years, a high average net income of 6,387.50 EUR, and a tendency towards “Rather yes” with a target value of 3.9.

Table 47. Cluster Centers for Purchase Offer (S202, $n=184=$ International, $k=4$)

Cluster	Age	Income	Purchase offer (S202)
1	35.15	2,533.31	2.28
2	41.97	1,692.05	4.32
3	27.03	1,357.56	4.53
4	35.92	6,387.5	3.9

To evaluate H1.5, which suggests that customers want to receive non-banking offers from the bank and, in return, permit extended data analysis and transmission for improved, targeted, and personalized marketing measures,

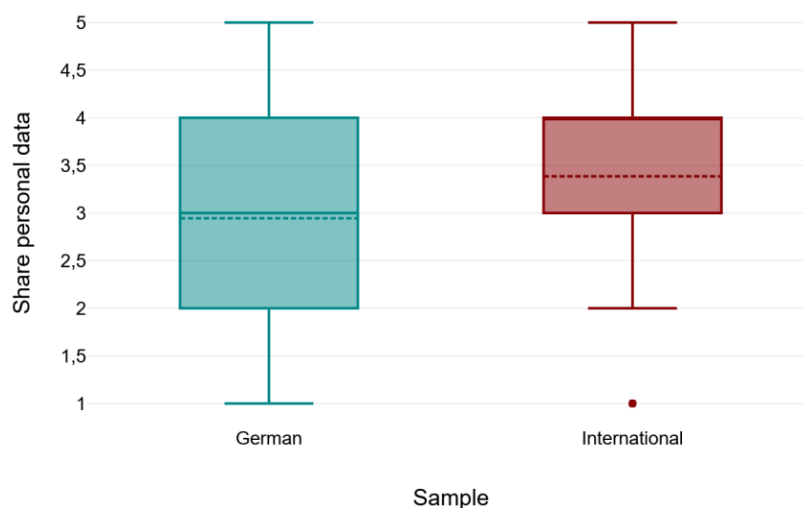
further consideration of the questions S105 and S107 for BB 2.0 services and S205 and S207 for BB 3.0 services is necessary. For this purpose, the Mann-Whitney U test is also used to explain the differences between the sample groups. The null hypothesis for questions S105 and S205 is: There is no difference between the “German” and “International” groups regarding the variable “Share personal data.”

The German group had lower values for the variable “Share personal data” (Median = 3) than the International group (Median = 4). The effect size r is .17 and is therefore considered small. The most important finding from Table 49 is that the German group tends to have a lower value for the variable “Share personal data” than the International group, as indicated by their lower average rank. Thus, the German group tends to choose “Neutral” for the transmission of personal data, while the International group tends to choose “Rather yes” (see also Figure 43). Therefore, the null hypothesis is rejected.

Table 48. Results for S105 (BB 2.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	2.94	3	1.26	243.5	82,310	25,019	-3.82	<.001	<.001	.17
int	184	3.39	4	1.22	294.5	54,194					

Figure 43. Share Personal Data According to the Sample (BB 2.0)

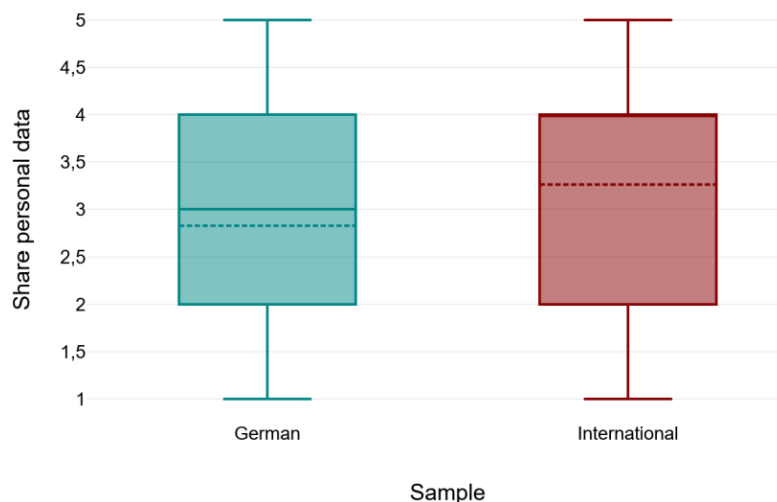


In comparison, the test for question 205 for BB 3.0 Services yields a very similar result (Table 50 and Figure 44), with a slightly reduced mean value, the same median, and the same middle rank for both groups. The effect size r is .16 and thus classified as small. The tendencies of both groups are analogous to the responses to BB 2.0 (S105). Therefore, the null hypothesis is also rejected.

Table 49. Results for S205 (BB 3.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	2.83	3	1.26	244.4	82,596	25,305	-3.63	<.001	<.001	.16
int	184	3.26	4	1.31	293	53,907					

Figure 44. Share Personal Data According to the Sample (BB 3.0)



In order for banks to provide their customers with more targeted, needs-based offers, a deeper analysis and evaluation of data, such as a payment flow analysis, is necessary. This topic is addressed by the questions S107 (BB 2.0) and S207 (BB 3.0). It should be noted that if participants answer “No” or “Rather no” to question S105 (analogous to S205) and thus do not want to share data, they are directly forwarded to question S108 (analogous to S208) and therefore do not answer question S107 (S207). As a result, the remaining 345 participants serve as the basis for these questions through this filtering approach. The null hypothesis

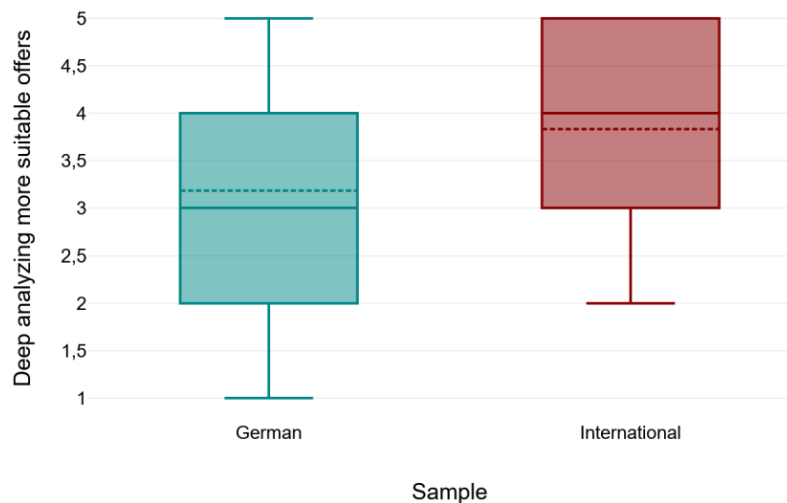
for questions S107 and S207 is: There is no difference between the “German” and “International” groups regarding the variable “*Deep analyzing more suitable offers*”.

The German group had lower scores for the variable “*Deep analyzing more suitable offers*” (Median = 3) than the International group (Median = 4). The effect size r is .27 and indicates a small to medium effect. The most important finding from Table 51 and Figure 45 is that the German group tends to have a lower value for the variable “*Deep analyzing more suitable offers*” than the International group, as shown by their lower average rank. Here, too, the responses tend to be “Neutral” for Germans and “Rather yes” for Internationals. The null hypothesis is rejected.

Table 50. Results for S107 (BB 2.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	203	3.18	3	1.19	151.6	30,772	10,066	-4.95	<.001	<.001	.27
int	142	3.83	4	1	203.6	28,914					

Figure 45. Deep Analyzing More Suitable Offers According to the Sample (BB 2.0)



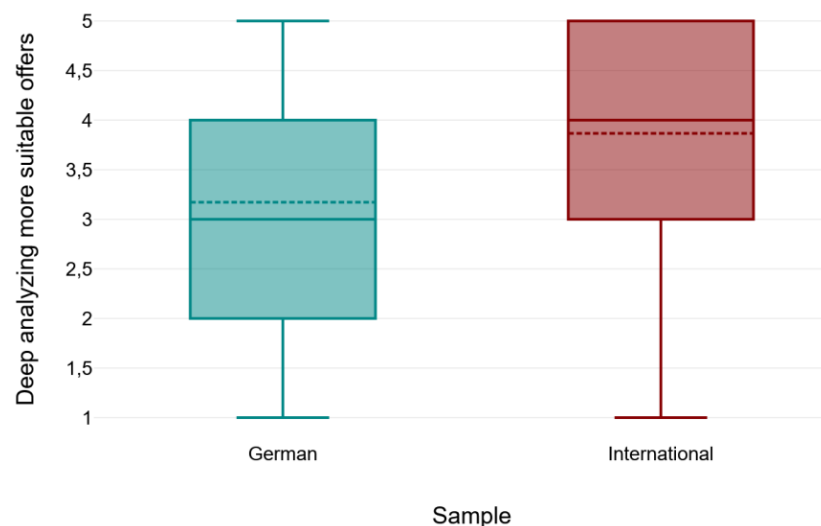
Compared to the question S107 regarding BB 2.0 Services, the data basis is lower for S207 and BB 3.0 Services ($n=326$). Here as well, the filter logic is the same as in the previous configuration for the question S107. The results here also align with those for BB 2.0 and 3.0 Services. The German group also had lower values for the variable “*Deep analyzing more suitable offers*” (Median = 3) than the International

group (Median = 4). The effect size r is .3, indicating a medium effect. The most important insight from Table 52 and Figure 46 is that the German group tends to have a lower value for the variable “Deep analyzing more suitable offers” than the International group, as shown by their lower average rank. The null hypothesis is also rejected.

Table 51. Results for S207 (BB 3.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	192	3.17	3	1.13	141.2	27,117	8,589	-5.33	<.001	<.001	.3
int	134	3.87	4	.96	195.4	26,184					

Figure 46. Deep Analyzing More Suitable Offers According to the Sample (BB 3.0)



If customers do not agree to transmit and evaluate their data in exchange for personalized offers, then the question becomes how much they can be encouraged to do so in order to transmit the data. This is addressed in H1.6, where incentives facilitate the decision for extended data evaluation and transmission by the customers. The questions S108 (similar to S208 for BB 3.0) and S109 (S209) are relevant for evaluating the hypothesis. It should be noted that if participants answered the previous questions S105 (sharing personal data, similar to S205 for BB 3.0) with “Rather no” or “No,” or S107 (S207) with “No,” “Rather no,” or “Neutral,” they are directed to questions S108 (S208) and S109 (S209). Question

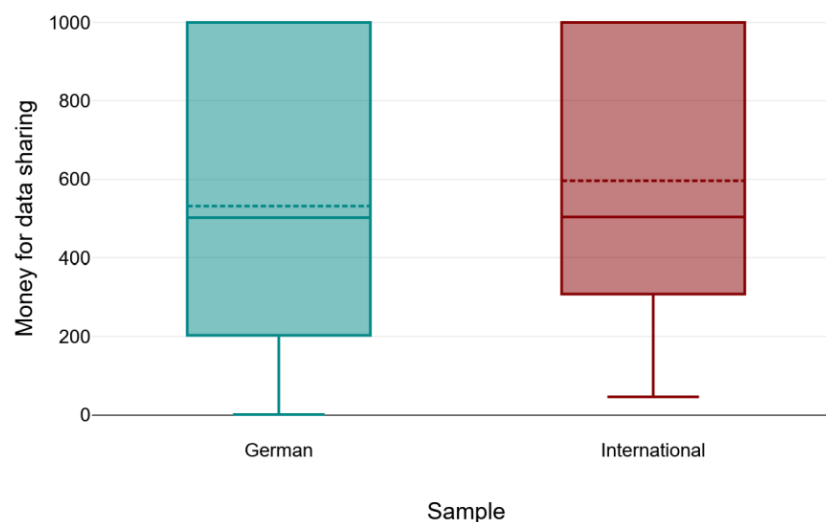
S108 (S208) aims to determine how much money it would be worth to the customers to transmit their data to the bank. If customers value other concerns more than money, this can be expressed through question S109 (S209).

For the questions S108 and S208, the following null hypothesis can now be formulated: There is no difference between the groups “German” and “International” regarding the variable “*Money for data sharing*.” Due to the previously mentioned filtering logic, a remaining number of 145 participants results. Here, the Mann-Whitney U test is initially used. The mean value for Germans is 531.4 EUR, and for Internationals, it is 596.1 EUR (S108). However, the results (Table 53 and Figure 47) indicate that the test with $p = .286$ is not statistically significant. This may be due to the too small sample size per group. Therefore, the null hypothesis cannot be rejected.

Table 52. Results for S108 (BB 2.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	97	531.4	502	369.3	70.37	6,826	2,073	-1.09	.275	.286	.09
int	48	596.1	503.5	351	78.31	3,759					

Figure 47. Money for Data Sharing According to the Sample (BB 2.0)

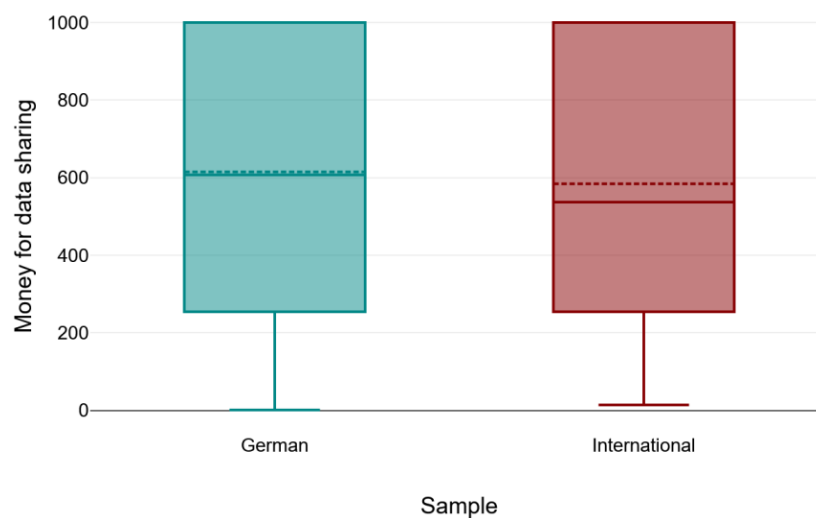


For question S208 regarding BB 3.0 Services, the number of participants is 141. The mean value for Germans is 615.2 EUR and for internationals is 584.3 EUR. However, it should also be noted that the test (Table 54 and Figure 48) with a p-value of .552 is not statistically significant. The null hypothesis is also not rejected.

Table 53. Results for S208 (BB 3.0)

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	88	615.2	607	364.4	72.6	6,389	2,191.5	-.61	.541	.552	.05
int	53	584.3	537	354.2	68.35	3,623					

Figure 48. Money for Data Sharing According to the Sample (BB 3.0)



For the questions S109 for BB 2.0 and S209 for BB 3.0 services, an independence test using the Chi-squared test is conducted to compare the distributions between the two groups. Subsequently, the following null hypothesis is formulated for these questions: There is no relationship between “Sample” and “Bank offer for data sharing”.

Question S109 received 293 responses. Among these, 58 Germans consider more favorable products and 49 Germans consider other topics besides monetary value important for convincing them to opt-in (Table 55). For the internationals, access to exclusive financial products (n=23) and good service (n=22) are important.

However, the test with $p = .154$ is not significant, so the null hypothesis is not rejected.

Table 54. Results for S109 (BB 2.0)

	Access to exclusive financial products	Good service	More social and ecological commitment	More favorable products	Other	Total	Chi2	df	p	C
ger	34	45	22	58	49	208	6.67	4	.154	.21
int	23	22	7	16	17	85				
Total	57	67	29	74	66	293				

For question S209, nearly identical responses were recorded, with 294 answers compared to S109. Among Germans, 61 consider more favorable products, 50 consider good service, and 50 prioritize monetary value, which is important for convincing them to consent to opt-ins (Table 56). Among internationals, access to exclusive financial products ($n = 24$) and good service ($n = 23$) are considered important. Due to the significance of the test ($p = .036$), the null hypothesis is rejected.

Table 55. Results for S209 (BB 3.0)

	Access to exclusive financial products	Good service	More social and ecological commitment	More favorable products	Other	Total	Chi2	df	p	C
ger	27	50	22	61	44	204	10.3	4	.036	.26
int	24	23	10	16	17	90				
Total	51	73	32	77	61	294				

In further analysis of the survey, it is also crucial to identify which items or products are frequently purchased together. With basket analysis (also known as association analysis), an online department store can identify connections between purchased items (Beekmann, 2003). This way, it is possible to determine, for the questions S104 for BB 2.0 and S204 for BB 3.0 services, which product groups show

a common interest among the customers of the entire sample ($n = 522$) in purchasing these products.

In the following shopping cart analyses, a minimal support of .15 and a minimal confidence of .6 are chosen. For the question S104, the following rules for BB 2.0 services are summarized (Table 57), and the relationships can be interpreted from the 16 formed shopping cart combinations: The first notable point is that especially the product groups Electronics and Leisure and Entertainment are included as Rhs products in the shopping cart. The top 3 product group combinations by confidence are: the transaction from Car and Motorbike with Electronics, with a confidence of .85; followed by Clothing and Fashion, Sport and Fitness with Electronics, with a confidence of .8; and Clothing and Fashion, Leisure and Entertainment with Electronics, with a confidence of .79.

The highest frequency, with 193, and thus the highest support, with .38, is the product pair with Leisure and entertainment as Lhs and Electronics as Rhs. If the transaction includes Health and beauty (Lhs) in the shopping cart, it is 1.91 times more likely that Clothing and fashion will be purchased than if the product Health and beauty is not in the shopping cart.

Table 56. Association Analysis Results for S104 (BB 2.0)

No.	Lhs	Rhs	Frequency	Support	Confidence	Lift
1	Car and motorbike	Electronics	116	.23	.85	1.23
2	Clothing and fashion, Sport and fitness	Electronics	79	.16	.8	1.15
3	Clothing and fashion, Leisure and entertainment	Electronics	84	.17	.79	1.13
4	Health and beauty	Clothing and fashion	96	.19	.78	1.91
5	Leisure and entertainment, Sport and fitness	Electronics	94	.19	.76	1.1
6	Food and beverages, Leisure and entertainment	Electronics	87	.17	.75	1.08
7	Sport and fitness	Electronics	152	.3	.75	1.08
8	Clothing and fashion	Electronics	154	.31	.75	1.08
9	Leisure and entertainment	Electronics	193	.38	.74	1.07
10	Clothing and fashion, Food and beverages	Electronics	77	.15	.73	1.05
11	Health and beauty	Electronics	86	.17	.7	1.01
12	House and garden	Electronics	122	.24	.7	1.01

13	Food and beverages	Electronics	140	.28	.7	1.01
14	Electronics, Food and beverages	Leisure and entertainment	87	.17	.62	1.2
15	Electronics, Sport and fitness	Leisure and entertainment	94	.19	.62	1.19
16	Sport and fitness	Leisure and entertainment	124	.25	.61	1.18

In contrast, the association analysis for question S204 regarding BB 3.0 services reveals the following relationships for the 16 formed product bundle combinations (Table 58): Even among responses to BB 3.0 services, the two product groups, Electronics and Leisure and Entertainment, can be identified as the largest groups of Rhs products. The top 3 product group combinations by confidence are: the transaction from Car and Motorbike, Leisure and Entertainment with Electronics, with a confidence of .87; followed by Car and Motorbike with Electronics, with a confidence of .78; and Health and Beauty with Electronics, with a confidence of .76.

The highest frequency is analogous to the BB 2.0 services with 157, and thus the highest support with .32, for the formed shopping cart pair with Leisure and Entertainment as the Lhs and Electronics as the Rhs. Similarly, with a higher lift factor, it is observed that when the transaction includes Health and Beauty (Lhs) in the shopping cart, it is 2.24 times more likely that Clothing and Fashion will be purchased than when the Health and Beauty product is not in the shopping cart.

Table 57. Association Analysis Results for S204 (BB 3.0)

No.	Lhs	Rhs	Frequency	Support	Confidence	Lift
1	Car and motorbike, Leisure and entertainment	Electronics	77	.16	.87	1.41
2	Car and motorbike	Electronics	130	.26	.78	1.28
3	Health and beauty	Electronics	89	.18	.76	1.24
4	Leisure and entertainment, Sport and fitness	Electronics	85	.17	.75	1.22
5	Clothing and fashion	Electronics	116	.23	.75	1.22
6	Sport and fitness	Electronics	126	.25	.72	1.17
7	Leisure and entertainment	Electronics	157	.32	.71	1.16
8	Health and beauty	Clothing and fashion	82	.17	.7	2.24
9	Food and beverages	Electronics	96	.19	.7	1.13

10	House and garden, Leisure and entertainment	Electronics	91	.18	.69	1.12
11	Electronics, Sport and fitness	Leisure and entertainment	85	.17	.67	1.52
12	Sport and fitness	Leisure and entertainment	113	.23	.64	1.44
13	Car and motorbike	House and garden	100	.2	.6	1.09
14	Food and beverages	Leisure and entertainment	83	.17	.6	1.35
15	Food and beverages	Clothing and fashion	83	.17	.6	1.92
16	Leisure and entertainment	House and garden	132	.27	.6	1.08

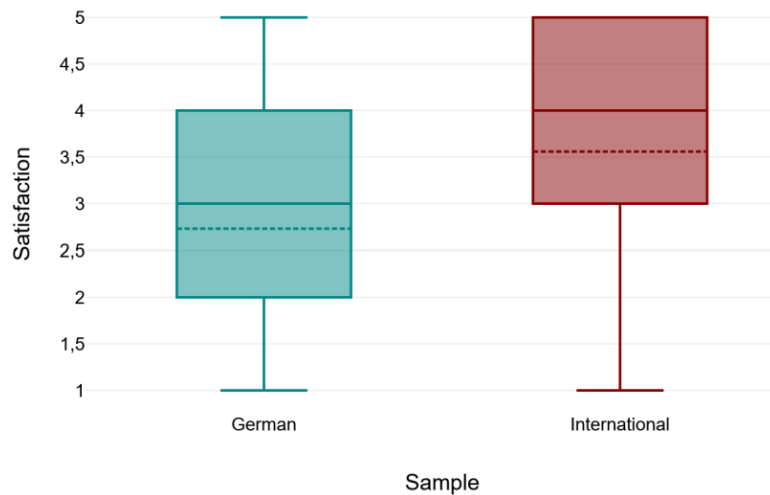
Finally, it should be examined how offering such BB services by the bank increases satisfaction and the likelihood of recommendation. For the dependent variable “*Satisfaction*,” question SC02 is used, and for the dependent variable „NPS” (Net Promoter Score), question SC03 is responsible. To investigate differences between the sample groups “German” and “International,” the Mann-Whitney U test will be used again.

The null hypothesis for SC02 is: There is no difference between the groups “German” and “International” regarding the variable “*Satisfaction*.” The results in Table 59 and Figure 49 show that an offer from BB Services is viewed as “Neutral” by German participants, with a mean of 2.73 and a median of 3. Among international participants, however, satisfaction with the bank tends to increase to “Rather yes” with a mean of 3.56 and a median of 4 due to the BB Services offer. In summary, the results of the Mann-Whitney U test suggest that there is a moderate effect (r -value=.3) between German and International groups, with the German group likely having lower scores on the “*Satisfaction*” variable. Therefore, the null hypothesis is rejected.

Table 58. Results for SC02

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	2.73	3	1.27	228.8	77,329	20,038	-6.9	<.001	<.001	.3
int	184	3.56	4	1.23	321.6	59,174					

Figure 49. Satisfaction According to the Sample

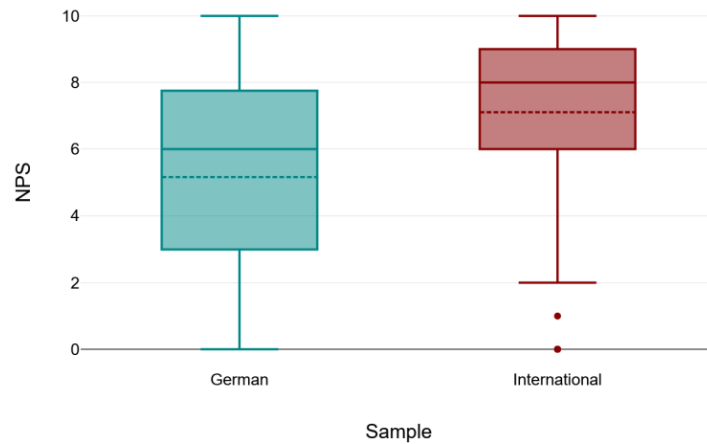


The null hypothesis for SC03 is: There is no difference between the “German” and “International” groups regarding the variable “NPS”. NPS responses are rated on a scale from 0 to 10 and categorized into three groups: “Promoter” for scores 9 or 10, “Passive” for scores 7 or 8, and “Detractor” for scores below 7 (Reichheld, 2003). The results in Table 60 and Figure 50 show that an offer of BB Services from the banks has a probability of recommendations among German participants with a mean of 5.16 and a median of 6, thus classified as Detractors. In contrast, international participants have a higher likelihood of recommending the bank, with a mean of 7.1 and a median of 8, classified as Passives. In summary, the results of the Mann-Whitney U test suggest that there is a moderate effect (r -value=.33) between German and international groups, with the German group likely having lower scores on the NPS variable. The null hypothesis is also rejected.

Table 59. Results for SC03

	n	Mean value	Median	Stand. error	Middle rank	Rank total	U	z	asymptotic p	exact p	r
ger	338	5.16	6	2.98	224.9	76,014	18,723	-7.58	<.001	<.001	.33
int	184	7.1	8	2.43	328.7	60,489					

Figure 50. NPS According to the Sample



But in order to make a final statement about how high the overall recommendation rate is and thus be able to compare the samples, the total number of Detractors must be subtracted from the total number of Promoters and then divided by the sample size (see formula) (Baehre et al., 2022):

Equation 14. Formula for Net Promoter Score

$$NPS = \frac{\sum Promoters - \sum Detractors}{sample\ size} \quad (14)$$

The NPS can range from -100 to +100 (Verhoeven, 2016). A negative value is generally interpreted as bad. A value of at least 0 is considered good, and a value of +50 or more is considered excellent. For the German group (n = 338), there are 30 promoters and 207 detractors, resulting in an NPS of -52.37, which is considered poor. In contrast, for the international group (n = 184), there are exactly 57 promoters and 57 detractors, resulting in an NPS of 0, which is considered good.

3.3.5. New Sales Signals Through Intercompany Customer Matching

After the definition of Beyond Banking Sales Signals (Chapter 3.3.2.2.) and the comparison of data usage options for customer matching (3.2.1.) and the derivation of models for banks (3.2.2.) have been established, this chapter now documents which approaches for New BBSS have been identified from the expert

interviews on the provider side and the survey on the demand side, and whether they can potentially be combined into BBSS for BB 2.0.

First, customer preferences are derived from the survey based on the Customer First approach (Rosli & Nayan, 2020). Subsequently, expert circles' approaches are considered, which can potentially align with the customer side. This approach enables participants from the previous chapter's survey to be linked through the target group definition, utilizing k-means clustering from question S102 (Purchase offer) with probability prediction for purchasing BB 2.0 services, in conjunction with shopping cart analysis and the most common shopping cart combinations (question S104).

Thus, the following new BBSS can be targeted to specific customer groups via the CRM for sales or directly as data-driven campaigns: First, the services are extracted from the top 3 shopping cart combinations with the highest confidence, the shopping cart combination with the highest frequency (analogous to highest support), and the highest lift. Accordingly, the service groups Car and Motorbike, Electronics, Clothing and Fashion, Sports and Fitness, Leisure and Entertainment, and Health and Beauty are identified as BB 2.0 services with the most significant potential for acceptance. These service groups can then be associated with the target groups of the German segment, specifically Cluster 1 (n=151=44.67%) with an average age of 56.34 years and a monthly average net income of 4,807.29 EUR, and Cluster 3 (n=103=30.47%) with an average age of 29.11 years and an average net income of 2,943.72 EUR. For international customers, they can be linked to Cluster 1 (n=60=32.61%) with an average age of 39.48 years and a monthly average net income of 2,134.85 EUR, Cluster 2 (n=31=16.85%) with an average age of 35.61 years and an average net income of 6,754.84 EUR, and Cluster 3 (n=61=33.15%) with an average age of 26.21 years and an average net income of 1,161.51 EUR.

Now, the clustered target groups of the dependent variable can be linked to potential service groups and the associated products from partners. After integrating selected partners into the banking ecosystem, who cover the identified demanded service groups, known data analytics methods (see Chapter 3.2.1.) such as GAFAM's User-Item Collaborative Filtering, Graph Theory for Relationship-based Banking, and recommendation systems (Kelleher & Tierney, 2018; Zuboff, 2019) can connect the potential customer with the partner's product and present it

as a recommendation. Additionally, the analysis of the customer's social media activities or the purchase of data from GAFAM can aggregate further transaction histories and behaviors, especially since methods like User-Item Collaborative Filtering analyze past interactions between customers and products to suggest matches. For example, a customer might show interest in buying an electric car through social media activities, and increased workshop payments detected via the transaction analysis of their checking account could indicate they are preparing to sell their old car. With this data, the customer can be referred to a platform for buying and selling cars, where the bank can participate in the sale of the old vehicle and the purchase of the new one. Since the confidence level is high at .85 that car enthusiasts would also buy electronics, offers for auto electronics or gadgets can be made to this customer through the same or another partner. For financing the new car, the customer can again take out a loan with their bank and also insure the vehicle. This example clearly shows that the bank can participate in five transactions within the Ecosystem Approach 2.0 for a fee. The first three transactions can be classified as BB Services, the fourth as Core Banking, and the fifth as Near-Banking. This customer journey also illustrates how BB Services can mutually reinforce Near- and especially Core Banking.

The experts mentioned various categories under the sub-codes "Diversified Beyond-Banking Services," "Co-operations and offers," and "Use/Business Cases 2.0" (see Chapter 3.3.3.), which, based on their analytical experience, already attract customer interest or are in implementation planning, and can be classified into the following service groups of the survey:

1. Travel and hotel booking, mobile communications, discounts and vouchers for e-commerce services, as well as cashback offers and tickets for events, fit under "Leisure and entertainment."
2. Depending on whether electronics and fashion products are also purchased through the e-commerce services, "Clothing and fashion" and "Electronics" are also appropriate.
3. Car services and management fit under "Car and motorbike".
4. Health and digital care advisors fit with "Health and beauty".

It should be noted that the mentioned travel and hotel booking service provided by the experts is also the most common response among survey

participants for question S104 (Service Groups) under the option “Other,” with 17 out of 40 indicating it relates to travel and vacation. Furthermore, the service offerings of discounts and vouchers, as well as cashback offers from the experts, are also clearly supported by 372 participants (71.26%) for question S103 and option 1 “Discounts and refunds.”

Ultimately, all five service groups of the experts can be reflected in the top service groups of the survey participants, which explains why the experts or the offering side should initially encounter BB 2.0 services based on customer demand. However, it is important to note that the participants only selected overarching service groups and not specific services such as purchasing tickets for events, which means there is no exact 1:1 comparability between supply and demand, but rather an indication of preference trends. Further research would be necessary to evaluate the extent to which the specific BB 2.0 offerings meet customer acceptance.

3.3.6. New Sales Signals Through Intracompany Customer Matching

This chapter is dedicated to intracompany customer matching for BB 3.0, analogous to the intercompany customer matching (BB 2.0) for BBSS. Due to the focus of the thesis on designing a BBE 3.0, in addition to generating the BBSSs from the data material of expert interviews and the survey (similar to the previous chapter), the focus here is on other data analytics methodologies for C2C customer matching, as well as developing specific sales signals as data recommenders from these. The extent to which machine learning (ML), as a subfield of AI, can support this data analytics model is discussed in Chapter 4.3. (Consideration of Beyond Banking Sales Signals in the AI model with its training levels).

The approach for determining new sales signals will be similar to the previous chapter. Here, the questions S202 (Purchase offer) are linked with the question S204 (BB 3.0) regarding the preferred service groups. Accordingly, the top 3 shopping cart combinations with the highest confidence, the shopping cart combination with the highest frequency (analogous to highest support), and the highest lift for BB 3.0 are extracted, which are most likely to be accepted by BB 3.0 services: Car and motorbike, Leisure and entertainment, Electronics, Health and beauty, and Clothing and fashion.

Then, these service groups can be associated with the target groups of the German group, with Cluster 1 ($n=141=41.72\%$) having an average age of 28.58 years and a monthly average net income of 2,865.16 EUR, and Cluster 3 ($n=114=33.73\%$) with an average age of 54.18 years and an average net income of 4,925.01 EUR. For international customers, however, they can be associated with Cluster 2 ($n=38=20.65\%$) with an average age of 41.97 years and a monthly average net income of 1,692.05 EUR, Cluster 3 ($n=59=32.07\%$) with an average age of 27.03 years and an average net income of 1,357.56 EUR, as well as Cluster 4 ($n=48=26.09\%$) with an average age of 35.92 years and an average net income of 6,387.50 EUR.

Now, when the mentioned BB 3.0 services from the expert responses are related to the relevant service groups of BB 3.0, various categories are mentioned under the sub-codes “Diversified Beyond-Banking Services,” “Experiences Beyond Banking 3.0,” and “Use/Business Cases 3.0” (see Chapter 3.3.3.). These categories have already attracted customer interest based on the experts' analysis experiences or are in implementation planning, and can be classified into the following service groups of the survey:

1. Craft Services platform, a platform for household-related services, and the Caring platform align with House and Garden.
2. Car service and management (and parking spot finder) platform suitable for cars and motorcycles.
3. Travel platform fits with leisure and entertainment.

In the initial platform types for the service group House and Garden, it should be noted that, according to the survey participants, this service group ranks in the middle of the Lhs and in the lower rankings of the Rhs compared to all shopping cart combinations (S204). Furthermore, 291 participants (55.75%) answered question S203 with selection 1 “Discounts and refunds,” which is lower compared to S103 (BB 2.0). However, the value is still considered high by more than half of the participants. This could be an argument for purchase, suggesting that the acceptance and attractiveness of the BB 3.0 services described above are increased through the use of discounts and refunds.

Additionally, further approaches to the services Health, Home, Car, and Transportation are mentioned by the experts as BB 3.0 services, but are not elaborated on in detail. For example, in the case of Health, the prevailing situation

of a shortage of skilled professionals in medicine and nursing (Dalhaus, 2023) in Germany and the alleviation of long waiting lists to get a doctor's appointment could serve as incentives to connect doctors and patients within a C2C model inside a bank and to utilize new or unused capacities as effectively as possible. Regarding Home, the current housing crisis in Germany (Karatas, 2022) can be referenced. Sharing concepts, repurposing, or temporary leasing of apartments, as in the case of Airbnb, can contribute to addressing the current problem and bring together parties such as landlords and tenants. This idea can also be extended to Car or other transportation sharing concepts, connecting owners and users.

3.3.6.1. *Customer Matching With Data Analytics Methodologies*

This chapter now addresses the customer-to-customer (C2C) approach using data analytics methodologies for Beyond Banking initiatives. However, first, the hypothesis H1.3 must be evaluated to determine whether there are already arguments for or against it in the literature sources or through expert interviews. Reflecting on Chapter 1.2.1. Literature Review, a systematic literature analysis reveals that while sources can be found that partially contradict the overall hypothesis, they do not do so entirely, as some findings suggest that C2C matching occurs, but do not explain which data analytics methodologies are explicitly and step-by-step implemented for this matching. Other works mention data analytics methodologies, including in banking, but not specifically for Beyond Banking initiatives.

According to experts 3, 4, and 7 regarding the sub-code “C2C-matching,” the C2C matching is only roughly outlined or only in one or two sub-steps of the overall process. Also, under the category “Beyond Banking Sales Signals,” although 5 out of 10 experts agree that they are familiar with Beyond Banking Sales Signals in their company or in other banks, they do not see any connection to an intra-institutional C2C matching.

Due to the lack of consistency in fully explaining or outlining a C2C matching process in the BB context, hypothesis H1.3 is verified. Therefore, an exemplary approach to a C2C matching process is presented below in a sequential order of work steps. In doing so, the insights and data analytics methodologies presented

by Han et al. (2023) and Ricci et al. (2022) are utilized to illustrate the process. Examples of this matching process are explained in Chapter 3.3.6.2.

Exemplary matching of a bank customer as a provider and a bank customer as a demander within a banking ecosystem, with the bank acting as a marketplace orchestrator.t:

1. Data collection and integration:

Combine and standardize all pertinent data sources, such as demographic information, transaction histories, and online behavior patterns.

2. Data preparation and feature engineering:

Clean the raw data and convert it into meaningful features that align with customer needs and offerings.

3. Creation of customer profiles:

Using the extracted features, detailed customer profiles are developed to illustrate individual preferences, behavioral patterns, and possible service options.

4. Clustering and Segmentation:

Algorithms such as K-Means, hierarchical clustering, or DBSCAN (Lamb et al., 2020) are used to group customers into similar clusters, thereby enhancing comparability.

5. Similarity analysis within the clusters:

Using distance or similarity metrics, such as cosine similarity, helps identify which customer profiles are particularly well-matched.

6. Use of Collaborative Filtering and Recommender Systems:

Building on earlier steps, predictions are generated using past interactions and preferences to identify the most promising combinations as potential matches.

7. Graph-based analysis (optional):

Modeling customer relationships as a network, such as using Graph Neural Networks, can reveal hidden connections and communities, providing more profound insights. The use of a graph database such as Neo4j (Vukotic & Watt, 2013) is conceivable and will be examined in more detail in Chapter 4.3.2.

8. Evaluation and Optimization:

The results are verified through A/B tests or feedback loops, and the models are regularly refined to enhance matching accuracy.

The sub-steps 6-8 of this exemplary process can be seen as AI-driven steps, which are discussed in more detail in Chapter 4.3.

3.3.6.2. *Application Scenarios and Generation of Concrete Sales Signals*

This chapter is intended to build on the previous chapter. Here, concrete sales signals will be developed through the customer matching process using three example scenarios. The selection of these three scenarios is based on current societal macro problems prevalent in Germany. Such structural issues in Germany include a shortage of skilled workers in medicine and caregiving (Dalhaus, 2023) and supply shortages of medications (Mallmann, 2022) (Scenario 1), a shortage of skilled workers in trades (Malin & Hickmann, 2022) (Scenario 2), and the current housing shortage, especially in urban areas (Karatas, 2022) (Scenario 3). Furthermore, medications (Scenario 1) are supported as a selection through the association analysis in Chapter 3.3.4.2., which identified them among the top 3 product group combinations (Health and Beauty) and as having high acceptance among customers. The housing shortage and related housing placement (Scenario 3) is a familiar product for banks as a near banking service, since many banking services related to real estate and housing, such as financing (loans) and real estate investment (core banking), are involved. Handyman services (Scenario 2) can also be seen as complementary services and thus expanded services within the area of housing and real estate.

Scenario 1: BBSSs for (inter)regional procurement of medications. In this context, bank customers act as demanders of medications, and pharmacists as suppliers of medications. Both parties are clients of the same bank. There may be an increased need for medications when temporary supply shortages occur (Mallmann, 2022). Customers can input their own data to update their profiles with the most important medications. Additionally, online behavioral patterns on social media and analysis of transaction histories of previously purchased medications from various partners can provide insights and indicate interest in relevant medications. By analyzing these raw data, the demand for specific medications over a certain period or cycle can be identified. From this, different customer

profiles A, B, C, etc., can be created, indicating that medications A, B, C,... are needed for illnesses A, B, C,... over a specific cycle. Subsequently, customers can be grouped into homogeneous clusters, such as similar age or income groups, through clustering. Using distance or similarity metrics, it can be determined which customer profiles fit particularly well within a cluster. Building on these steps, predictions are made based on historical interactions and preferences about which combinations are the most promising matches—for example, a 60-year-old customer needs medication A every three months, and pharmacist B can provide medication A at the lowest price after three months. A sales signal can be sent to the customer (demand side) when medication A is available from a particular pharmacist. Conversely, a sales signal can be sent to the same pharmacist indicating that there is an urgent or timely demand for medication A from the customer. Modeling customer relationships as a network (e.g., using Graph Neural Networks) can provide additional insights, such as pharmacists responding to specific customer communities that all need a certain medication currently unavailable due to supply difficulties. A sales signal can be sent to the pharmacists (suppliers) indicating that there is active communication within this customer community and that a particular medication is mentioned more frequently.

Pharmacists and medication customers can leave feedback with each sales signal, indicating whether it was accurate or helpful. Additionally, it can help determine if the medication or the timing of the need is correct.

Scenario 2: The frequently mentioned craftsman platform by the experts (Chapters 3.3.3. and 3.3.6.) will be included in the next scenario. Here, bank customers act as demanders of craft services, and craftsmen as providers of such services. Both parties are clients of the same bank.

The start here is also the customer self-disclosure input to learn more about them. This can include information about their living situation, whether they own property, and what goal should be defined, such as modernizing their own house, which requires craftsmen. The subsequent process can follow the same steps as the above process, meaning that after integrating additional data sources like social media activity or transaction histories, insights about craftsmen data points can now be developed into features, e.g., that certain craftsmen skills are needed for modernization. Based on these features, customer profiles can be created. For

example, it can be determined that customers who own a home and are over a certain age, such as 20 or 30 years after the house was built, may no longer need modernization. Clustering based on this can group customers into specific segments, such as homeowners with particular age and income patterns. Within the cluster, distance metrics can identify which customers or customer groups are particularly well matched. With these previous steps, predictions can be made about which customer profiles can be matched with which craftsmen. A sales signal can be triggered by increased search activity from the customer for certain types of craftsmen, for example, Customer A searching for an electrician and tiler, which then allows data recommenders to select craftsmen with foreseeable availability. Similarly, these craftsmen can receive sales signals from interested customers.

Furthermore, demand-oriented customer groups can generate additional network effects and content creation through information exchange in a chat network. For example, the demand for specific craft skills can be discussed in certain blog sections, after which sales signals are sent to the required craftsmen. Similar to Scenario 1, optional feedback from both parties can be obtained through A/B tests or feedback loops on the sales signals.

Scenario 3: In this scenario, the bank customers act as demanders of housing, and the providers act as landlords of apartments. Both parties are clients of the same bank.

Renters can enter basic data related to their housing search in their customer profile. Tracking histories and purchases in the nearby area can therefore provide a more precise housing profile or a narrower movement radius for the renter. From these raw and master data, a feature can be developed, for example, indicating that a rental apartment is needed in a specific city at a certain price. The person's self-disclosure data are usually available to the bank. Based on this, customer profiles can be created, such as identifying that mainly young people need a 1- to 2-room apartment in a particular city. This can then be confirmed through a cluster analysis, showing that several customers resemble this group and are classified or grouped accordingly. Customers can be ranked based on their matching probability to certain variables. Subsequently, customer profiles with the highest probabilities, which meet specific criteria such as a certain monthly net income, can be sent to landlords via sales signals.

A housing search/tip-sharing community can also connect interested tenants and landlords more quickly and for specific housing units. Reminders via sales signals can be sent to prospective tenants as soon as a property is listed or becomes available. Feedback from both parties is also essential here to improve the matching model.

These three scenarios describe classic problem situations that are temporarily or permanently prevalent in Germany. A marketplace model like this cannot completely solve such societal macro problems, but it creates greater transparency and brings actors together. Especially for regional banks, regional marketplace nuclei can be established to address structural issues in Germany such as labor shortages in medicine and care (Dalhaus, 2023) and supply shortages of medications (Mallmann, 2022) (Scenario 1), labor shortages among craftsmen (Malin & Hickmann, 2022) (Scenario 2), and the current housing situation, especially in urban areas (Karatas, 2022) (Scenario 3). Additionally, banks can act as trusted intermediaries, serving as verifiers of bank customers (suppliers and demanders) and building trust across the entire ecosystem.

3.4. OPT-IN AS A BENEFIT INDICATOR

The importance of opt-ins and increasing these consent declarations with customers has already been addressed by the experts (Chapter 3.3.3.). On the one hand, they serve as the business basis for allowing banks and TPPs to offer BB services and operate in a data protection-compliant manner. On the other hand, they contribute to increasing customer penetration and relevance. Among bank customers, the survey (Chapter 3.3.4.2.) reveals that, in addition to direct monetary incentives, other added values, such as more favorable products, good service, or access to exclusive financial products, are important for convincing customers to give their consent and opt-in. However, the following section outlines additional persuasive arguments and incentives for obtaining consent to opt in.

To persuade customers to subscribe, service providers should leverage attractive incentives and effective strategies:

1. Highlight clear added value for the customer, as customers are more likely to consent when they understand the specific benefits they will receive.

Examples include exclusive offers, personalized content, and early notifications about new products. This is emphasized by Kilian & Kreutzer (2022), who describe Benefit Selling as a success factor that clearly highlights the user advantages. Reciting product features is discouraged here.

2. Create transparency and trust by providing a clear and understandable explanation of why consent is needed and how the data will be used (Acquisti et al., 2015). This can be accomplished, for instance, by building trust through a data protection guarantee, such as stating, “We will never share your data.”
3. Use “social proof” by highlighting that many customers have already signed up to create FOMO (Fear of Missing Out) (Palau Reyna, 2024). For example: “Already 85% of our customers receive exclusive offers – join in!”
4. Applying psychological principles like Commitment and Reciprocity, people often act consistently after making a decision (Kahneman, 2011). Offering small free benefits, such as a free e-book or a discount for first-time buyers, can motivate them to reciprocate.
5. Simplify and make opting in appealing with a clear, attractive design for the opt-in process (Thaler & Sunstein, 2008). For example, use positive language like “Yes, I want to receive exclusive benefits” instead of “I agree.”
6. Create a sense of urgency or exclusivity. Offering limited-time deals or exclusive benefits to opt-in users can expedite their decision-making process (Tversky & Kahneman, 1981). Example: “Only this week: 10% discount for all new customers!” However, the implementation by Beshears et al. (2021) should be considered, which offers economic incentives through an active choice program to those interested in an opt-in.
7. Avoid negative incentives such as making opt-out a hurdle. A complicated opt-in process can cause customers to drop out (Johnson & Goldstein, 2003). Providing a straightforward and clear way for customers to give consent is crucial.

By integrating psychological principles, a well-defined value proposition, and intuitive design, service providers can effectively motivate customers to opt in. The steps banks are taking today to encourage customers to provide opt-in

consents are explained below. A guide by the Swiss Bankers Association (Schweizerische Bankiervereinigung, 2021) explains that banks can enhance customer value through personalized offers and advice, thereby increasing their willingness to share data. A blog post by Qwist (2019) describes how banks can implement consent management in line with PSD2 guidelines by clearly specifying the data shared with third-party providers and the frequency of sharing. This approach fosters trust and encourages customers to grant consent. Some banks also use loyalty programs to motivate customer consent further. Overall, these examples demonstrate that transparent communication, tailored offers, and loyalty incentives can increase customers' willingness to share their data.

3.5. LEGAL RISKS AND CHALLENGES

This chapter discusses the legal risks and challenges that go beyond Section 2.3.2. of the Regulatory Framework Conditions and the responses from expert interviews (Chapter 3.3.3.). During the writing of this thesis, the EU's regulatory framework was expanded to include the "Regulation on a Framework for Financial Data Access" (FIDA) (Finken & Hensen, 2025). The European Commission published this proposal "as part of its strategy for digital finance and a common European financial data" (p. 297, para. 2). Besides new product considerations, such as crypto assets and real estate, insurance products are also included in this regulation. "Therefore, the proposed FIDA offers far-reaching opportunities to develop and offer personalised financial services integrated into the customer journeys of third parties" (p. 297, para. 2), Finken & Hensen argued. While this opens up toward near-banking services, BB services are still not considered. It remains unclear whether and how BB services should be regulated independently or in conjunction with financial and other personal data.

Another legal risk is the international inconsistency of a coherent identity. "Each country has seemingly developed its own approach to OB, leading to various models based on different rationales, data-sharing obligations, and standardisation processes" (Colangelo & Khandelwal, 2025, p. 17, para. 3). Especially outside the EU (regulatory framework), this can lead to increased effort to coordinate regulatory and technical standards for data transmission.

Another aspect, already mentioned by experts (Chapter 3.3.3.) and further elaborated here, is the increased risk of integrating external partners into the banking ecosystem, as they can serve as potential entry points exposing the system to data breaches and hacker attacks (Frei, 2023). “Establishing a robust platform for open banking and a solid accreditation system for companies participating in open banking can reduce these risks. Regulators play an essential role in creating a reliable accreditation system and establishing standards” (p. 172, para. 2). Soares et al. (2025) exemplify this idea further: “how an attacker might leverage scientific correlations to infer individuals’ level of neuroticism and self-control from their transaction history” (p. 1, para. 1). Therefore, additional departments such as Legal for BB, Ecosystem Knowledge, and especially the legal and security teams handling external partnerships must be prepared.

In addition to external dangers and risks, the bank faces a significant internal challenge in fully harmonizing and centralizing its customer data to serve as a marketplace operator for a C2C matching model. This can be addressed through entity resolution and data integration.

Entity resolution (ER) is essential for consolidating customer data across different bank systems (Hagan, 2024). As a market orchestrator, the bank offers a range of services and products, resulting in fragmented customer profiles. ER enables the matching and merging of customer records from multiple sources to form unified profiles, simplifying relationship management across lending, borrowing, investment, and other banking activities.

Probabilistic matching is employed to compare various records and establish links using probabilistic estimates. This approach is particularly valuable when customer data is incomplete or shows variations in names, addresses, or other identifiers. The system calculates match scores that reflect the likelihood that two records refer to the same entity.

The Deterministic Matching method depends on precise matches of specified fields, such as account numbers or social security numbers, to reconcile records. It is particularly effective when high-confidence matches are required, such as in regulatory reporting and financial transactions.

The challenge of data integration becomes even greater when a marketplace orchestrator is at the central data hub and external partners are involved.

Prioritizing the harmonization of customer data is essential in order to reliably manage a functioning, data-driven market model.

3.6. PROPOSED SOLUTIONS AND RECOMMENDATIONS FOR ACTION

This chapter aims to summarize, based on existing research, what banks and their decision-makers can already do in the context of Beyond Banking. The insights into actionable recommendations derived from this and how they can be presented in a guide will also be discussed below.

Firstly, it is important to note that the relevance of Beyond Banking can be confirmed through market environment analysis (Chapters 2.3. and 2.3.1.). In the international context, especially in Eastern European and Asian markets, banks have been considered BBE (Beyond Banking Entities) for a longer period and are expanding with various additional verticals. However, most models (3.3.1.1.) of BB 2.0 are limited to a near-banking approach. Compared to BB 3.0, large international banks and companies from Asia, particularly China with its Big Tech giants Tencent and Alibaba (3.3.2.9. and 3.3.2.10.), are leading in offering and connecting BB services. For this business model, regional banks (3.3.2.6.) are well-suited due to their characteristics and regional ties, even though they may initially be limited in scale by regional boundaries and might not target a highly scalable customer base, such as those in Asian regions. By working with multiple regional banks or offering cross-regional services, regional boundaries can indeed be broken.

A guide for banks and their decision-makers can thus look like the following, based on the previous research findings:

1. Understanding the relevance of beyond banking
 - a. Engagement with the topic Beyond Banking (Chapter 2.1.) and its developmental stages (Chapters 2.2. and 3.1.)
 - b. Market relevance and distinctive features through BB (Sirakova-Yordanova, 2024)
 - c. Market analysis, comparison, and success stories (2.3. and 3.3.)
2. Survey Results: Customer Acceptance of Beyond Banking Services (Chap. 3.3.4.)
 - a. Acceptance of BB 2.0 and 3.0 services is generally given.

- b. Acceptance is higher among international customers compared to German customers.
 - c. The BB service groups Car and Motorbike, Electronics, Clothing and Fashion, Leisure and Entertainment, Health and Beauty, and House and Garden have the most significant potential.
 - d. Strong incentives or trust mechanisms can influence skeptics to reconsider non-financial services.
 - e. Recommendation: Tailor offerings to match individual user preferences and segment-specific needs.
 - f. Conduct own market research and customer surveys to assess how well “beyond banking” your customers accept services and to identify potential additional strategies if needed.
3. Knowledge Building and Insights from Expert Interviews on Beyond Banking Ecosystems (Chap. 3.3.3.)
- a. The confirmed revenue potential of Beyond Banking from various perspectives.
 - b. The importance of partnerships in ecosystem development, highlighting existing or planned collaborations and use cases.
 - c. Regulatory hurdles and data protection issues.
 - d. Leverage expert insights to guide strategic planning and risk management.
 - e. Use expert insights to increase awareness and train your bank employees for BB.
4. Understanding Banks as Marketplace Orchestrators and Other Roles (Chap. 3.3.2.1.)
- a. Banks can serve as marketplace orchestrators by linking customers as suppliers and buyers.
 - b. Other potential roles include service enablers, such as providing APIs and platforms; data-driven advisors who leverage analytics for customer insights; trust centers that focus on security and compliance within digital ecosystems; and more.
 - c. Managers need to evaluate their bank’s core strengths to identify the best role within a Beyond Banking strategy.

5. Beyond Banking Sales Signals and Data Analytics Methodologies (Chap. 3.3.5. and 3.3.6.)
 - a. Implement sophisticated customer data analytics to detect potential sales signals beyond banking.
 - b. Apply methods like:
 - i. Predictive analytics: Anticipate customer needs by analyzing past behavior using collaborative filtering and recommender systems.
 - ii. Cluster analysis: Use k-means to identify user segments for targeted offerings.
 - iii. Real-time analytics: Identify triggers for cross-selling opportunities using graph-based analysis.
 - c. Develop an internal AI-powered recommendation engine to boost customer engagement (see Chapters 4.3. and 4.5.).
6. Encouraging Customers to Opt-In for Beyond Banking Services (Chap. 3.4.)
 - a. Clear communication regarding the value proposition of Beyond Banking services.
 - b. Implement measures that steadily increase user approval:
 - i. Provide tailored incentives such as improved financial insights or exclusive deals.
 - ii. Offer detailed and specific consent choices to build greater trust.
 - c. Utilize gamification strategies to boost user engagement within digital banking ecosystems (Saks, 2024).
7. Legal Risks and Challenges (Chap. 2.3.2., 3.3.3. and 3.5.)
 - a. Major legal challenges encompass GDPR compliance, financial regulations, and data protection standards.
 - b. Suggestions for reducing legal risks:
 - i. Make sure the legal and compliance teams participate early in the ecosystem development process.

- ii. Establish robust customer data protection policies and promote transparency across the bank and its entire ecosystem involving various stakeholders.
 - iii. Collaborate closely with regulators to foresee and adjust to upcoming legal developments.
 - c. Consider using regulatory sandbox environments to trial new Beyond Banking services prior to full deployment (Ahern, 2021).
- 8. Suggested Action Plan for Implementation
 - a. Short-term (0-6 months):
 - i. Perform research on customers and the market.
 - ii. Establish collaborations with TTPs and other ecosystem partners.
 - iii. Initiate pilot projects within targeted customer segments.
 - b. Mid-term (6-18 months):
 - i. Expand successful Beyond Banking services informed by pilot results.
 - ii. Invest in AI and data analytics to enhance understanding of customer insights.
 - iii. Enhance regulatory compliance frameworks.
 - c. Long-term (18+ months):
 - i. Position the bank as a comprehensive provider of integrated ecosystem services.
 - ii. Maintain a steady pace of innovation by integrating emerging technologies and forming new partnerships.
 - iii. Consider expanding internationally if it is feasible.

Following these recommendations, banks can effectively incorporate Beyond Banking services, maintaining customer trust, complying with regulations, and supporting long-term growth. The next chapter will explore a helpful design concept for developing BBE 3.0.

IV – CONCEPTION MODEL OF CREATING A SUCCESSFUL SCALABLE BEYOND BANKING ECOSYSTEM

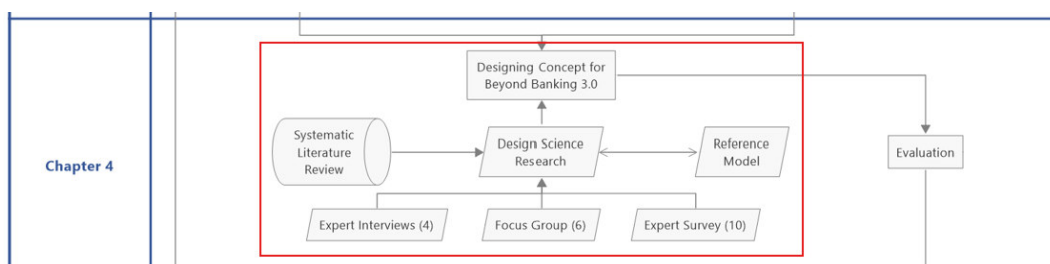
IV - CONCEPTION MODEL OF CREATING A SUCCESSFUL SCALABLE BEYOND BANKING ECOSYSTEM

This chapter, building on the previous chapters, now deals with the conceptualization of a successful scalable BBE with a focus on Level 3.0 (C2C). Insights and elements from Chapter 3 will be incorporated into the design.

The topics covered are initially divided into literature research on the relevance and strategies of digital ecosystems and market analyses of promising approaches. Next, the integration of AI into the design within the context of BBSSs is considered. Subsequently, key influencing factors and evaluation criteria for a BBE related to contextual banking are developed.

Chapter 4.5 focuses on the thesis (Figure 51), where the model's concept is developed collaboratively with various experts using DSR. Before this, a systematic review of literature and an analysis of maturity for several existing concepts are conducted, serving as a foundation for further research to find a suitable reference model and iteratively develop it with experts.

Figure 51. Section "Designing Concept for BBE 3.0 Using DSR"



4.1. RELEVANCE OF DIGITAL ECOSYSTEMS

Since previous chapters have already discussed (digital) ecosystems to some extent (such as BBE), whose characteristics and Tencent and Alibaba (3.3.2.10. case studies; Fasnacht, 2021, 2023) have even been referred to as super-ecosystems, this chapter focuses on the relevance of digital ecosystems and the difference from platforms. According to Fasnacht "ein offenes [und digitales] Ökosystem [ist] .. ein

dynamisches und zugängliches [digitales] Netzwerk, in dem diverse Akteure Technologie, Wissen und Ressourcen einbringen, um einen Teil der Wertschöpfung zu generieren, welche zu Kundenmehrwert führt” [an open (and digital) ecosystem... (is) a dynamic and accessible (digital) network in which various players contribute technology, knowledge, and resources to generate part of the added value that leads to customer value] (Fasnacht, 2023, p. 6, para. 2). And furthermore, Fasnacht argues that the following concepts and theories are most relevant for open ecosystems:

- Open Innovation involves organizations utilizing external ideas and resources to encourage innovation. In an open ecosystem, companies access a variety of resources from multiple providers.
- Co-Innovation involves actors collaborating in a system to reach a shared goal, often with providers working together to develop or improve platforms through new products or services.
- Platform economy involves offering and exchanging products or services via a shared digital platform that acts as a gateway to an ecosystem, enabling multiple providers to integrate, showcase, and sell across sectors.
- Network effects occur as a product gains value with more users. In open ecosystems, they attract providers, boosting value and growth in a feedback loop that drives exponential scalability.
- Knowledge management involves capturing, storing, analyzing, and sharing knowledge, along with relationship skills like openness, agility, and ambidexterity. In an open ecosystem, actors share knowledge via digital tools and collaboratively develop solutions.

The distinction between (digital) platforms, as described by Stokar et al. (2018), in connecting supply and demand—and in counteracting information asymmetries to build trust in the reliability, scalability, and reach of offerings—lies in their ability to make markets more efficient and expansive by increasing demand, reducing transaction costs, and benefiting from network effects. According to PwC (Grandt & Bollig, 2024), (digital) ecosystems add further characteristics beyond these core functions:

- Lock-in effects related to the end customer and the product and service partners within the ecosystem.

- User-centered perspective (Business-to-Human (B2H))
- Expanding the network effect by integrating individual products and services from partners into a seamless end-to-end customer journey.
- Growing importance of partnerships and collaborations
- Connected services work together so that their combined benefit exceeds the sum of individual benefits.

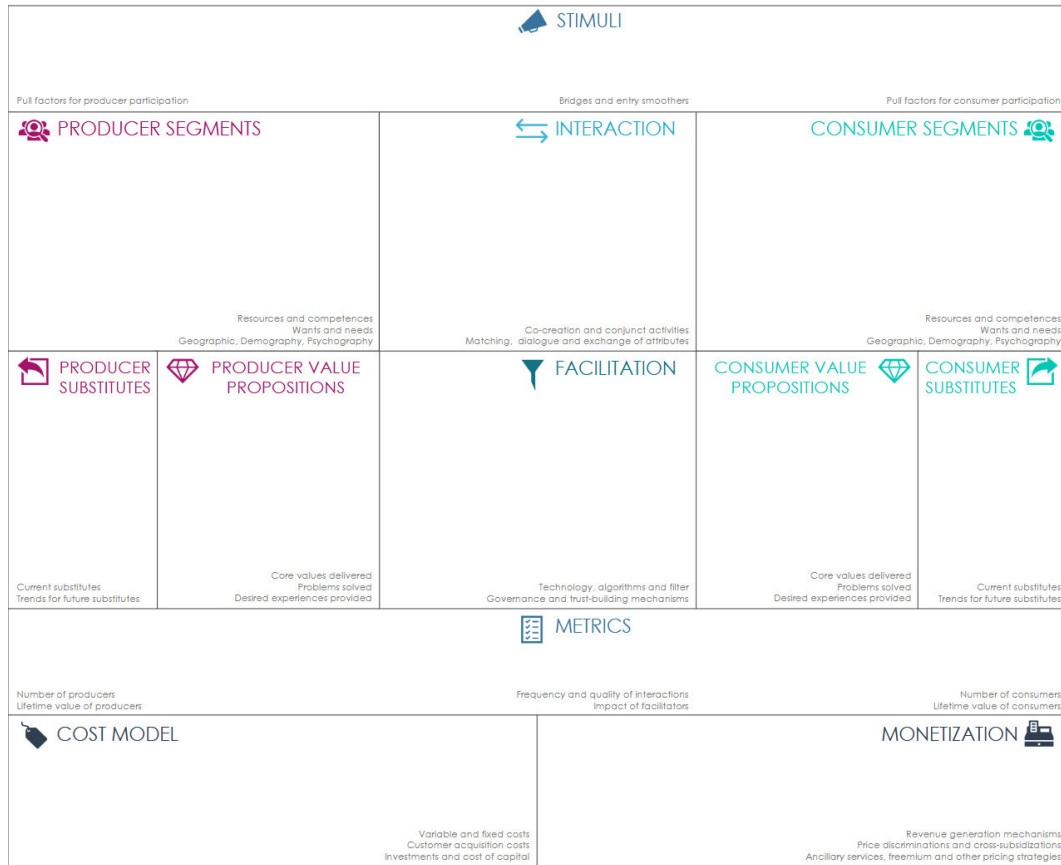
In particular, the expansion of network effects and the interconnection of related services are characteristics of digital ecosystems that facilitate collaboration among all actors and thus generate (exponential) economies of scale.

4.2. DIFFERENT ECOSYSTEM STRATEGIES

Already in 2018, Fasnacht pointed out that “financial institutions need to redefine their individual value chains and adopt an ecosystem mindset with value constellations” (p. 1, para. 1). To expand business development across the entire ecosystem, for example, by developing underserved markets or creating new businesses, various ecosystem strategies are discussed below.

Under Chapter 2.4., methodological guidelines for developing business models have already been included, with the Business Model Canvas (BMC) serving as the framework. The further evolution of this model into a platform-based approach is the Platform Business Canvas Design (PBCD), developed by Allweins et al. (2021) as a design framework for multi-sided platform companies (Figure 52). The PBCD is “the first peer-reviewed tool empowering managers and entrepreneurs to visualize the essential elements and mechanisms of multi-sided platform businesses” (Allweins et al., n.d.), and it also sets the PBCD apart from the BMC by emphasizing the open system among all involved parties.

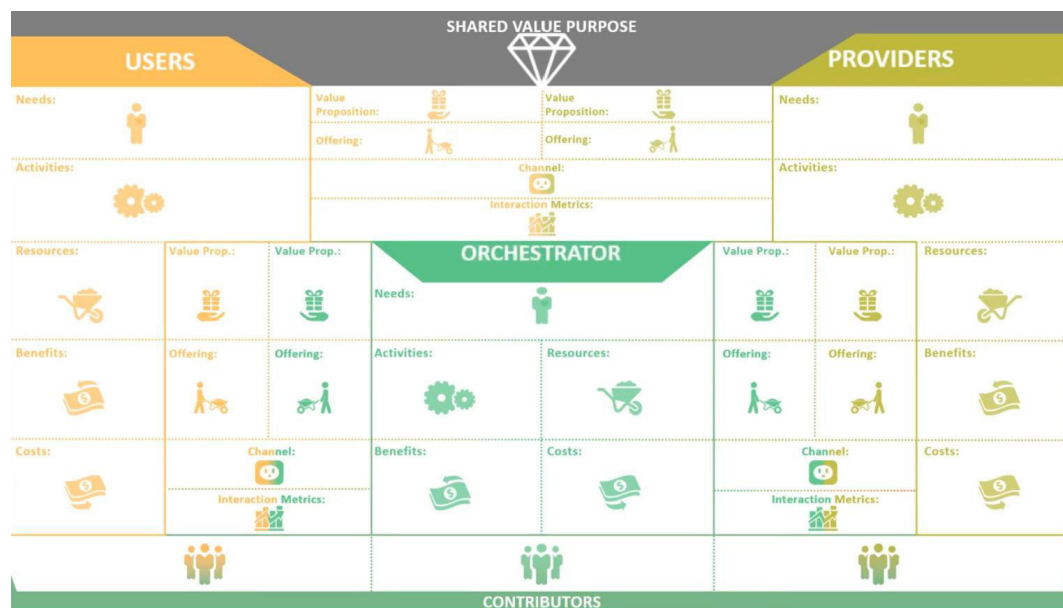
Figure 52. The Platform Business Canvas Design (Allweins et al., 2021)



However, it should be noted that a P-BMC was already developed four years earlier (Fleing, 2016) by Hoogendoorn & Walter (Figure 53). It allows visualization from the viewpoints of various target groups or “stakeholders” and offers more flexibility regarding the direction of value flows (Neckel & Reichel-Busch, 2024). This is particularly relevant for applications that focus on developing or engaging an ecosystem.

countries. Only Revolut (UK), with a score of 3.4 (out of a maximum of 10), and the only German C24 Bank, a subsidiary of the well-known comparison platform, with 3.9 points, are rated as moderate.

Figure 54. The Ecosystem Canvas (Burkhalter, 2020)



In addition to utilizing various ecosystem frameworks to determine the strategic positioning of banks within an ecosystem, Auge-Dickhut (2022) introduces a structured approach to exploring business ecosystems. Initially, customer needs and trends are assessed, followed by the development of the core value proposition and associated services. Subsequently, appropriate partners are chosen, and cooperation models, platforms, and governance frameworks are established. Lastly, plans are made for market entry, operations, and ongoing development. This methodology enables companies to create ecosystems that are both viable and strategically scalable. The described concepts of platform business and, more importantly, ecosystem business models provide a good starting point for further research and design of a BBE.

Another approach draws on the resource-based view and the idea of dialectical fine-tuning, explaining how platform companies coordinate resources to grow within ecosystems. A case study by Zeng et al. (2022) on Tencent highlights

specific actions and capabilities employed during various growth stages. Initially, the company aims to gather a critical mass of users by offering appealing services and continuously enhancing the user experience. It then broadens its network through service diversification and external partnerships to access new resources. In the final stage, the ecosystem is sustainably reinforced by fostering innovation and self-organization within the network. This approach underscores the significance of dynamic interactions between internal resources and external collaborators for the successful expansion of platform companies.

4.3. CONSIDERATION OF BEYOND BANKING SALES SIGNALS IN THE AI MODEL WITH ITS TRAINING LEVELS

In the previous chapters, Beyond Banking Sales Signals were discussed as the core of a functioning, self-sustaining, and self-learning ecosystem, along with which data analytics methodologies, especially process steps 6-8 of the DA process from Chapter 3.3.6.1., are relevant for C2C matching. In this chapter, the BBSSs are placed in the context of AI, and the possible AI learning methods best suited for improving and automatically further developing these data recommenders are identified. An analysis of their relevance for the conceptual design is presented first, followed by an investigation of possible AI learning methods for this purpose within a theoretical framework. Consideration of potential AI concepts and possible feature engineering is modeled in Chapter 4.5.

4.3.1. Relevance for the Conceptual Design

Disruptive AI technologies (Biswas et al., 2020) primarily contribute to key outcomes such as “higher profits, at-scale personalization, distinctive omnichannel experiences, and rapid innovation cycles” (pp. 2-3, para. 7). They also identify additional potential areas like “lower costs through efficiencies generated by higher automation, reduced error rates, and better resource utilization; and uncover new and previously unrealized opportunities based on an improved ability to process and generate insights from vast troves of data” (p. 2, para. 6). The potential of AI and analytics for global banking is estimated at 1 trillion USD, with the largest portion, 624.8 billion USD, coming from marketing and sales.

In recent years, many companies have increasingly relied on data analytics and business intelligence tools, which analyze (semi-) structured data to generate insights and respond more quickly and flexibly to complex challenges (Scheer & Heilig, 2023). However, these tools have limitations because they primarily rely on historical data and are not well-equipped to handle the rapid growth and complexity of data volumes. Decision Intelligence (DI) represents the next phase in data utilization, combining two key aspects: domain- and context-specificity, which recognizes that each problem is unique and requires a tailored approach, and the technical dimension, which employs advanced technologies such as artificial intelligence. In this way, the connection between these two aspects can be used to develop the fundamental domain-specificity needed to create an AI model that generates a specific BBSS, which can be isolated and independently developed within a microservice. “Domain-driven design (DDD) is [hereby] one of the proposed methods of extracting microservices from a domain” (Vural & Koyuncu, 2021, p. 32722, para. 4). It is used as the standard way of modeling the AI concept within a modular microservice later on (Chapter 4.3.2. and 4.5.), always to maintain complex relationships within an evolving model of the core business domain.

The relevance of an AI model for C2C data matching is therefore evident, as it allows for better anticipation of customer needs and the development of automated, personalized offers, which leads to higher customer retention, creates network and scale effects, generates new content, and ideally transforms into a recurring, self-developed, cyclical ecosystem supported by AI and monitored by (human) control instances. Biswas et al. (2020) also mention the overarching establishment of building an AI-powered decision-making layer, which throughout an “enterprise-wide road map for deploying advanced-analytics (AA)/machine-learning (ML) models across entire business domains” (p. 11, para. 2), is considered, which is not part of this thesis. The thesis, therefore, focuses on modeling an isolated C2C data matching for BBSS within a microservice, which can be part of the bank's overarching data analytics strategy. The concepts outlined below refer to potential microservices, not just their interfaces. They embody a type of recommender system—an AI-driven tool that processes user data to provide relevant matches. These systems access data, analyze it—for example, using embeddings or similarity search algorithms—and produce recommendations.

4.3.2. Investigation of Possible AI Learning Methods

The following outlines a structured approach to exploring potential AI learning techniques for a Customer Data Matching (C2C) system to produce BBSS. It examines explicitly collaborative and content-based filtering in recommender systems, graph-based analysis methods, and continuous optimization through feedback loops at various training stages. Additionally, it covers other pertinent techniques, such as autoencoder-based feature extraction and semi-supervised learning. In this case, the craftsman platform (Scenario 2) from Chapter 3.3.6.2. is selected as an exemplary example, which explains the investigated AI models for customer data matching in a practical and illustrative manner.

Application of Collaborative and Content-based Filtering in Recommender Systems

Scenario 2: The craft services platform is utilized by bank customers. Some customers provide services like painting and plumbing, while others require exactly those services.

Basic Level: Traditional collaborative filtering (Adomavicius & Tuzhilin, 2005), which relies on historical interactions like bookings and reviews, can be employed to generate demanders' recommendations based on past transactions.

Intermediate Level: A hybrid recommender system integrates collaborative data with content features, such as a craftsman's specific skills or the range of services provided (Koren et al., 2009). This enhances recommendation accuracy by considering both subjective customer preferences and objective details of the offer. Koren et al. (2009) demonstrate that hybrid methods significantly enhance recommendation quality.

Advanced Level: Deep learning methods, such as Neural Collaborative Filtering (He et al., 2017), can incorporate feedback loops by continually learning from new transaction data and user reviews. This results in adaptive models that actively respond to evolving customer needs and market trends. He et al. (2017) show that deep learning-based recommender systems attain higher accuracy through iterative optimization.

Use of Graph-based Analyses

Extended Scenario 2.1: A network on the craft services platform connects providers and demanders. Graph-based methods effectively capture the complex relationships in this network.

At the basic level, initial analyses involve calculating simple network metrics, such as centrality measures or clustering coefficients, to identify key actors (Lamb et al., 2020).

Intermediate Level: Graph embedding techniques, such as Node2Vec (Grover & Leskovec, 2016), transform nodes (customers) into a continuous vector space, enabling similarity comparisons. When applying node2vec (or similar random-walk-based embedding algorithms), a graph $G=(V,E)$ is created, where nodes $v \in V$ represent customers—each being a provider, a demander, or both. The objective is to learn a d -dimensional vector for each customer that maintains structural similarities. These similarities are assessed using cosine similarity (cos). Below is a practical checklist of attributes and graph information to store and prepare either before or during the embedding process:

1. Node-Meta (static/semantic) per customer
 - a. ID, Role(s): Provider, Consumer, or both
 - b. Skills or categories (e.g., electrician, plumbing, carpenter) represented as a token list or using one-hot/multi-hot encoding.
 - c. Profile text embedding (describing the craftsman and services) can be converted into preprocessed text embeddings (using BERT or sentence embeddings) for use as node features.
 - d. Location coordinates (Lat/Lon) or region (for distance features)
 - e. Price range/hourly rate/price category
 - f. Availability/Time window (binary or histogram)
 - g. Certificates, business registration, and potentially verification status
2. Customer relationship edges (connections)
 - a. Transaction edges include bookings ($A \rightarrow B$), as well as frequency, recency, and ratings.

- b. Communication edges: contact requests and message counts.
 - c. Social/recommendation edges include referral links, joint projects, and shared employers.
 - d. Similarity Edges (Co-occurrence): indicate that both were booked by the same demanders (co-booking).
- 3. Dynamic or behavioral features represented as node or edge attributes.
 - a. Profile click rate, response time, cancellation rate, and customer satisfaction (CSAT).
- 4. Example (Craft Services Platform)
 - a. Craftsman A is an electrician in Berlin-Central, priced at a medium rate with a rating of 4.8. Clients with smart home projects frequently hire him.
 - b. Customer B (Requester) is seeking an electrician in Berlin-Central with a medium budget.
 - c. The node2vec embeddings of A and B (assuming B also has node representations, such as for profiles with demand history or profile features) result in similar vectors $\rightarrow$ high cosine similarity $\rightarrow$ indicating a match signal.

Advantages: It is scalable and supports combining topological and attribute data, primarily when attribute features are used as extra signals.

Advanced Level: Graph Neural Networks (GNNs) (Hamilton et al., 2017) facilitate the identification of complex, nonlinear relationship patterns between craftsmen providers and demanders, enabling end-to-end modeling. This approach is especially beneficial for customer data matching, as GNNs can effectively integrate diverse data types such as reviews, interactions, and direct recommendations. “Nonlinear” here indicates that relationships generate information that cannot be explained by straightforward addition or linear combinations of immediate features. Instead, it involves multi-level interactions and context-dependent effects. GNNs capture these intricate dependencies by passing messages and aggregating information across neighbors over multiple layers. Concrete examples of nonlinear relationship patterns on a C2C craft services platform include:

1. Multi-step recommendation process (multi-hop effects)

When craftsman A frequently collaborates with craftsman B on large projects and B is recommended by C, a user who has booked B can strongly match with A — this connection involves multiple steps (2–3 hops). GNNs effectively capture these relationships, while basic collaborative filtering may not.

2. Context-dependent complementarity (heterogeneous relations)

A painter (M) is not typically suited for sanitary tasks, but if M often collaborates with plumbing installers (complementarity), a client seeking comprehensive solutions might still consider M a valuable provider. Therefore, relevance is not solely based on individual skill scores. GNNs capture these complex, heterogeneous relationship patterns.

3. Trust/Reputation Propagation (with weighted, nonlinear effects)

Ratings and verifications spread across the network: when several highly-rated customers endorse a provider, their reputation grows exponentially within the subnet, rather than increasing by a simple average. GNNs are capable of learning these weighted, aggregated reputation effects.

4. Temporal or Sequential Interactions

Seasonal demand, such as heating work in winter, interacts with network patterns, like certain providers being booked more often during specific seasons. Time-aware GNNs, also known as Temporal GNNs, learn these complex, nonlinear patterns that depend on time.

GNNs are effective here because they integrate topology with node and edge features, utilize nonlinear aggregation functions (neural networks), and can model complex multi-hop or contextual patterns in an end-to-end manner (as mentioned above).

Graph Neural Networks (GNNs) are a type of neural network (Khemani et al., 2024) specifically designed to work with data organized as graphs. Among these, the Graph Convolutional Network (GCN) is a particular architecture that applies the principles of Convolutional Neural Networks (CNNs) to graph data processing. Neo4j is particularly well-suited as a GCN (Vukotic & Watt, 2013) for modeling customer relationships as a network. It efficiently stores, queries, and analyzes complex relationship data by organizing nodes (such as customers,

products, interactions) and edges (like “buys,” “knows,” “recommends”), with properties like timestamps, amounts, or categories. This setup allows for detailed mapping of customer interactions, purchasing habits, and social connections. Additional features can be added through Graph Data Science and Machine Learning. Using the Neo4j Graph Data Science (GDS) Framework (Hodler & Needham, 2022), advanced analysis methods become accessible, including:

- Community Detection: The process of identifying groups of customers exhibiting similar behaviors.
- PageRank: Determining influential customers in the network.
- Graph Embeddings: Numerical representations of nodes for machine learning.
- Graph Convolutional Networks (GCN): Predicting customer behavior using network structures.

Henna & Kalliadan (2021) show that combining GCNs with Neo4j can notably enhance sales forecast accuracy in B2B CRM. The benefits of Neo4j (Hodler & Needham, 2024) include:

- Intuitive modeling: Nodes and edges represent actual entities and their connections.
- Powerful queries: Cypher, a declarative query language built for graph databases like Neo4j, allows for complex pattern searches with straightforward syntax.
- Scalability: Neo4j efficiently handles large and complex networks.
- Machine Learning Integration: ML models can be directly applied to the graph via GDS. Neo4j Graph Data Science (GDS) facilitates machine learning integration on two levels: first, by calculating graph-based features and node embeddings that are used by external ML algorithms like Random Forest, Gradient Boosting, or Logistic Regression; second, through native ML pipelines for tasks such as node classification, link prediction, and regression, which run directly inside the database. For complex relationship patterns, methods like Node2Vec, FastRP, and GraphSAGE are effective, while for nonlinear patterns, Graph Neural Networks (such as GCN and GAT) can be combined with external ML frameworks.

Continuous Optimization Through Feedback Loops

Extended Scenario 2.2: The platform employs a continuous learning approach, utilizing outcomes such as successful service placements or repeat bookings as feedback to steadily enhance the recommendation algorithms.

Basic level: Periodic batch retraining (Dangi et al., 2011) is used to update the model based on new data (such as newly concluded contracts and customer reviews). With periodic batch retraining, newly collected data (e.g., new customer contracts, reviews, interactions) is added to the training dataset at fixed intervals, and the model is retrained completely. In the C2C craft services platform scenario, this could involve collecting new customer reviews, bookings, and provider profiles every 4 weeks. Subsequently, the recommendation system is retrained to reflect current trends, such as popular craftsmen and shifting customer demand.

Intermediate Level: Online learning methods (Wang et al., 2024) enable near real-time model updates, allowing for the immediate incorporation of changes in customer behavior, such as seasonal fluctuations.

Advanced level: Reinforcement learning techniques, such as multi-armed bandit algorithms (Kuleshov & Precup, 2014), can be employed to enhance reward maximization (i.e., success rates in placements) and enable real-time strategy optimization.

Additional Supplementary Methods (Scenario 2.x)

Autoencoder-based feature extraction: Autoencoders (Goodfellow et al., 2016) are used to convert high-dimensional customer data into a compressed latent space. Autoencoder feature extraction is valuable for high-dimensional, complex data, especially when nonlinear relationships are crucial. It reduces data from very high dimensions to a much lower latent space, often by a factor of 10 or more. To enhance efficiency, traditional feature selection methods—such as filter, wrapper, or embedded approaches—can be applied beforehand to eliminate irrelevant features. This process enhances the recognition of hidden patterns, improves matching between providers and demanders, and effectively extracts relevant features.

Semi-supervised learning: Since labeled data is often scarce in customer data matching (Chapelle et al., 2006), semi-supervised learning allows the model to utilize both labeled and unlabeled data during training.

Summary Using the Example of the Craft Services Platform

In a craft services platform where bank customers serve as both service providers and seekers, the following AI learning methods can be effectively utilized:

Collaborative filtering and recommender systems utilize historical transactions and customer reviews to generate personalized recommendations. For instance, if a customer offers craft services, they might also be suggested as a provider for similar services, based on positive reviews and previous interactions.

Graph-based analyses reveal the interaction networks between craftsmen and customers. By utilizing GNNs, especially GCNs like Neo4j, complex relationship patterns can be identified—such as pinpointing providers that are highly sought after in certain regions.

Ongoing optimization, utilizing feedback loops—such as monitoring successful placements and customer feedback—ensures the model remains current. This enhances recommendation accuracy and enables adaptive adjustments for seasonal or regional variations. Complementary methods, such as autoencoders and semi-supervised learning, help effectively handle diverse and partially unstructured customer data, converting it into meaningful, reduced features.

This combined approach creates a resilient, adaptable system that enhances the matching of craftsperson services while continuously learning from new data and market trends. By carefully implementing these methods across different training levels, an adaptive and efficient system can be built, exemplified by the craftsperson platform. This system effectively connects customer and service provider information, resulting in targeted BBSS. It encourages the integration of bank customers into the platform ecosystem, allowing the bank to serve as a market and data orchestrator, and delivering additional value to both providers and users.

If customer relationships are modeled as a network (Hodler & Needham, 2024; Vukotic & Watt, 2013), then adopting Neo4j is a logical choice. It enables efficient storage and retrieval of complex relationship information and provides advanced analysis capabilities through machine learning integration. This can aid in uncovering hidden patterns, identifying customer segments, and supporting strategic decision-making.

For customer data matching on a C2C craft services platform, suitable machine learning methods vary based on the objective. Node embeddings like Node2Vec are ideal for assessing similarities between customers and handymen and generating recommendations, though they are less effective for complex predictions. Graph neural networks, such as GCN and GAT, excel at integrating diverse data types—reviews, interactions, and network effects—but they come with higher computational demands and lower explainability. Traditional collaborative filtering performs well with ample interaction data but faces challenges during the “cold start” problem with new users or handymen lacking a history. Community detection and clustering help identify segments and target groups, but are less suitable for individual recommendations. In summary, when data relationships in the network are dominant, graph-based models are more appropriate. Conversely, for focus on personal preferences or reviews, content-based or collaborative filtering methods tend to be more effective.

4.4. BANKING BECOMES CONTEXTUAL BANKING - KEY INFLUENCING FACTORS AND EVALUATION CRITERIA FOR A SUCCESSFUL BEYOND BANKING ECOSYSTEM

While open banking allows third-party providers to access customer financial data through open interfaces (Deloitte, 2025) and embedded finance integrates financial products and banking data from non-bank companies into customer-focused channels for a seamless experience (Tenner, 2022), the broader idea of contextual banking—focused on improving digital customer proximity (Akcok, 2023)—is becoming increasingly significant. Akcok describes Contextual Banking (CB) as fully customizing and personalizing the banking experience. The ideal customer receives the right product tailored to their specific context, at the right time and place. This holds true whether the service is provided on their banking platform, embedded within other services, or accessed via third-party platforms.

In addition to researching the CB and how it can support BBEs, H3.5 is also being validated to determine which decisive influencing factors and evaluation criteria can assess the value of a successful BBE. Furthermore, it is being examined how service design and governance under CB can be integrated into the BBE concept.

4.4.1. Relevance and Economic Implications

While from the customer's perspective, changing customer demands for UX (User Experience) and seamlessness (Kreger, 2025) are key drivers for modern banking, for banks, securing or regaining customer proximity is crucial. Here, customer centricity (Möller et al., 2024), where the customer and their needs should be at the center of a transaction, as well as banks becoming closer to the customer (Nicoletti, 2021), which 88% of respondents consider relevant, by offering additional value-added services along the customer journey and aligning more intensively and consistently with the customers' life worlds, are important.

Akcok (2023) provides a detailed overview of use cases and impacts of revenue growth in contextual banking, with the most relevant potential economic implications including an increase in the Customer Satisfaction Score and improved service offerings, a reduction in customer churn (-20%), more effective (re-)customer outreach (75% more relevant leads), and unlocking business potential (15% higher revenue). Furthermore, Chougule & Dudekula (2024) mention hyper-personalization as a key attribute for future ecosystems in chapter 2.3.3., which should be understood and implemented as part of the final stage of a contextual banking approach.

4.4.2. Fundamental Key Influencing Factors and Evaluation Criteria for a Successful Beyond Banking Ecosystem

The following explores various key influencing factors and evaluation criteria that are relevant and measurable from the perspective of the CB. Furthermore, it is necessary to examine the extent to which these factors align with and support BBE. Based on a combined investigation of literature review and the expert interviews from Chapter 3.3.3., the following fundamental strategic success factors and measurable performance indicators (KPIs) for BBEs can be identified.

Strategic Success Factors

Center on essential customer needs: An ecosystem should prioritize key customer requirements (Liesenkötter et al., 2020) to deliver actual added value by integrating diverse services. This approach boosts customer loyalty and satisfaction.

A Win-Win-Win Situation for All: Everyone involved in the ecosystem—whether it's the orchestrator, partner, or customer—should gain benefits from their participation. This approach encourages sustained collaboration and engagement over the long term.

Attractive and complementary partnerships are essential: selecting partners that genuinely enhance the service offerings is key to the ecosystem's success. Having a diverse range of partners makes the ecosystem more appealing to customers.

Efficient and user-friendly platform design: An intuitive, fast, and convenient experience encourages more active use by customers and partners, fostering customer loyalty

Measurable Performance Indicators (KPIs)

User adoption and engagement: number of active users, platform usage frequency, and customer retention rate.

Transaction metrics: total number of transactions, total transaction value, and success rate of transactions.

Financial performance: Revenue growth driven by services beyond traditional banking, cost reductions achieved via process automation, and the ecosystem's return on investment (ROI).

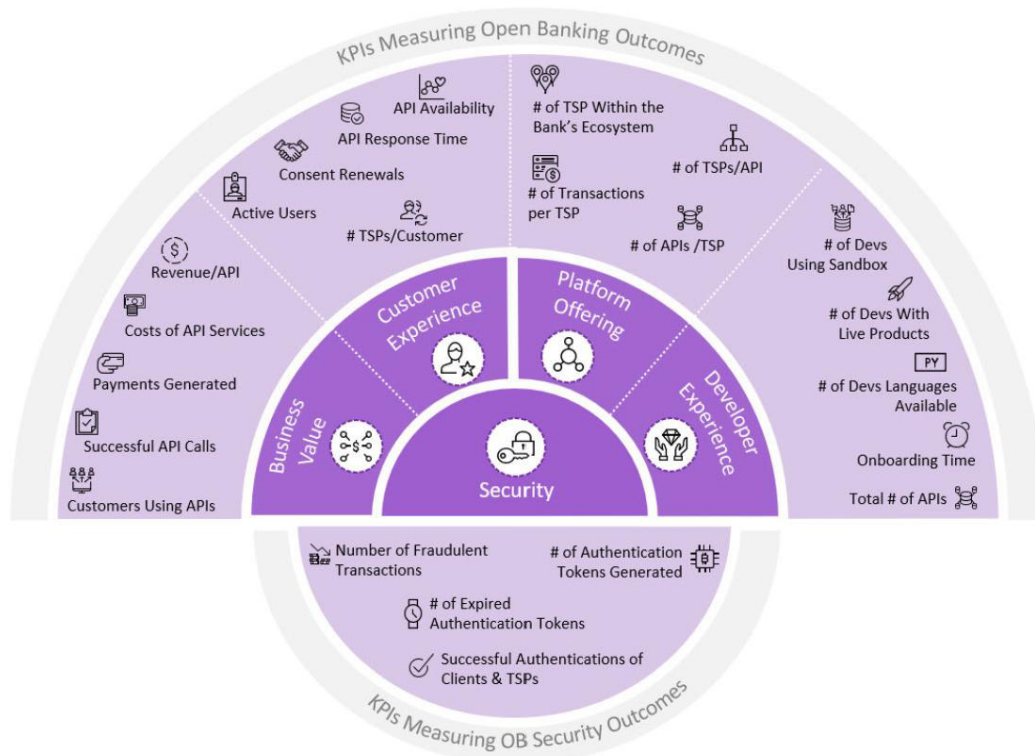
Customer experience: Net Promoter Score (NPS), Customer Satisfaction Score (CSAT), and the number and type of customer complaints (Lean Transition Solutions, 2025).

Innovation and Development: number of integrated third-party apps, time to market for new services, and development cost efficiency (Dezem et al., 2024).

Another illustrative, helpful, and complementary compilation of KPIs for measuring Open Banking outcomes, as well as security outcomes, which can be well adapted due to their similarity to Beyond Banking, is presented in the following graphical representation (Figure 55) by Accenture (Mallick et al., 2020). It presents KPIs for the five key areas: Business Value, Customer Experience, Platform Offering, Developer Experience, and Security. For the Business Value focus, examples include customers using API calls or revenue per API; for Customer Experience, it includes consent renewals or the number of TSPs

(Technical Service Providers) per customer; for Platform Offering, the number of transactions per TSP or the number of APIs per TSP; for Developer Experience, the number of developers using sandboxes or onboarding time; and for Security, successful authentications of clients and TSPs and the number of fraudulent transactions can be considered as metrics within the overall evaluation context.

Figure 55. Open Banking KPIs for Business Value by Accenture (Mallick et al., 2020)

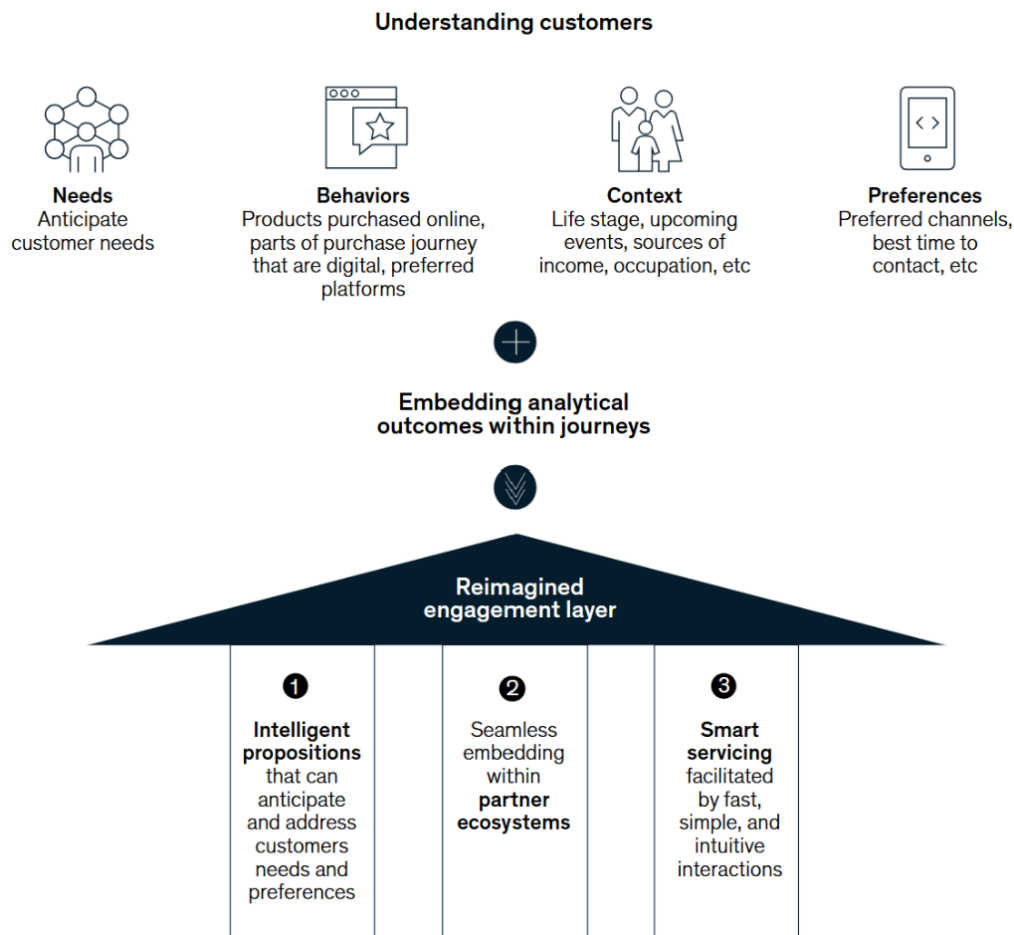


4.4.3. Derivation of Context-based Influencing Factors and Evaluation Criteria for a Successful Beyond Banking Ecosystem

After the fundamental success factors for BBEs have been compiled, the next consideration is how these success factors can be supplemented or modified with the customer's contextual understanding. The McKinsey & Company Global Banking Practice (2021) states that a reimagined engagement layer is based on understanding customers (Figure 56). Here, alongside the factors Needs with "anticipate customer needs," Behaviors with "Products purchased online, parts of

the purchase journey that are digital, preferred platforms,” and Preferences with “Preferred channels, best time to contact,” the dimension Context with “Life stage, upcoming events, sources of income, occupation” completes the Understanding Customer dimension. This enables the development of a reimagined engagement layer through embedding analytical outcomes within journeys, which can provide “Intelligent propositions that can anticipate and address customers' needs and preferences,” “Seamless embedding within partner ecosystems,” and “Smart servicing facilitated by fast, simple, and intuitive interactions” (p. 22, Exhibit 3).

Figure 56. A Reimagined Engagement Layer Uses AI and Advanced Analytics (McKinsey & Company, 2021)



Building on the reimagined engagement layer, the factor Context can be enriched and integrated into a contextual banking or beyond-banking ecosystem using the following elements:

Payments and payment-linked experiences: Integrating payments directly into the service environment—such as through automated loyalty programs or in-app offers—turns each transaction into a data touchpoint. Other activities, such as consulting (if recorded electronically) and chatbot usage, also produce touchpoint data and can be partially integrated with payments. This helps generate sales signals and assess the effectiveness of payment processes. According to McKinsey (Chheda et al., 2023), seamless payment experiences are a crucial factor in fostering customer loyalty and delivering added value in digital ecosystems.

Insights: Advanced data analysis and AI-driven dashboards deliver real-time insights into customer behavior. These insights reveal trends and patterns, such as the most in-demand craft services or the most popular offers.

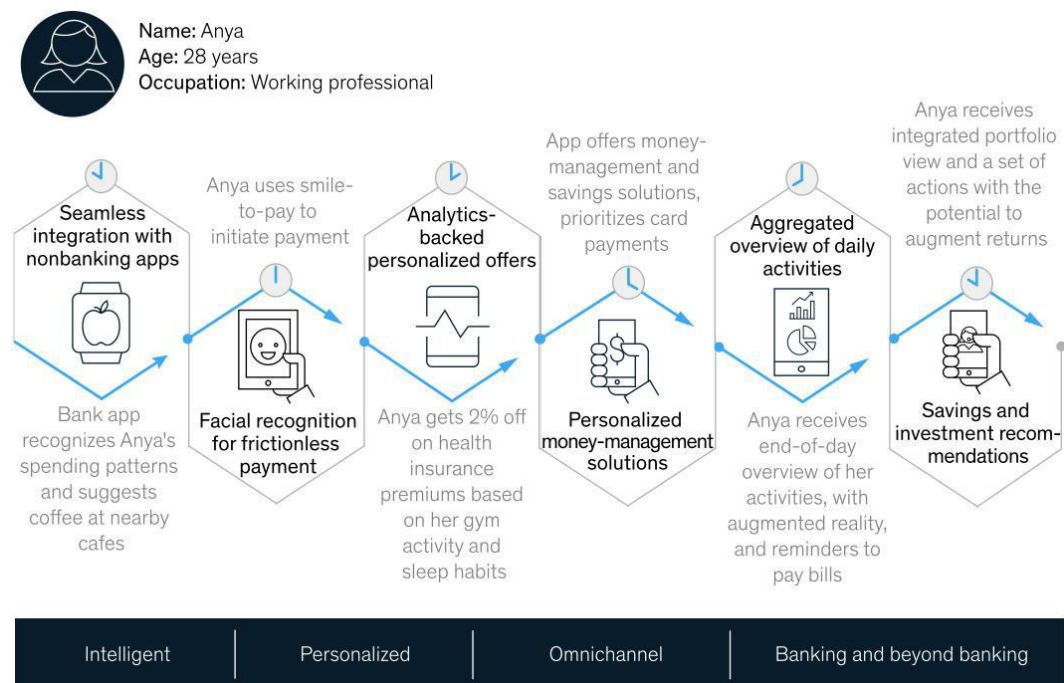
Lifestyle: A lifestyle module records personal preferences and interests that significantly impact the customer experience. For instance, craftsmen who provide both technical services and lifestyle-oriented services—such as home design or renovation advice—can be incorporated into a customized offering (Sironi, 2022).

Advanced APIs and Apps: The open integration of third-party providers (non-bank providers) and other banks broadens service options. This API-centric architecture enhances interoperability and facilitates the direct incorporation of context-specific offers—such as contractor reviews and regional deals—into current banking applications.

Sales touchpoints and contextual sales signals: Connecting various customer interactions throughout their journey—like login, payments, or post-service—allows for the generation of precise sales signals (Verhoef et al., 2015). These signals are crucial for spotting cross-selling and upselling opportunities and providing offers that are relevant to the context. The following graphic (Figure 57) from McKinsey & Company (2021) illustrates, as an example, how such a bank could engage a retail customer throughout the day with various digital touchpoints. In particular, the first contact point, where the “bank app recognizes Anya's spending patterns and suggests coffee at nearby cafes” (p. 8, Exhibit 3), provides an opportunity for further consideration of loyalty programs. Various cafes could

offer cashbacks or other benefits as added value. The third contact point, where “Anya gets 2% off on health insurance premiums based on her gym activity and sleep habits,” can also be combined with the gym's loyalty program in the form of cash back, free drinks, or free or discounted participation in fitness classes. This metric could measure how well context-based offers engage customers. Verhoef et al. (2015) demonstrated in their analysis that combining all touchpoints results in a notable enhancement of the customer experience.

Figure 57. Retail Customer's Engagement over the Course of the Day (McKinsey & Company, 2021)



Additional dimensions can now be derived or expanded based on the previously mentioned influencing factors and evaluation criteria, as well as the consideration of context-based elements. Now, essential factors have been included to assess the success of a beyond-banking ecosystem from the viewpoint of contextual banking.

Customer-Centric Contextualization: Contextual Banking focuses on delivering timely and relevant offers. Beyond user adoption and engagement KPIs, it assesses how well the platform captures each customer's specific context—like

location, life circumstances, transaction history, and usage patterns—and provides personalized services. This approach enhances customer value and boosts conversion rates, as offers are accurately aligned with the customer's immediate needs (Verhoef et al., 2015).

Integration of context-related partners and services: While a beyond-banking ecosystem relies on a broad range of partners, contextual banking emphasizes the importance of “relevant context integration.” This means evaluating how effectively external partners and complementary services—such as local craft businesses and lifestyle providers—integrate seamlessly into the customer experience, delivering consistent and everyday-relevant added value (Yoo et al., 2010). Success is gauged through user feedback, NPS, and CSAT.

Real-time transaction metrics and contextual adaptability: Besides traditional transaction metrics like number, volume, and success rates, in contextual banking, it is vital to assess how quickly and precisely the platform adapts to evolving customer contexts (Wang et al., 2024). Prompt data analysis and ongoing optimization—such as utilizing online learning or reinforcement learning—help ensure that recommendations and offers reflect the current situation, thereby fostering long-term customer loyalty.

Extended financial and operational KPIs: The ecosystem's success isn't just measured by traditional metrics like revenue growth and ROI. It also considers how context-based offerings help lower costs and create new revenue streams. For instance, the extra value from contextual cross-selling or cost reductions through integrated services can serve as additional KPIs. In addition, trust and security aspects, as well as scalability and data quality of a context-based BBE, can represent additional KPIs as measurement bases.

In summary, a successful, scalable, robust, and reactive BBE within the framework of contextual banking should mainly be judged by its ability to understand individual customer contexts and deliver personalized, relevant offers (being able to respond to external influences such as workplace loss, divorce, etc., at the right time)—considering technological, partnership, and business factors. The additional criteria indicate that success is measured not only through quantifiable transactions but also by providing high-quality, context-aware customer experiences.

4.5. CONCEPTION OF THE MODEL

In this chapter, the design of a BBE 3.0 will be created using Design Science Research (DSR). The elements explored in the previous chapters will be incorporated into the design concept.

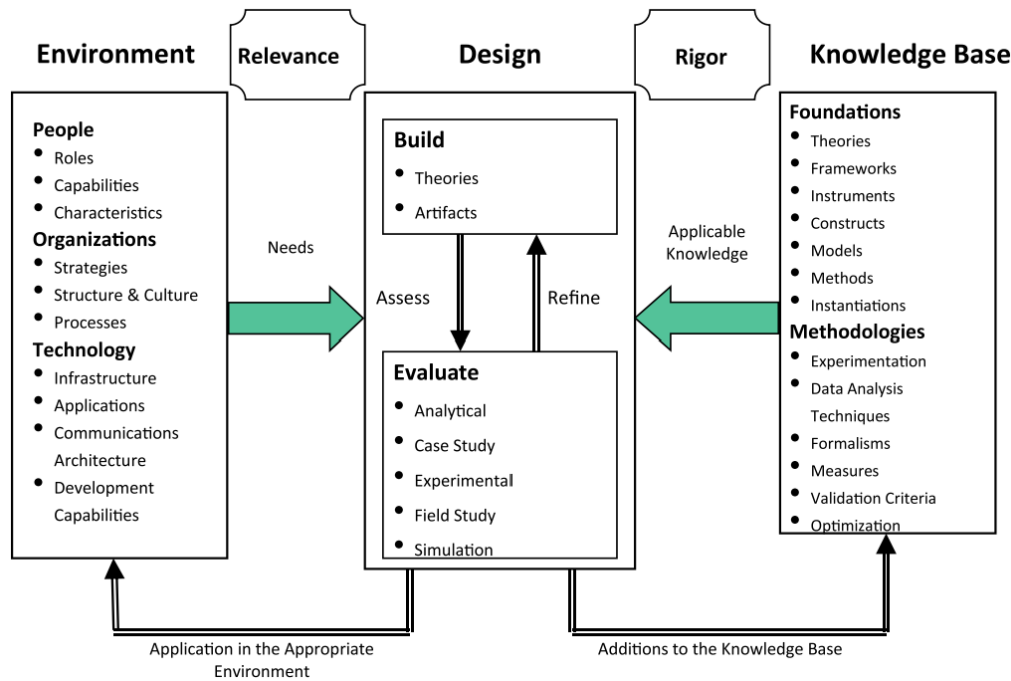
The process of model development will proceed through the following steps: First, the DSR methodology will be explained in detail, including its problem space and solution space. In the second step, all already researched relevant elements and attributes for a BBE will be compiled, which are to be incorporated into the final design. Next, a systematic literature review will be conducted, after which various maturity models from the platform, ecosystem, open banking, and beyond banking sectors will be examined as suitable reference models and selected as a basis for further modeling of the target design. The target design will be developed in iterative cycles with experts.

4.5.1. Designing the Concept Using the Design Science Research

In the methodology section of this thesis (Chapter 1.3.), the DSR has already been introduced as the methodology for modeling the design using expert knowledge. How the necessary DSR is explained in detail and how it is used for the research goal will be described below. To understand the DSR methodology and its process, as well as the purpose of these models in combination for this research, the following will examine the DSR Framework (Hevner et al., 2004), the Design Science Research Process (DSRP) model (Peppers et al., 2007), and the DSR Evaluation (Sonnenberg & vom Brocke, 2012).

The DSR Framework (Figure 58) “presents a conceptual framework for understanding, executing, and evaluating design science research” (vom Brocke et al., 2020, p. 2, para. 3) and is derived from the environment that defines the problem space in which the interesting phenomena are located. These phenomena can involve individuals, organizations, or existing or planned technologies. From this, the goals, tasks, problems, and opportunities can be derived, which define the needs. “Framing research activities to address real stakeholder needs assures research relevance” (para. 3).

Figure 58. Design Science Research (DSR) Framework based on Hevner et al. (2004) (vom Brocke et al., 2020)

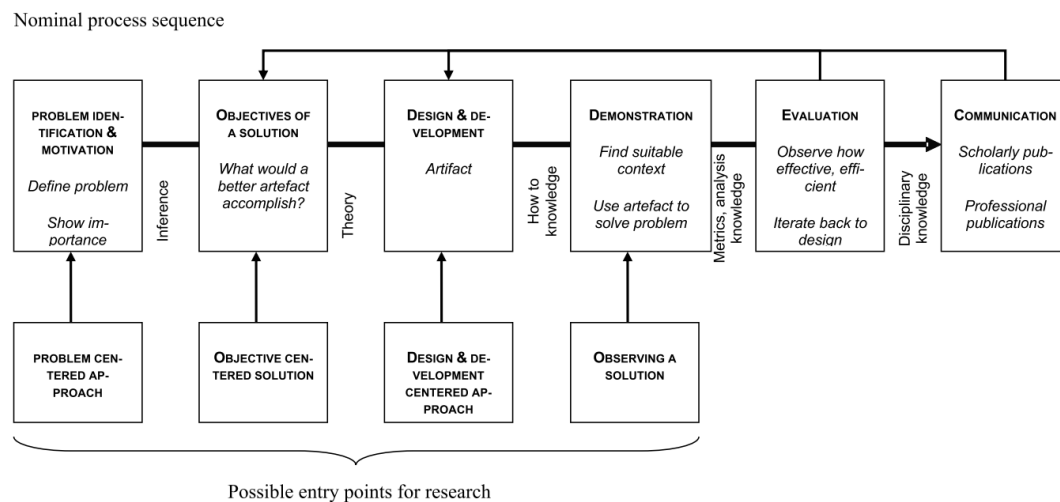


The knowledge base “provides the raw materials from and through which DSR is accomplished” (para. 3) and is called the Solution Space. Foundations are established through prior research and results from reference disciplines during the build phase of a research study. Methodologies provide guidelines necessary for the evaluation phase. “Rigor is achieved by appropriately applying existing foundations and methodologies” (para. 3). In the design process, theories and artefacts in the build space are refined through multiple iterations with the methodologies in the evaluate space until an adequate target design is achieved, intended to solve the research problem best or offer new or divergent insights, and thus may update the design theory.

How the DSR process takes place is explained using the following model (Figure 59) by Peffers et al. (2006). The DSRP is depicted in a nominally sequential order, with the possible entry point depending on the current state of research. Since it is assumed that problem identification and motivation, as well as the objectives of a solution, have already been addressed as two of the six activities in Chapter 1, the entry point occurs at the Design & Development-centered approach.

In this approach, an existing artefact is examined that has not yet been thoroughly considered as a solution to the explicit problem domain. “Such an artifact might have come from another research domain, it might have already been used to solve a different problem, or it might have appeared as an analogical idea” (Peffer et al., 2007, p. 55, para. 3). The already existing artefact can serve here as a reference model and thus as a starting point for the entire DSR process.

Figure 59. Design Science Research Process (DSRP) Model (Peffer et al., 2006)

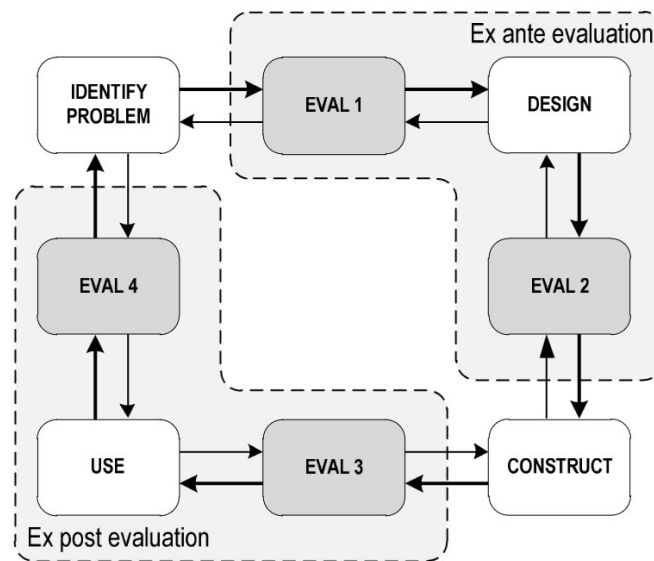


Subsequently, the reference model is combined with the suitable context of the research from the previous chapters and demonstrated, after which the evaluation is carried out using appropriate methodologies. Finally, scholarly and professional publications in the field of communication are produced. The evaluation process is iterative, meaning that the design is adjusted after each evaluation cycle and re-evaluated in a feedback loop until the target design is achieved.

The DSR evaluation process (Figure 60) “sketches a cyclic high-level DSR process incorporating a design-evaluate-construct-evaluate pattern” (Sonnenberg & vom Brocke, 2012, p. 392, para. 2). This DSR process includes the DSR activities “problem identification, design, construction, and use followed by corresponding evaluation activities” (para. 2).

In such a process, ex ante evaluations validate the design of an artifact and ex post evaluations validate artifact instances and artifacts in use. In particular, ex ante evaluations are conducted before the construction, ex post evaluations are conducted after the construction of any artifact. (para. 2)

Figure 60. Evaluation Activities Within a DSR Process (Sonnenberg & vom Brocke, 2012)



Vom Brocke et al. (2020) plausibly argues that in the work of Peffers et al. (2007), the DSR process should and would also be conducted iteratively, as “evaluation only takes place after design, development, and demonstration activities; missing out on the opportunity to inform the design in an early stage of the research process” (p. 5, para. 3). This kind of evaluation can lower risk (Venable et al., 2019) by allowing early feedback on the small steps toward the final artefact to be incorporated into the design process. The authors also suggest that this type of assessment becomes more precise and focused when it targets different design aspects, particularly during key decision points in the design process. For these reasons, the focus is placed on the DSR Evaluation Process with the four activity cycles by Sonnenberg & vom Brocke (2012), according to which the four evaluation cycles are derived along with their main evaluation criteria from the research design necessary here:

Eval 1 Activity: Evaluating problem identification involves criteria such as importance, novelty, and feasibility. This section first summarizes the already examined and developed problem statements, design objectives, and design theory. Then, all elements, factors, and criteria from previous research are systematically compiled. Based on these two steps, the justified design theory and design objectives with their testable propositions can be further elaborated in detail. With a precise formulation of the design theory and design objectives, various potentially suitable models and frameworks can be analyzed and integrated as existing solutions to the investigated problem at different maturity model levels. Here, the appropriate reference model (M0) is examined and selected through a systematic literature review (maturity analysis), which will serve as the starting point for further evaluation cycles within the solution space.

Eval 2 Activity: Evaluating the solution design involves considering criteria such as simplicity, clarity, and consistency. The first iteration and evaluation stage (M1) is the design model based on the research needs and findings from the problem space, which is formed by market observations from literature analysis, expert interviews, and surveys. Here, all previously gathered elements, factors, and criteria from the existing research are incorporated into the reference model (M0), enriched with relevant attributes for the design of a BBE 3.0. Because the artefact has not yet been built (instantiated) and therefore has not been applied to any actual reality, this evaluation is considered artificial (Venable, 2006). “The design specification is evaluated [with logical reasoning] against its correctness and completeness to assess whether the design flawed (M1.1). In particular, it should be evaluated whether the constructs used in the design specification as well as their relationships correspond to the stated design objectives” (Sonnenberg & vom Brocke, 2012, p. 395, para. 1). Moreover, it is important to make sure that the design specifications are clear and meaningful for all stakeholders involved. In this process, individual expert interviews (4 experts) are conducted to validate the initial design after the first “artificial” evaluation (M1.1) according to design specifications, and to add new attributes or modify or omit existing attributes (M1.2). Subsequently, a reevaluation of the expert feedback takes place, leading to the development of the final design in the Eval 2 cycle (M2).

Eval 3 Activity: Evaluating the instantiation of the solution involves criteria such as ease of use, fidelity to real-world phenomena, and robustness. Here, the instance of an artefact (prototype) is validated in an artificial setting (Venable, 2006) (proof of applicability) and “might only prove that an instance is applicable to a task, within a system, or by a real user. The interplay of all three realities together with the artefact instance would be the focus of the Eval 4 activity” (Sonnenberg & vom Brocke, 2012, p. 395, para. 2). Here, the aggregated solution design from the collected and evaluated feedback of the individual experts (M2) is assessed using a targeted focus group of 6 experts (M2.1) and subsequently validated for applicability using the constructed artefact in the form of a fictional use case or case study (M2.2). This focus group potentially consists of the entire set of Eval 2 activities and the 10 experts from Chapter 3.3.3. Afterward, a reevaluation takes place, leading to the development of the design (M3).

Eval 4 Activity: Assessing the solution's performance involves criteria such as effectiveness, efficiency, and external consistency. In this activity, the final instance of an artefact in a naturalistic setting is validated (proof of usefulness) and “ultimately show that an artefact is both applicable and useful in practice. Evaluations reflect the organizational context by means of all three realities (real tasks, real systems, and real users)” (p. 395-396, para. 3). To assess the practical relevance and suitability of the model, an expert survey will be conducted with experts from all previous evaluation cycles, which will serve to finalize the design (M3). This survey will also gather final feedback from the experts regarding the potential use or application of the model in banks, as well as relevant KPIs for measuring BBS and (banking) ecosystems (M3.1). The last reevaluation will complete the final design (M4). Finally, “with regard to design theories the main focus of the Eval 4 activity would be to finally validate the artefact based on the testable propositions specified in the design theory” (p. 396, para. 1), including the verification of the hypotheses.

4.5.2. Eval 1

Before the concept model can be evaluated, preparatory activities for the first evaluation must be carried out. This initially involves establishing and transitioning to a design theory with design objectives, followed by the compilation

of design specifications. After these steps, the analysis to find a suitable reference model (M0) can begin, and the first initial concept (M1) can be developed based on already collected research results.

4.5.2.1. *Transition to Design Theory With Design Objectives*

The observation of the problem, based on the systematic literature review (Chapter 1.2.1.), is that no concept for intra-institutional customer data matching (C2C) in connection with Beyond Banking (BBE 3.0) has been identified. As a result, the research gap “Key factors and evaluation criteria for successfully developing a scalable Beyond Banking Ecosystem and its conceptual model” (Chapter 1.2.2.) was postulated. From this, RQ3 was formulated, which explores how the yet-to-be-investigated elements and factors can be integrated into a newly designed concept.

The design theory can be simplified based on the title of the thesis “Conceptualizing and Designing Scalable Beyond Banking Ecosystems Using Machine Learning and Data Analytics Methodologies.” More specifically, it involves the proposed development of a concept for BBE 3.0, surrounded by determining factors and elements (from Chapter 3) that (potentially also interactively) influence the concept. Furthermore, the researched data analytics and machine learning methodologies (Chapters 3.2., especially 3.3.6. and 4.3.) could represent the potentially central customer data matching engine (C2C), which should also be integrated into the overall concept. The design objectives belonging to the design theory can initially be derived from the overarching hypotheses H3.1 and H3.3 - H3.5. After the initial development of the design specification with the appropriate reference model (M0) and the resulting solution design (M1), the design objectives are refined with more precise evaluation criteria and validated through expert interviews.

4.5.2.2. *Compilation of Design Specifications*

In the next step, all elements, factors, criteria, etc., explored in this thesis that could serve as potential input data for design specifications are compiled as artefacts and phases. There is no unified artefact ontology for DSR in the literature. Baker (2004) and Johannesson & Perjons (2014) define an ontology as a human-made object intended to solve a practical problem. Specifically, Gregor & Hevner

(2013) advocate for a broader understanding of the IT artefact, encompassing any designed solution that addresses a problem within its context. Hevner et al. (2004) distinguish four different artefact types: constructs, models, methods, and instantiations. Accordingly, subsequent artefacts can be referred to as various context-related objects that address problems and include solutions within an overarching design. In combination with the phases, the entire design can then be described in a sequence after identifying the appropriate reference model (M0).

Artefact 1 – Selection and specification of an existing model or design theory related to ecosystems: In Chapter 2.4., “Methodological guidelines for business model development,” initial guidelines for a possible overarching design were discussed, and more suitable models based on ecosystem approaches were examined in Chapter 4.2., “Different ecosystem strategies.” Taking into account Chapter 3.1., “Distinguishing between the two scales 2.0 and 3.0,” initial models were identified, and further considerations toward investigating a suitable reference model in the following work step through maturity analyses were specified. The focus is on the matching engine according to BBE 3.0, but model considerations for 2.0 should also be included if possible. A suitable ecosystem reference model, which will serve as the basis here for Artefact 1 in DSR modeling, is discussed in Chapter 4.5.2.3.

Artefact 2 – Customer Acceptance of Beyond Banking Services as a Construct: In Chapter 3.3.4., customer acceptance of various service groups within Beyond Banking was researched. Customer surveys with a variety of predictor variables and clustering models can be used to identify which target groups demand which Beyond Banking services through a filtering logic. This logic can be restarted or rerun for each new Beyond Banking use case. The result is Beyond Banking services that are based on genuine, validated customer interest and added value.

Artefact 3 – Optional selection of the appropriate partner to provide the requested BB services: If the bank cannot offer or provide the BB Service itself, a suitable partner (TPP) must be found, who should be selected based on specific criteria through expert interviews (Chapter 3.3.3.). Criteria may include, among others, a positive reputation, market success, technical integrability and scalability, and experience with banks (compliance).

Artefact 4 – Opt-in Construct as a Preparer and Catalyst for the Subsequent Customer Data Matching: To increase customer penetration and relevance, a motivating, easy-to-understand, and value-adding explanatory and convincing opt-in approach (analyzed in Chapters 3.3.3. and 3.4.) is necessary. This should be presented in such a way that this consent engine is mandatory to display with every requested Beyond Banking service. A centralized consent management system can, through mutual communication with the matching engine, identify additional potentially suitable BB services that are determined based on customer preferences and profiling, but have not yet received consent. Strong incentives or trust mechanisms can persuade skeptics about the value of non-financial services.

Artefact 5 – AI Model as Microservice with ML Methods as Matching Initiator: Here, customers are crawled as suitable candidates who represent a potential match for exchanging data or goods (BB Services). This AI model can operate as an independent microservice for each BB Service entity and can be improved through feedback loops (Chapter 4.3.). This artefact will also have connections to the central data hub and consent management (initially artefact A12, after adjustment A8 see M1.21st in Eval 2), so that feedback on data matching and the opt-in construct can be taken into account and processed in the data hub.

Artefact 6 – Integrated C2C Matching Engine with DA Methodologies in the AI Model: This Data Matching Engine serves as an integrated central method within the AI model (Artefact 5) to connect customers as suppliers and buyers within the ecosystem. Various DA methodologies discussed in Chapters 3.2. and 3.3.6. (also partially from Chapters 3.3.4.2. and 3.3.3.) have been considered for executing this approach. As part of the AI model, data points between customer pairs can be specifically linked depending on the BB Service Entity (use case).

Artefact 7 – Beyond Banking Sales Signals as a data recommender product from Artefacts 5 and 6: After the AI model (Artefact 5), with the integrated C2C matching engine (Artefact 6), has identified potential customer pairs, data recommenders for personalized offerings based on user preferences and segment-specific needs are automatically sent as the product result to those actors who can benefit from them and have expressed a legitimate interest. The legitimate interest must have already been established through prior consent in the consent to the

specific BB service, in order for data processing and the associated data matching to be permitted.

Artefact 8 – Influencing Factors and Criteria for Scaling the BBE: For this purpose, influencing factors and evaluation metrics were examined based on expert interviews (Chapter 3.3.3.) and literature review (Chapters 4.4.2.) that can enhance the scaling of a potential BBE as (initial) preparatory and permanent (framework) measures.

Artefact 9 – Network (effects), including all BB Service Entities as possible instantiations or further development of BBE 3.0: By integrating multiple BB services and actors, new insights about customers and products can emerge. Innovations, complementary services, and even entirely new services can be generated through network effects in the combinations of several BB services and within the community.

Artefact 10 – Context-based influencing factors and evaluation criteria: These factors regarding contextual banking (Chapter 4.4.3.) can be considered when creating a BBE. For example, a customer-centric contextualization and the associated integration of context-related partners and services can be established as the standard framework for each customer case (per customer matching) in every purchase transaction.

Artefact 11 – Organizational Measures and Conditions and Compliance Requirements: In chapters 2.3.2., 3.3.3., 3.5., and 4.4.2., both organizational framework conditions and compliance requirements were examined, which can be considered as preparatory constructs in the model. Here, the awareness and training of bank employees, as well as the development of knowledge about BBE for necessary departments such as Legal, can be taken into account.

Potential actors in this BBE are the bank as an organization, which is expected to act as the market orchestrator and thus as the central data hub of the Data Matching Engine. Bank employees serve as the implementation body of the bank and are the contact point for customers, and are categorized under the actor 'Bank.' Additionally, partners (TPPs) are involved, offering BB services if the bank cannot provide them itself. Finally, the IT provider is a solution provider of technical infrastructure, which also serves as the foundation for a scalable ecosystem model.

The design theory and objectives were therefore further specified based on the artefacts described above and the involvement of the stakeholders.

4.5.2.3. *Analysis of the Appropriate Reference Model (M0)*

After the relevant artefacts for a BBE 3.0 have been identified, an appropriate reference model (M0) needs to be examined, which will serve as a starting point for further treatment through evaluation iterations. It has already become clear that the main features described in the artefacts should be considered for model investigation. These potential model sections, which are intended to feed the entire target model, are divided into an overarching ecosystem structure that can represent Beyond Banking or Open Banking phenomena. In this context, the bank will act as a market orchestrator actor within the ecosystem, bringing together its own customers as providers and demanders (C2C). It is conceivable that the bank could also take on a different role if bank customers are matched with non-customers or external customers from other ecosystems or partners.

The second model area will represent a pre-stage two-phase process designed to successfully pass a Beyond Banking use case through customer acceptance criteria. For each BB use case, an entity process is formed, which, after successfully meeting the criteria, leads into the bank's (customer) ecosystem. The second phase involves a kind of reverse analysis and potential assessment. Customers are analyzed within the banking ecosystem to determine whether they are even interested in the pre-selected Beyond Banking use case. Insights may include the addition of customer profiling. Using probability indicators, both potential matches and a critical mass of customers can be identified.

The third model area will implement the C2C Matching Engine with DA and ML methodologies as a standalone microservice, tailored for each individual BB use case entity. If both customers have agreed to the data processing, BBSS products can be generated after the matching process and distributed to the parties.

The three model areas, which together should form a target design, are based on the first model area of the overarching ecosystem model. Therefore, an appropriate overlaying ecosystem model is initially examined, which brings together and completes the model areas. The two-phase acceptance model for evaluating individual Beyond Banking use cases, as well as the model for the C2C

matching engine, are viewed here as areas within the overall BBE design that include or address multiple artefacts.

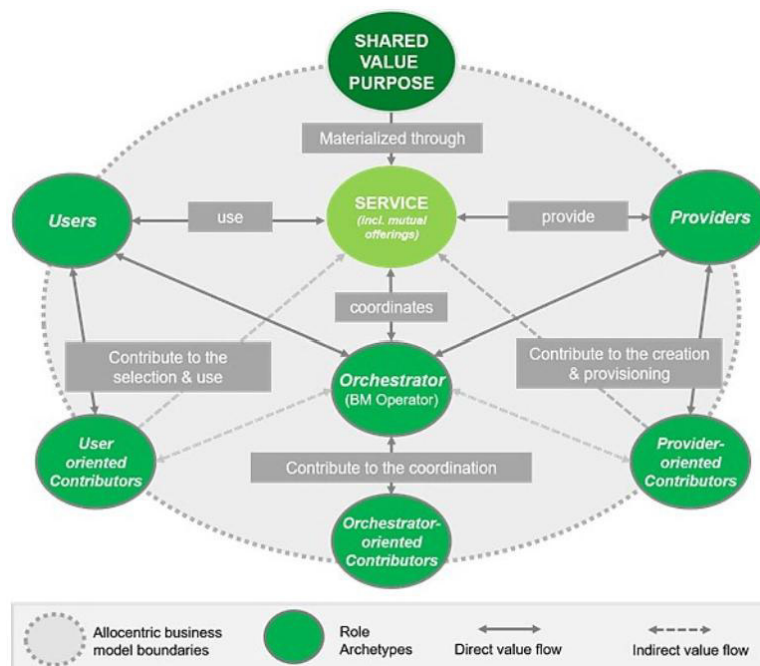
First, it is necessary to determine to what extent the existing literature review (Chapter 1.2.1.) can present suitable models. The focus here is initially on the relevant sources that are listed in the concept matrix after the literature review, under point 2, which primarily addresses concepts and designs related to ecosystems. After a thorough review, no suitable ecosystem models could be found in the literature review.

In Chapter 2.4., initial frameworks and guidelines were identified based on Osterwalder & Pigneur (2010) and Omarini (2023), but here the consideration of an ecosystem landscape is missing. This landscape should depict the relationships among various actors and reflect the decisive influence of the orchestrator, who is important for the realization of a BBE 3.0 (see Chapter 3.3.2.1. “Banks as marketplace orchestrators”). In Chapter 4.2., different ecosystem strategies were analyzed, with Burkhalter's (2020) Ecosystem Canvas—derived from Osterwalder's Business Model Canvas (see Figure 54)—used to organize collaborative business models. Additionally, this design is supported by studies and empirical data collection using the Competence Center Ecosystem in the Financial Industry, which “is a spin-off of the Institute of Information Management of the University of St. Gallen” (p. 28, footnotes). “Together with industry experts (e.g. banks and financial service providers) its research members analyze, among other phenomena, the impact of emerging ecosystems on financial service providers by following a consortium research approach” (p. 28, footnotes). In addition to developing the framework using Financial Services Use Cases, proven Ecosystem Business Models were also designed with companies and initiatives from other industries, such as Airbnb and TED.

To better understand the role relationships and value flows within the ecosystem, a more suitable visualization is necessary. Burkhalter has visualized the different role archetypes and their relationships to each other in his allocentric business model (Figure 61). Four different role archetypes are depicted here. The provider delivers the service in coordination with the orchestrator. The orchestrator, who acts as a business model (BM) operator, coordinates the service so that the customer (user) can utilize it. Operating in the background, there are

various contributors who, depending on the task, function as user-, provider-, or orchestrator-oriented in the realization of the service outcome. Burkhalter standardizes the use of the framework in two different ways, with the first point being more decisive for the research project. “It permits a BM operator .. acting as an orchestrator of VALCO [Value co-creation] to define relevant BM participants in relation to the proposed Shared Value Proposition and related Service” (p. 206, para. 1). “On the other hand, the framework can also be used as a strategic positioning framework for companies to better outline their roles in ABMs [Allocentric Business Models] that are not orchestrated by themselves” (p. 206-207, para. 1).

Figure 61. Different Role Archetypes in an Allocentric Business Model (Burkhalter, 2020)



Although the model already seems promising as a candidate for the reference model according to Burkhalter (2020), additional sources are still being reviewed to exclude certain models or identify better reference models for completeness. In the literature review, the focus was on keywords such as “ecosystems,” “orchestration,” and “designs, frameworks, blueprints” in combination. The following notable sources are mentioned, divided into three groups: The first group

emphasizes the management of ecosystems with “actionable guidance for practitioners through structuring the constructs within the ecosystem literature” (Fox & Unal, 2024, p. 1, para. 1) and a “structuralist approach to conceptualizing the ecosystem construct” (Adner, 2017, p. 1, para. 1) from a strategic perspective for decision-makers. Pidun et al. (2019) also offer a guide for managers on when business ecosystems are necessary. Ehrensperger et al. (2023) introduce a maturity model based on existing digital business ecosystems in an exploratory study.

The second group examines orchestration (processes) in ecosystems. Shen et al. 2024 investigate a “comprehensive qualitative meta-analysis of 31 case studies and identified multifaceted orchestration practices employed by industrial firms” (p. 1, para. 1). Furthermore, Shi & Chen (2022) examine “a multi-agent and multi-level knowledge ecosystem from macro, meso, and micro perspectives based on the Quintuple Helix theory and design four evolutionary stages of knowledge orchestrating processes” (p. 1, para. 1). Meanwhile, Degen & Teubner (2024) research the “understanding of public–private orchestration where governments act as orchestrators” (p. 1, para. 1) through a structured document analysis of 80 position papers and 14 semi-standardized in-depth interviews.

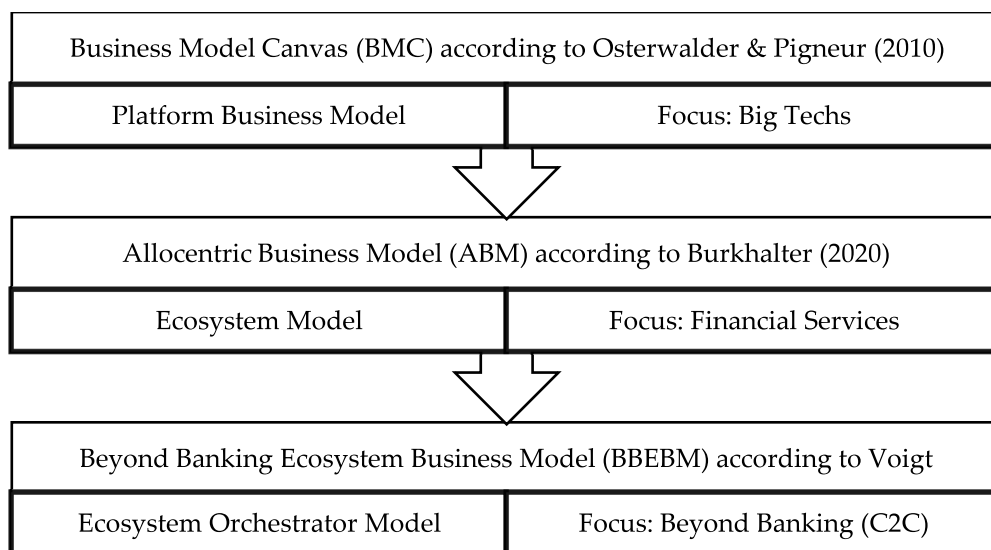
The last group deals with the design of ecosystems. Robra-Bissantz et al. (2022) examine methods for designing digital platforms, business models, and service ecosystems and further develop them. The study by Schmidt & van der Sijde (2022) “systematically identifies 122 disruptive business models that have been discussed in the literature during 2006–2019” (p. 1, para. 1). Subsequently, these disruptive business models are classified into five archetypes, with the archetypes matchmakers and collaborators potentially being suitable models. However, after thorough analysis, no suitable models could be found from these two archetypes.

In summary, various studies examine many elements from the fields of ecosystems, ecosystem orchestration, business models, and their methodologies and design, some with a banking reference. However, there is also a problem here. These elements are combined, as well as the development of knowledge about BBE for necessary departments such as legal, and the service through the coordination of actors. And this should ideally be supported by empirical research within the context of banking ecosystems. All of this is unified by Burkhalter's ABM (2020),

which therefore serves as a reference model (M0) in the further DSR process as a starting point.

To conceptually categorize the models of Osterwalder & Pigneur (2010), Burkhalter (2020), and the model developed through this thesis into maturity levels, the following Figure 62 is presented. The model by Osterwalder & Pigneur (2010) serves as the starting point, as it is a proven platform business model developed through the analysis of Big Tech companies like Apple, and it also serves as a reference for Burkhalter's (2020) model. The ABM (Burkhalter, 2020) is therefore being further developed with an ecosystem approach by utilizing experts from financial services, where various participants use a shared infrastructure to organize their collective value creation (CC Ecosystems, 2021), and the orchestrator acts as the coordinator of this value creation. The Beyond Banking Ecosystem Business Model (BBEBM), based on Burkhalter (2020), is further developed into an ecosystem model through Beyond Banking Services between bank customers (C2C), orchestrated and coordinated by the bank.

Figure 62. Maturity Level Analysis



4.5.2.4. *Explanation of Phases and Creation of the Initial Concept (M1)*

After the appropriate reference model (M0) has been identified and its classification within the maturity model has been established, the first model (M1) is explained based on the design specifications of the artefacts and the subsequent phases. The present meta-model (M1) is inspired by the reference model by Burkhalter (2020). While this reference model serves as the theoretical basis, it is gradually expanded, abstracted, and contextualized in this work through four evaluation cycles according to the DSR approach of the DSR Evaluation Process by Sonnenberg & vom Brocke (2012). The resulting meta-model thus represents an independent contribution of this dissertation that goes beyond the original presentation. Unlike the original reference model, the present meta-model incorporates additional dimensions such as the artefacts described earlier and phases to be considered, takes into account the specific application context BBE 3.0, and is iteratively further developed based on empirically supported evaluations. Therefore, it should be understood as the original design of this work from M2 (Eval 2). Accordingly, the process is described from left to right in Figure 63 (und Appendix 15) as follows:

Phase 1 (P1) - Collection and evaluation of relevant customer and market data on the Beyond Banking Service (BBS). As a result, a market-confirmed and accepted service (ABBS(1)) is adopted by customers (A2).

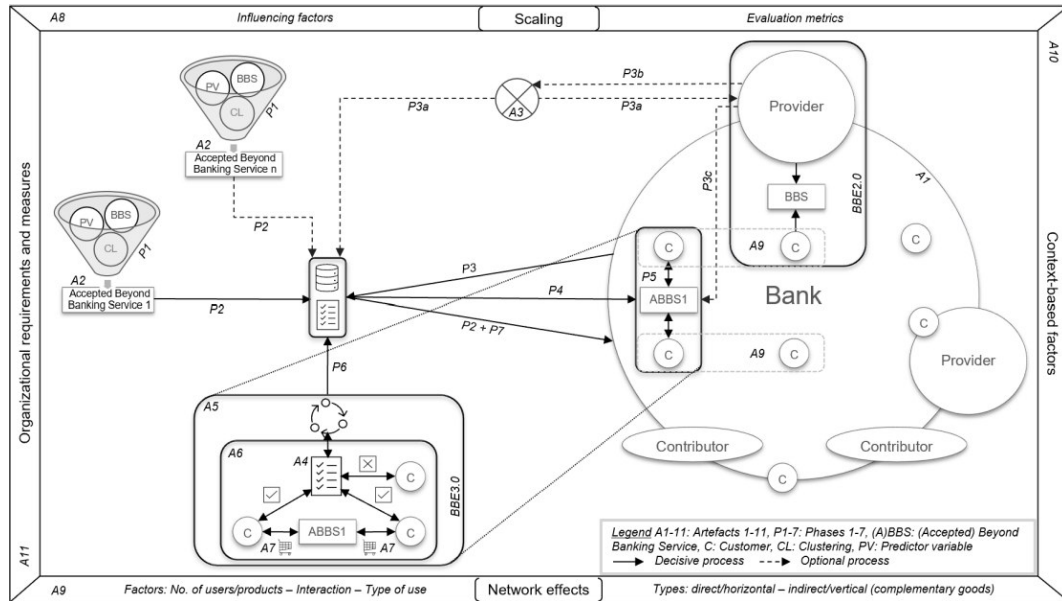
Phase 2 (P2) – Providing ABBS for initial segment profiling in the banking ecosystem. Subsequently, the ABBS is fed into the Data Hub and then made available to the Banking Ecosystem (A1). The goal is to analyze to what extent and how many customers within the Banking Ecosystem could be relevant for this ABBS through customer profiling and probability analyses.

Phase 3 (P3) – Obtaining proof for verifying segment profiles. The insights will then be sent back to the Data Hub to determine whether the acceptance among the bank's own customers aligns with the sample from the market analysis or even appears better.

Phase 3a (P3a, optional) – Enquiry to the provider regarding the provision of the ABBS and matching with bank requirements. If the bank cannot provide or offer the ABBS itself, an external partner (provider) is necessary to supply this service.

Here, the conditions of the ABBS as well as the requirements for integration into the banking ecosystem must be checked.

Figure 63. Solution Design BBE 3.0 (M1) based on Burkhalter (2020)



Phase 3b (P3b, optional) – Obtaining data on ABBS and bank requirements. The data for the ABBS and the bank requirements are mirrored in A3. A manual review and decision are made on the bank's side to determine whether the bank's requirements align with the provider's circumstances.

Phase 3c (P3c, optional) – Providing BBS for the banking ecosystem and customers. If the bank's decision to provide the ABBS is favorable, meaning the provider's commitment to supply the service, then the provider will make this service available to the Banking Ecosystem (A1).

Phase 4 (P4) – Providing ABBS for the banking ecosystem and customers. Suppose the matching of the insights from the market analysis and the acceptance by bank customers in the banking ecosystem is positive. In that case, the ABBS will be made available to its customers by the bank.

Phase 5 (P5) – Customer Approach and Matching (BBE3.0). In this phase, an AI model (A5) utilizes customer profiles suitable for each individual, who can serve as either providers or demanders for the ABBS, to facilitate matching. Customer

Data Matching is conducted under A6. Customers—potential providers or demanders—must have previously consented to the service's use through an opt-in process (A4) for a match to occur. After matching, the product Beyond Banking Sales Signals (A7) is then delivered to both customers (supplier and demander). Feedback from consent management and the use of BBSS for the specific ABBS is consolidated and fed back to A5 to enhance training.

Phase 6 (P6) – Sending the findings from data matching and feedback to the Data Hub. Here, the insights from A5 are collected and sent back to the Data Hub and the central, overarching consent management system, which centralizes all opt-ins and consents from all BBS and reflects them.

Phase 7 (P7) – Providing new data and insights to the banking ecosystem for creating new/adjusted use cases. After the feedback from P6 has been reflected in the Data Hub, new insights related to this ABBS can be sent back into the banking ecosystem and made accessible to customers. This can lead to new customer configurations or new matchings (network effect). The artefact A9 represents this network effect and the matching of new customers.

This completes the entire process of an ABBS through the seven phases. The process can then be repeated with the same ABBS, starting from phase 5 in a loop logic. If a new ABBS is to be made available to the banking ecosystem and, therefore, to customers, the process begins again from Phase 1.

Finally, additional elements in the design are explained. Here, an ABBS(n) is used as an example to represent all other potential ABBSs that could be considered for analysis and integration into the banking ecosystem. Furthermore, the matching between the provider's BBS and the bank's customer is shown (BBE2.0), which also functions as a B2C model. Lastly, artefacts A8-A11 serve as contextual factors influencing the creation and further development of a BBE3.0 model. The description of these factors has been visualized in three different formats. Accordingly, the scaling factors (A8) are grouped into influencing factors and evaluation metrics, while network effects (A9) are further detailed into factors and types, with their respective enumerations. The context-based factors (A10) and organizational requirements and measures (A11) are briefly mentioned. This setup allows experts in the subsequent evaluation (Eval 2) to choose among the three different representations and to prefer one.

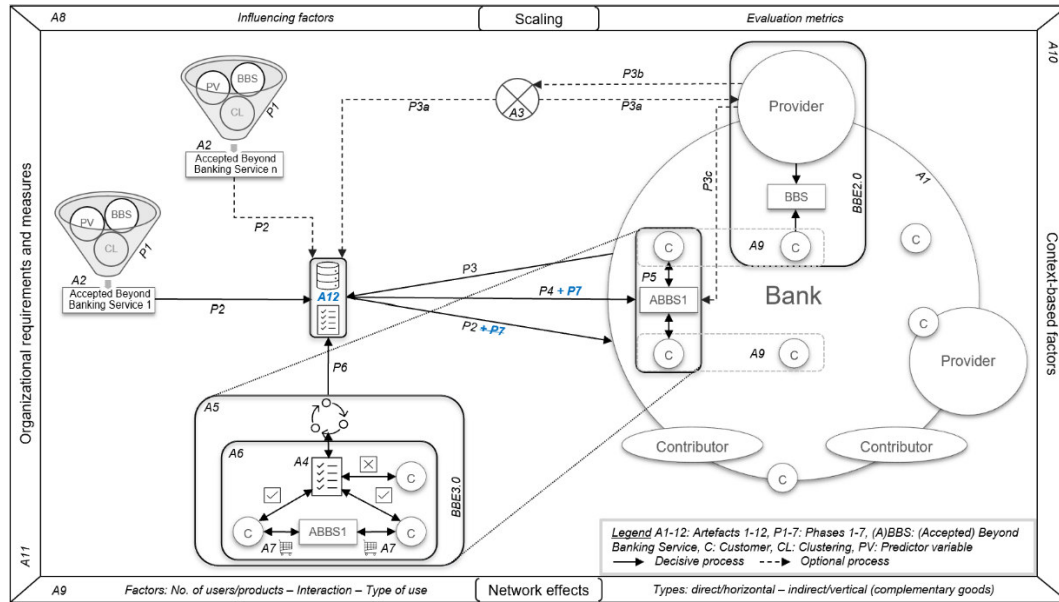
4.5.3. Eval 2 – Expert Interviews (M2)

Before the design (M1) is evaluated by experts under real-world conditions, an initial artificial evaluation is conducted through self-critical reflection of the current design (M1.1), as described by Venable (2006). During this process, three potential optimizations of artefacts or phases have been identified for further examination:

The Data Hub, with its central consent management, has so far not been assigned to any artefact. However, since this construct acts as the central integration point for opt-ins as well as data analysis and evaluations, including the merging of data matching learnings and feedback from BBS, this construct is so essential that it must not be labeled. Therefore, the Data Hub is designated as Artefact A12 as a standalone artefact following the initial evaluation, to ensure transparency about the insights obtained in this iteration. During the design process, it also functions as the third artefact, maintaining proper logical classification within the system.

Artefact 4 initially described the mutual communication between the central Consent Management (Data Hub) and the AI model, as well as the Matching Engine. P6 should therefore describe this relationship, but here there is only a one-way relationship from the AI model to the Data Hub and central Consent Management. At the same time, P7 describes the forwarding of the new insights from P6, which had previously been sent to the Data Hub. Therefore, it makes sense to remove P7 from the phase at P2 and place it under P4 to maintain a consistent flow of data and insights at the level of the ABBS. The phase depiction of P6 can then remain unchanged. All these adjustments were highlighted in the iteration (M1.1) with blue font color (Figure 64, changes in blue).

Figure 64. Solution Design BBE 3.0 (M1.1) based on Burkhalter (2020)



Another consideration is to what extent the BBSS (A7) can also be mirrored to the bank so that, for example, bank employees can track it in the CRM and address customers through various channels. However, since the insights and feedback from data matching are forwarded via the Data Hub to the banking ecosystem through the phases P6 and P7, the BBSS (A7) can also be mirrored to the bank for further use. Therefore, no adjustments are necessary here.

Next, the design M1.1 will be evaluated by experts based on the design specifications (artefacts and phases) and objectives (hypotheses H3.1, H3.3-H3.5) through expert interviews. If significant changes, deletions, or additions to the design elements occur beyond this, M1.1 will be expanded to M1.2. Minor changes or additions identified by the experts in M1.2 will be documented and shown through iteration levels within M1.2 (e.g., M1.21). Finally, in Eval 2, there will be a re-evaluation of the expert feedback, which will be finalized in M2. The interview procedure and methodology will follow similar steps to those in Chapter 1.3. and 3.3.3., but the focus will now be on assessing the design, and overall, the QDA will be more concise.

The selection of experts follows a representative mix of specialists, each with focuses in technical and banking business knowledge backgrounds. They are (as in

section 3.3.3.) senior and lead professionals working in consultancies, startups, and banks, who either excel primarily with strong technical or banking business expertise. Generally, however, all experts have at least some banking experience. Four experts have been identified here, who are described below. Since experts from chapter 3.3.3. and from this evaluation phase (Eval 2) will be invited later in the focus group, the following experts are numbered consecutively from the previous ones for better clarity (starting from expert 11). They are divided into two groups: “Technology” and “Business.”

Group 1 “Technology”

Expert 11 (Chapter Lead): Lead professional with over 8 years of banking experience and managing 18 colleagues in process automation and decision management. This includes responsible products related to data integration, orchestration, data mapping, including external partners and data. Previously, worked as a business expert in API with responsibility for a platform transforming asynchronous data patterns into real-time data.

Expert 12 (CEO and Co-Founder): Company owner and lead professional with a total of 23 years of professional experience, primarily as an AI engineer in agile software development (SAFe) in the banking environment. Previously worked as a global product director and vice president at tech companies in financial services.

Group 2 “Business”

Expert 13 (Customer Journey Owner): Lead Professional and Member of Management with 25 years of banking experience at a Swiss retail bank. Started in service provision and solution development, then focused on roles as Head of Value Added Services with Loyalty and Marketplace services, Lead Innovator for new shopping solutions, Digital Commerce, and member of the Payment Expert Group. Additionally, serves as a Lecturer in Digital Business Innovation.

Expert 14 (Senior Expert Beyond Banking): Senior professional with 25 years of experience in banking, primarily in corporate client business. Developed a new business area at a regional bank to bring together beyond banking services from providers and corporate clients. Focus areas include cybersecurity, digitalization, automation, sustainability, skilled labor shortages, and new work.

After the experts' presentation, the division of the semi-standardized expert interview takes place (Appendix 16). In this process, the experts' understanding of roles and expertise is used to evaluate the design specifications. Artefacts, phases, the use of specific design tools and methods, and contextual factors are assessed in the first interview section. Subsequently, a preliminary review of the research questions related to the design objectives is conducted to determine the extent to which hypotheses H3.1 and H3.3-H3.5 can already be validated considering the design (M1.1). Finally, in the third section, additional evaluation criteria such as feasibility, accessibility, comprehensibility, clarity, applicability, etc., are examined for the overall design, and feedback is provided. A role-based expert analysis is omitted here due to a small dedicated group of experts (4 experts) and the lower overall response rate of sub-codes. Instead, the focus is placed on the consensus-based improvements to the design.

The following coding system (Table 61) is based on the previously described three-part division of content, which follows a deductive category approach according to Mayring (2022), so that the stated design objectives (Sonnenberg & vom Brocke, 2012) align with the chosen constructs of the design specifications and can be evaluated. Accordingly, four sub-codes were assigned to the three categories: "Evaluation design specifications," four sub-codes to "Research hypotheses design objectives," and eleven sub-codes to "Further evaluation criteria" for the overall design.

Table 60. Coding System for Expert Interview Findings (Eval 2)

Categories	Subcodes	Number of citations (frequency)	Frequency in % of 154 citations
		154	100,00%
Evaluation design specifications		50	32,47%
	Artefacts	5	3,25%
	Processes/Phases	12	7,79%
	Design tools and methods	19	12,34%
	Framework factors	14	9,09%
Research hypotheses design objectives		31	20,13%
	H3.1	7	4,55%
	H3.3	8	5,19%
	H3.4	8	5,19%
	H3.5	8	5,19%
Further evaluation criteria		73	47,40%
	Feasability	8	5,19%
	Accessibility	6	3,90%
	Comprehensibility/Meaningfulness	4	2,60%
	Clarity	6	3,90%
	Simplicity	9	5,84%
	Elegance	7	4,55%
	Completeness	7	4,55%
	Level of detail	5	3,25%
	Internal consistency/Correctness	5	3,25%
	Applicability	8	5,19%
	Operationality	8	5,19%

In the first category area, “Evaluation design specifications” under the subcode “Artefacts” (Table 62), all experts initially describe the artefacts as understandable, having logical contextual meaning, and representing an overall fit. Here, expert 11 (sc. 1) pointed out that other banks as potential providers are missing in a multilateral ecosystem. Therefore, another bubble labeled “Banks” or something similar should be added to the model. Expert 14 also adds that the point of contact with the customer is missing at A2. Additionally, the source from which the customer mass data originates and how it is filtered is not sufficiently identifiable in the model.

In the next sub-code “Processes/Phases,” experts 12 to 14 evaluate the phases as understandable and coherent, but expert 11 considers them appropriate yet

complex. Expert 13 sees the model as a meta-model. Suggestions for improvement by expert 11 (sc. 2) include, on one hand, that the box for the Data Matching Engine A5/A6 should be placed within the Banking Ecosystem A1. On the other hand, P7 is questioned regarding what happens to this process afterward. The final process should be clearly defined and positioned. Additionally, expert 14 notes that the focus is heavily on the customer side. The provider side is neglected but would now be an even more important component, as providers already have high expertise and can often better assess and anticipate customer needs than the customers themselves. For this, providers typically have weak or no sales staff, whereas banks with their strong and established sales units can offer support. Since this model M1.1 views providers only as an implementing entity of ABBS, provided that the bank cannot represent it itself and the ABBS is only analyzed and evaluated unilaterally by the customer or the market—e.g., through market research—the BBS can also be defined and more strongly integrated into the model as an accepted ABBS by the provider using its analyses and studies. In this context, A3 and the related phases P3a to P3c can be adapted, or additional processes can be added in the upstream process P1/A2. However, this assumes that the studies on BBS are trustworthy, already validated by successes, and accepted or established by the customer. Therefore, banks must reassess these studies and, when implementing a potential BBS, conduct extended due diligence and a make-or-buy analysis.

Table 61. Expert Feedback on the Category “Evaluation design specifications”

	Expert	Categories Subcodes	Evaluation design specifications			
		Artefacts	Processes/Phases	Design tools and methods	Framework factors	
Technology	Expert 11 (CL)	A1 relates to the banking ecosystem. Where are other banks? This could involve providers or another 'banks' bubble. Questions on A1, A2, A6.	So far, it fits but is a bit complicated. The Data Matching Engine box with A5 and A6 should be inside bank A1, which should frame the box. What about P7? What is the final outcome? Where does the process end?	Rename Data Matching Engine as Matching Process or IT-controlled process, potentially a microservice. Bubbles Contributor and Provider lack detail. Unclear why they are named and positioned this way, and why the Customer is in different positions.	Very cleverly presented. Framework factors are somewhat misleading; suggest a separate chart for these factors with a simplified model, integrating the framework factors into the structure.	
	Expert 12 (CEO+CF)	All artifacts have a logical contextual meaning.	The phases make sense in terms of sequence and logic.	Participants can be color-coded and labeled as Customer 1 (supplier) and Customer 2 (customer). This visual aid clarifies interactions and motivations, helping explain why a customer prefers this banking platform over others. Key questions: What am I seeking? Why use this platform instead of another?	Success factors are network effects in platforms. Definitions of framework factors are missing, and their interaction importance in the model is unclear. How can these factors be measured? Framework factors, including hypotheses, assumptions, and customer benefits, should be evaluated separately first, without mixing them into a simplified model, then measured individually.	
Business	Expert 13 (CJO)	The picture is complete, but the creativity of the analysts and the strategy and customers in the respective company are decisive.	It is all comprehensible and coherent. In the end, this is a meta-model.	Visualization depends on the target group. Exciting for specialists but not suitable for management. Does the audience understand or is it for an ignorant audience? Inform or inspire? The current model is too technical for business analysts. Use a holistic approach: first customer value, then company value, then cost-benefit and implementation speed. Who operates with a framework and what are the goals?		
	Expert 14 (SEBB)	The point of contact with the customer to A2 is missing. Also missing is where the masses of data come from and how they are filtered. Otherwise, everything fits.	This is all understandable in the model. Past focused on the customer, but now the partner perspective is more important. Monetization isn't considered. Customer surveys sometimes miss issues because customers aren't aware of their needs. Providers often know customer problems before customers do because of their expertise. Banks can help improve sales staff, who are often lacking or ineffective.	It would have been difficult without an explanation. Simply write in the selected box that it is P5. Highlight the ecosystem and participants. The dotted lines at A9 are unclear. New customer matchings are shown; how is this differentiated? Highlight and display the ecosystem on one side and the market with research on the other. Participant Contributor is not fully clear. Provider is at the same level as the contributor, but the provider is your service provider, and the contributor is the supporter.		Factors are somewhat unclear, involving organizational needs and influencing fit. Network effects' goals are uncertain. Focused only when factors are deliberately addressed. Keep details brief and scaled, avoiding extra explanations. Visually, factors seem coherent but aren't always functionally necessary. Framework factors should be handled in a separate, simplified model.

Regarding the “Design tools and methods” (sc. 3), the experts have mixed opinions, with some fully understanding it (expert 12). At the same time, visualization depends on the target audience and can be challenging without prior explanation of the model. Experts 11 and 14 mention visual improvements, while experts 12 and 13 address broader, strategic questions that are more relevant to bank management.

The visual improvement suggestions are to label the Data Matching Engine as a microservice for a matching process or an IT-supported process, which could be a microservice (expert 11). The bubbles for provider and contributor are not explained in detail, and why they are defined and positioned as such. The same applies to the customers (C), who are placed in different positions around and within the banking ecosystem.

Expert 14 notes the missing label for the zoom-out view of P5. The label for P5 is also missing here. Furthermore, experts 12 and 14 distinguish and emphasize the participants and their interactions within the ecosystem using different colors. In this context, different customers and their roles can be distinguished by color, such as Customer 1 as the provider and Customer 2 as the demander (expert 12). Additionally, the dotted line around A9 is unclear in terms of what it represents (expert 14). This visualizes new customer matchings, but they cannot be distinguished from the previous customer matching configurations. The participant “Contributor” is also not fully understood. The provider is positioned at the same level as the contributor, which is not understandable. Another suggested improvement is the visual separation or highlighting of the market side with market research on one side and the ecosystem on the other.

With the feedback from experts 12 and 13, it becomes clear that this design model is aimed at a technical (scientific) target audience and is less suitable for management. There is a growing demand for a management-oriented model that addresses primary strategic questions such as “What are the hypotheses? What are the benefits? Why should the customer prefer this banking platform over others? What is the motivation?” (expert 12). In contrast to the current model M1.1, which already has a technical and detailed character and targets an informed audience or specific group (as per expert feedback), management must be inspired about planned initiatives and the related topics beforehand to enable decision-making

regarding implementation (expert 13). There is a need for a holistic, easy-to-understand model that, for example, follows a logical order based on importance: customer value, company value, cost-benefit value, and the “how” —how quickly it can be implemented and realized. Additionally, the appropriate target groups — specifically, which role participants are the recipients — and the achievement of the model's goals should be further clarified and elaborated.

The demand for two models that are intended to address two different target groups is also supported under the subcode “Framework factors.” The experts note that these are not consistently understandable (expert 14), partly misleading (expert 11), and not integrated into the model's interaction (expert 12). Therefore, they appear visually coherent but are not necessarily functionally necessary (expert 14). Accordingly, all experts agree that these framework factors should be integrated into a separate, simpler model and removed from this one (M1.1). Additionally, all framework factors should exhibit a higher level of detail and explanation (expert 11) in the separate model. Suppose the framework factors remain in the current model. In that case, all four factors should adopt the level of detail of “Scaling” (the aforementioned factor) in every direction, short without additional explanations (expert 14). Finally, these factors must be measured and evaluated (expert 12).

In category 2 “Research hypotheses design objectives” (Table 63), the verifications or falsifications by the experts regarding hypotheses H3.1, H3.3, H3.4, and H3.5 are listed first. Subsequently, notes, justifications, and arguments for their responses are compiled.

The H3.1 (sc. 1) is verified by experts 11 and 14, so the design can be used as a blueprint. Expert 13 falsifies the hypothesis because the design is presented as too scientific and technical. From a strategic perspective, the design cannot be used. The expected output and the amount of investment to be planned for a project are not addressed, which can, in turn, be reflected in the management-friendly model later. Also, expert 12 provides input for the new management design. It leaves the hypothesis open, responding with counter-questions such as “Why should I, as a bank, get involved in such competition, which other platforms are already doing successfully today? Why should a customer request these services from a bank if a bank does not expect them?”

Table 62. Expert Feedback on the Category “Research hypotheses design objectives”

	Categories Subcodes Expert	Research hypotheses design objectives			
		H3.1	H3.3	H3.4	H3.5
Technology	Expert 11 (CL)	Yes can be used as a blueprint. Here, however, the BBE model is understood from the perspective of a bank (singular).	Yes, delivers value. There is interest in how matching is evaluated, including the criteria and measurement methods, as a potential research continuation.	Limited scaling depends on customer numbers. When will outside expansion occur? No technical or infrastructure issues are seen. How to handle non-customers? Must they be converted into customers?	The design depicts it well. Important: What influences it, how to control them, the critical factors, and hygiene factors?
	Expert 12 (CEO+CF)	Hypothesis remains open, answered with a counter question: Why should a bank engage in competition already successful on other platforms? Why should customers request these services from a bank if they don't expect it?	Factors must demonstrate value via evaluation, starting with MVPs and recognizing leading indicators like trend indicators and acceptance models.	Is given. Ratio of costs and potential profit to scaling is important.	Focus on a few easily interpretable indicators that show early trends and allow for more interpretation.
Business	Expert 13 (CJO)	No, not from a strategic view, it's too technical and scientific. A company has various business fields. What is the expected output and investment process? This isn't included in this model.	For business analysts yes, for management no. The framework's use depends on flight level, role, and goal. For me, it's clearly a used framework.	No, not given. They are theses. How should the scaling potential be mapped? While granularity is provided, people are very individual. Customer perception and value realization depend on design and communication. Expectations related to the interaction model determine what is expected or not.	Yes, but that is very coarse granularity. Flight altitude is crucial for determining a value. The acceptance of BBE requires live or rapid prototyping or beta versions to get early feedback on the business model's suitability. It's not for assessing scalability or customer acceptance but to connect strategy and purpose.
	Expert 14 (SEBB)	Yes, can be used as a blueprint.	Yes, it delivers value for banks and customers but focuses mainly on banks, neglecting partner management, which is important.	If it is done well, yes. Doubtful due to outdated and rigid banking systems. But basically feasible in theory.	Yes is a given. Customer-centered thinking is essential.

Regarding H3.3 (sc. 2), a similar picture emerges. Here, experts 11 and 14 also verify this hypothesis. Expert 11 shows interest in how the data matching is evaluated, which evaluation criteria are used, and how it is measured. Expert 14 criticizes that the model heavily considers the bank side and too little the partners or partner management.

Expert 13 would verify this hypothesis for business analysts but falsify it for management, while expert 12 does not reach a conclusion because the factors must first prove their value through evaluation. Early steps for determining the value for banks and customers can include MVPs (Minimum Viable Products) and recognition of leading indicators, such as trend indicators and acceptance models.

H3.4 (sc. 3) is verified by experts 12 and 14. In this context, the ratio of costs and potential profit to scaling, as well as (if still applicable) outdated and rigid banking systems, should be considered in the decision-making process for the scaling approach.

For expert 11, the scaling is only limitedly available. This depends on, and is simultaneously restricted by, the number of customers in the ecosystem. From a technical and infrastructural perspective, no issues are seen regarding implementation, which contradicts the statement of expert 14. Expert 11 also questions the handling of non-customers, i.e., prospects who are not yet customers of the bank. If non-customers have access to individual ABBS, potential peak loads must be balanced by increasing the performance or capacity of a system.

Expert 13 again fundamentally falsifies the hypothesis due to the individuality of customers but sees a fact at a granular level. The expert formulates his statement with open and dependent questions such as how the scaling potential is mapped, how design elements are created, and how communication with customers should proceed. Additionally, perception and value realization on the part of customers are crucial.

The hypothesis H3.5 (sc. 4) is supported by experts 11, 13, and 14. Expert 11 explains how the factors can be controlled and identifies which are critical influencing factors and which are hygiene factors. Expert 13 confirms his statement at a very broad level. Additionally, the model is not used to assess customer acceptance. Instead, acceptance of a BBE is achieved through live order rapid prototyping to gather early feedback on whether a business model is viable. The current model helps connect strategy and purpose during a transaction. Expert 12 leaves the hypothesis open and suggests only a few simple, interpretable indicators that can detect early trends and allow for more interpretation.

In the final category, "Further evaluation criteria," the 11 evaluation criteria are divided into two tables for better clarity. The following Table 64 presents the first five evaluation criteria: "Feasibility, Accessibility, Comprehensibility/ Meaningfulness, Clarity, and Simplicity."

Table 63. Expert Feedback on the Category “Further evaluation criteria” (subcodes 1-5)

	Categories Subcodes		Further evaluation criteria			
	Expert		Feasibility	Accessibility	Comprehensibility / Meaningfulness	Clarity
Technology	Expert 11 (CL)	Has potential but needs a mindset shift from customers, though many may be open. Customers must retain control over service choices and data sovereignty, and an opt-out option should be included.	Yes	Is given after the model has been explained.	It is clear as far as the model is understood.	After explanation, the model dilemma is whether to map all use cases or select a simplified example without factors and other processes.
	Expert 12 (CEO+CF)	It is technically feasible. Is it also commercially feasible? Do customers want and accept the service?	Accessibility is sufficient, but its frequency is low. Customer usage behavior must change.	Yes	The model is clear. It needs contextual background, otherwise the model cannot be interpreted.	The model illustrates participant introduction and communication, hiding the basic business relationship. Sequence: 1. Motivation for entering the relationship? 2. Customer willingness? 3. How to measure acceptance of the business/hypotheses?
Business	Expert 13 (CJO)	Yes, if the business requirements are right.	Yes, depending on target groups.	For IT target group	Again, depending on the target group	Yes, but a model must be designed to be useful, which depends on the target group.
	Expert 14 (SEBB)	Yes, theoretically feasible but faces technological challenges due to data protection issues like banking secrecy and core banking system interfaces.	Yes	Yes	Yes	Subjective perception is clear to experts but hard for the uninformed like the Management Board, which lacks information on added value, advantages for the bank, and profit potential.

The subcode “Feasibility” (sc. 1) is considered given by expert 13, technically feasible by expert 12, and theoretically feasible by expert 14. Expert 11 also values the feasibility, noting that it has “lots of potential.” A mindset change among customers is necessary for this, and many will be open to it. It is important to highlight that customer acceptance requires “control over service selection and data sovereignty.” An opt-out process should also be included in the model. Experts 12 and 13 also support this statement, emphasizing that business requirements (commercial feasibility) and customer acceptance must be in place for feasibility. Expert 14 also highlights technological challenges, including data privacy and interfaces to the core banking system.

The “Accessibility” (sc. 2) is considered a given by all experts. Expert 13 adds that accessibility, however, depends on target groups. Even though expert 12 sees

accessibility as a given, he notes that “the frequency of accessibility is low.” Alongside “Feasibility” (expert 11), a mindset change or, in this case, “customer’s usage behavior” (expert 12) is also cited as a prerequisite for “Accessibility.”

Regarding “Comprehensibility/Meaningfulness” (sc. 3), all experts agree this evaluation criterion is inherent. Expert 11 adds that the model becomes understandable after explanation, while expert 13 states that the IT target group is the intended audience.

The “Clarity” (sc. 4) is also perceived as given by all experts, although expert 13 still considers this to depend on the targeted group. Expert 11 mentions the existence of clarity as long as the model is understood. Expert 12 goes a step further and states that the model “needs contextual background, otherwise the model cannot be interpreted.”

For the subcode “Simplicity” (sc. 5), these evaluation criteria are mostly described as given, although this only applies after explanation (expert 11) and “a model must be modeled to the extent that it is useful” (expert 13). Expert 14 also points out that the model “is easy to understand for experts, but difficult for the uninformed, such as the Management Board.”

Further elaborations by expert 12 support the expansion to include a designed model for the management board. Here, “the model shows the introduction and communication between the participants, but the basic business relationship is hidden behind it.” Accordingly, the following questions should be answered sequentially, which can be incorporated into the “simplified” model:

1. What should motivate entering into the business relationship?
2. How much do customers want to engage in such a business relationship?
3. How can I measure the acceptance of the business or hypotheses?

Especially the first two questions can be incorporated into the further model. Question 3 targets the (measurable) contextual factors that can be integrated into the model. Visual consideration here is still questionable and requires further evaluation. These suggestions from expert 12 are also supported by a similar, more concise argument from expert 14, who states that “the Management Board lacks information on added value, advantages for the bank, and profit potential.”

Table 64. Expert Feedback on the Category “Further evaluation criteria” (subcodes 6-11)

	Expert	Categories Subcodes	Further evaluation criteria				
		Elegance	Completeness	Level of detail	Internal consistency/ Correctness	Applicability	Operationality
Technology	Expert 11 (CL)	Potential available. Delete what doesn't fit, then it becomes simpler and simpler.	Is given. Other parties are deliberately excluded so that the framework is not overboard.	More detail is needed for readability. Work with values or colors. Suggest two illustrations: one is a scientific paper, and the other is an application example with enriched phases and processes, signatures, details, and explanations. Many abbreviations are not understood straight away.	Yes	The text simplifies complex processes to interactions between customer A and B, with the bank serving as mediator. An AI or IT-supported process is used for evaluation.	Very easy to implement. Start with a simple MVP. Customers must be well understood.
	Expert 12 (CEO+CF)	Average elegance. Not suitable for board members, they would drop out quickly.	Establish basic business relationships. What are the incentives and profit potential? Switching costs are overlooked. Why would a customer cancel a platform or seek an offer at a bank?	Good for getting started, for a contextual, semantic discussion.	If seen as an invitation card, then it is sufficient.	Conceivable as a teaser, but the main reason for the bank to implement it is missing.	Yes
Business	Expert 13 (CJO)	Yes, but a model must be designed to be useful, which depends on the target group.	Yes, but a model must be designed to be useful, which depends on the target group.	Yes	Yes	Yes, this is what a business analyst uses, but it depends on the context.	This depends on velocity and capabilities, not the model.
	Expert 14 (SEBB)	Approve two models: technical and simple for management, presented clearly for everyone. Ensure a common thread for BB to avoid losing focus in complexity.	The human perspective from the advisor and customer discussion is missing, but otherwise complete.	Very detailed and in need of explanation. The resolution in two models can bring clarity.	Comprehensibility given. Customers C with A9 and P3 with the partner business unclear. How are providers or partners selected? Need vs. qualitative factors. Clarify factors for choosing a partner.	Conditionally applicable. A simple, saleable model is needed for management and as a working tool for IT specialists.	What capacities (what and who) are available for this? Partner management and a mindset change are needed. Reconcile expectations and reality.

The remaining 6 out of 11 evaluation criteria, “Elegance, Completeness, Level of detail, Internal consistency/Correctness, Applicability, and Operationality” are presented in the second table overview, Table 65. The “Elegance” (sc. 6) is viewed differently by the experts, ranging from “potential available” (expert 11), “average elegance” (expert 12), to being given (expert 13). From the perspective of elegance,

a model should be presented more simply. Unnecessary details should be omitted (expert 11), and therefore, in this form, it is not suitable for board members (expert 12). Expert 14 also refers to an even simpler design. Here, the expert approves the “development of two models (technical, scientific, and simple, suitable for management),” so that “there must be a common thread to implement BB so that the focus is not lost in complexity.”

Regarding “Completeness” (sc. 7), there is a majority consensus among experts 11, 13, and 14 about the state of the model. Expert 11 praises that “other parties are deliberately excluded so that the framework is not overbroad.” In contrast, expert 14 criticizes that “the human perspective, i.e., the advisor and the information drawn from the customer discussion, is missing.” Expert 12 provides suggestions for developing a simple, manageable design. It should “establish basic business relationships. What are the incentives? What is the bank's profit potential? ... Why should a customer cancel with a platform or then seek out the offer at a bank?” Furthermore, the expert adds that the consideration of switching costs is missing.

The “Level of detail” (sc. 8) is rated differently by the “Business” and “Technology” experts. While Business experts 13 and 14 describe a given level of detail in very high detail, the Technology experts criticize that the model “more detail is needed for readability” (expert 11) and “good for getting started, for a contextual, semantic discussion” (expert 12). To bring more clarity to the model, a two-model construct is again referenced here (experts 11 and 14). Expert 11 suggests using “values or colors” and reducing many unclear abbreviations to improve readability. In addition to the current scientific illustration M1.1, the other illustration, “an application example where phases and processes are enriched with signatures, details, and explanations,” can be used.

Initially, all experts consider the “Internal consistency/Correctness” (sc. 9) of the model to be given. For expert 14, the customer's “C” with A9 and P3 with the partner business are not entirely clear. It would be desirable to clarify “how the providers or partners are selected” and which “need vs. qualitative factors” are used in detail.

The “Applicability” (sc. 10) is mostly described by the experts as given. The Business expert group sees the use of the model for Business Analysts (expert 13)

and IT Specialists (expert 14) as the intended audience. “A simple, saleable model is necessary for management.” Among the Technology experts, expert 12 considers this model “conceivable as a teaser,” while expert 11 advocates for a fundamental reduction in the model’s complexity, “where customer A and B interact with each other. The bank acts as a contact initiator and mediator. An AI- or IT-supported process is used for the evaluation.”

In terms of “Operationality” (sc. 11), an inverted picture emerges, where the technology experts consider it a given (expert 12) and the model is straightforward to implement (expert 11). However, the customers must be well understood initially. A simple MVP can provide early feedback.

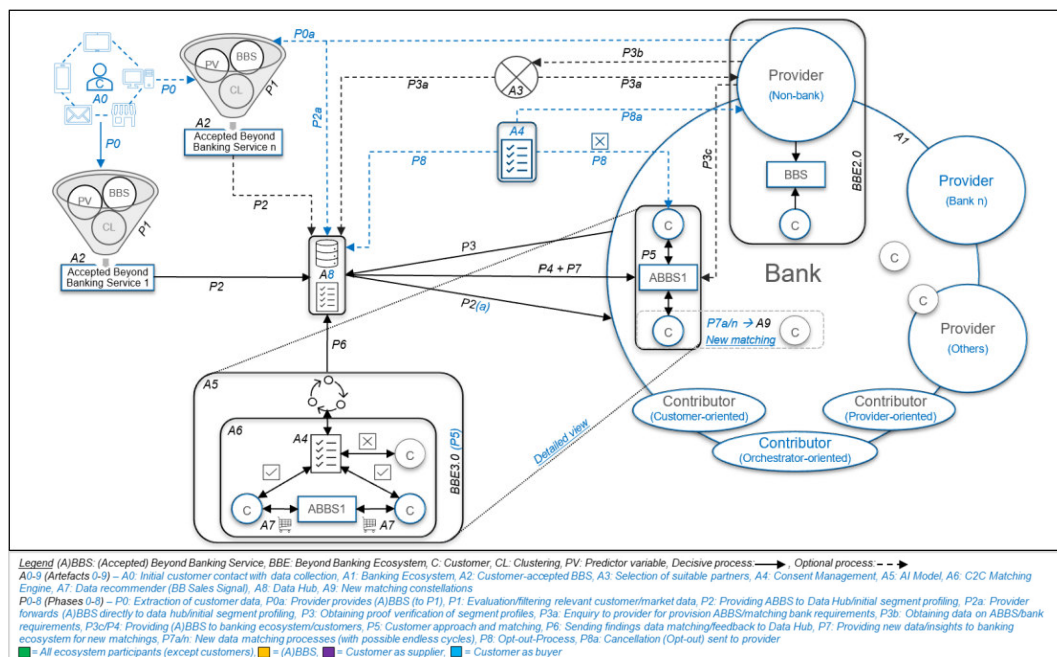
The group of business experts assesses that the model does not determine operationality, but rather by velocity and capabilities (expert 13) or capacities (expert 14). Furthermore, a “partner management and a mindset change are needed” as well as a “reconciling expectations and reality” towards management and stakeholders regarding operational units that evaluate evidence-based market data and feasibility.

In summary, the iteration with individual interviews indicates that there is already a high demand for a simpler, more elegant, less complex design that can be addressed to uninformed target groups or management. At the same time, the existing design is classified as a meta-model, serving to represent a scientific and technical perspective suitable for IT professionals and business analysts. This could be made more transparent, more organized, and more differentiated in some areas, such as artefacts (A) and phases (P), and missing artefacts could be added (e.g., an incomplete process: what happens after P7?), as well as existing artefacts should be adjusted.

Accordingly, in the next step, all desired additions and adjustments based on expert feedback should be critically questioned and justified decisions made regarding which modifications in the current design M1.1 are to be incorporated into the next iteration M1.2 (Figure 65, changes in blue). Subsequently, a new, separate design will be created based on the expert responses, which can potentially be addressed to the (bank) management. Here as well, the responses are critically analyzed, and decisions regarding implementation and consideration of relevant elements for the design are justified. The updated model M1.2st as a

scientific, technical design, and the newly created design for management M1.2m together represent the final iteration M2 of this evaluation's 2-cycle. In this context, “st” in M1.2 stands for the “scientific, technical” target design, and “m” indicates the target design addressed to “management” within the model.

Figure 65. Solution Design BBE 3.0 (M1.2st)



So, when referring retrospectively to the expert feedbacks, the first category area “Evaluation design specifications” under the subcode “Artefacts” (see Table 62) has now been expanded to include another bubble labeled “Provider (Bank n),” to clarify that banks can also be potential providers and thus partners of the main banking ecosystem (A1) (see expert 11). Consequently, the provider that supplies a BBS to the banking ecosystem is here exemplarily referred to as a non-bank provider. The provider under the provider (Bank n) was labeled as “(Others)” because this provider can represent all other providers, such as the government. Additionally, theoretically, all providers can offer BBSs. Furthermore, the top left of the model now includes the point of contact, meaning the customer at the center of an omnichannel environment (Wagner Mainardes et al., 2020), through which they can be reached and connected via various channels such as branch offices, mail

(and email), smartphones, tablets, and PCs. It is also relevant to mention additional channels like social networks and digital stores, which communicate with users of applications like mobile banking apps through devices such as smartphones. This means that the feedback from expert 14 has been taken into account, indicating that the customer at the point of contact in the omnichannel universe is considered as the initial contact, with data sources incorporated into the model (A0). Furthermore, the phase P0 has been added, where data extraction is forwarded into the filter model P1.

In the next subcode, “Processes/Phases,” expert 11 criticized that the Data Matching Process P5, along with its artefacts A5/A6, is placed outside the Banking Ecosystem A1. However, this can indicate a misunderstanding, as Process P5 is already within A1, and A5/A6 are visualized outside of A1 in a detailed zoom-out view due to a lack of space in the diagram. Therefore, for better clarity, the note “Detailed view” was added to the dashed zoom-out line of the illustration. Additionally, the “P5” process was added to the detailed view. It was missing until now and contributes to clarity and consistency.

Another point of criticism from expert 11 is the open question of what should happen after Process P7 and where the final process occurs. This is not addressed in the current model. In this context, the optional process P7a/n was added next to the lower dashed rectangle with A9 to show that after P7, a new data-matching process with a different customer configuration at ABBS1 (A9) can take place. The model cycle can end at P7 once a data matching process between two customers is successfully completed and the newly collected data has already been fed into A1 to improve the training model of ABBS1. Alternatively, the process can continue with P7a, creating new matching configurations and evolving through n-cycles (P7n). The upper dashed rectangle, which depicts a new data matching process (A9), was omitted for clarity. A diagram for illustration suffices here to help explain this topic.

Expert 14 criticized the highly one-sided view of the customer side when selecting the appropriate (A)BBS. Since this thesis focuses on customer acceptance of BBS, which is defined and researched as a crucial part of the market analysis for a suitable (A)BBS, the provider of a potential (A)BBS was only seen as an implementation entity unless the bank could provide it itself. To incorporate this

provider-based (A)BBS approach into the model, additional optional processes are added. In this context, the (A)BBS under P0a can be placed before process P1, meaning that a BBS (presumably) accepted by the provider undergoes further market research, and the bank can independently reassess the acceptance of the BBS here. If there is greater confidence in the acceptance of the provider's (A)BBS or if it has been confirmed through evidence-based studies, it can be immediately made available in the Data Hub (P2a). In both cases, the ABBS is then forwarded via P2 to the banking ecosystem for the purpose of verifying the acceptance among its own customers. To clearly distinguish this optional process from the standardized process and to maintain consistency with the preceding process P2a, the optional part "a," i.e., P2(a) is added. It is important to note that all processes involving the provider are declared optional because the standardized process, with customer acceptance relevant to (market) research, reflects the focus and validity of the model.

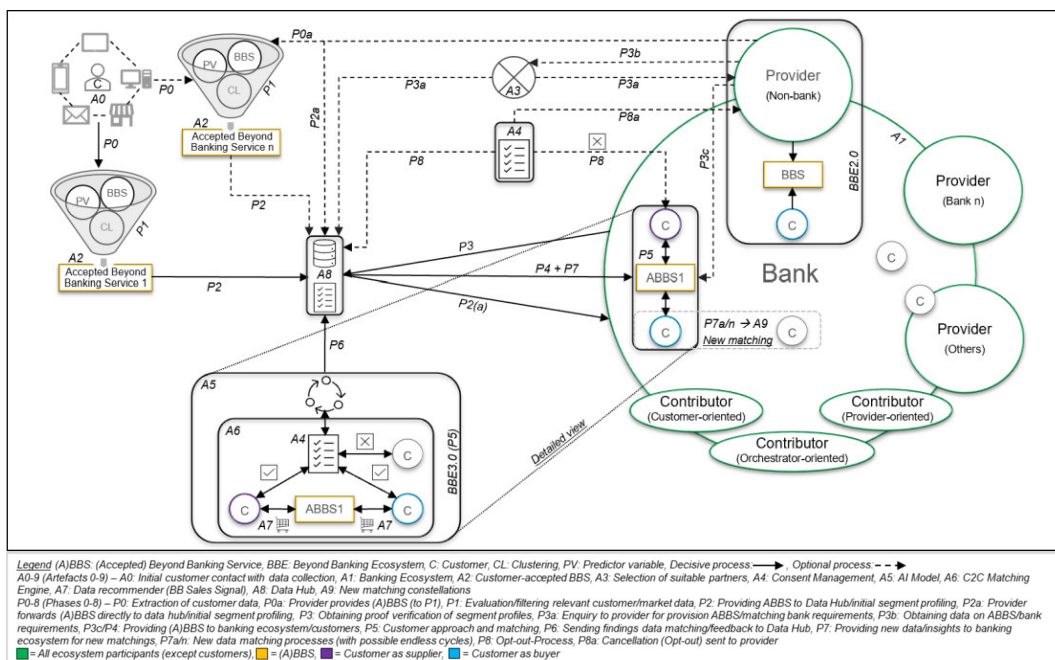
Regarding the "Design tools and methods" (sc. 3), expert 11 additionally criticizes why the providers and contributors are not defined in more detail (similar to the sub-code "Artefacts"). The providers have now been elaborated in more detail, while the contributors are still missing. The design was based on the model by Burkhalter (2020), and an additional contributor was added (now a total of three), which required replacing a customer (C). Accordingly, the contributors were described as "Customer-oriented," "Orchestrator-oriented" (bank), and "Provider-oriented," depending on their support role for the ecosystem participants.

Another question of understanding was asked regarding the Customers (C), specifically, why they are placed in different positions within and around the Banking Ecosystem. Due to the reduction of a Customer (C) to soften the impact of a third Contributor, there are still two Customers in A1 without any further direct function. However, both can be well exemplified in this representation. One Customer, who is freely located in A1, has not yet been matched with another Customer, while the other Customer, who is positioned between the Provider (Others) and A1, indicates that this Customer is being transferred from the Provider to the bank as a potential new customer. This can also be interpreted in another

way, suggesting that the bank might want to pass a new customer to the Provider if it intends to do so. Based on this reasoning, no changes are made here.

The critique from experts 12 and 14 regarding the differentiation and highlighting of participants and their interactions within the ecosystem using different colors. Providers, contributors, and the orchestrator (bank) are color-coded similarly to Burkhalter (2020), with green; the (A)BBS in orange; the supplier in purple; and the buyer in light blue, in a matching configuration, with the color explanations also included in the legend (Figure 66 with color distinctions as another iteration through M1.21st). Here, different customers and their roles can be distinguished by color, such as Customer 1 as the provider and Customer 2 as the demander (expert 12). To clarify the function of the encased dotted line at A9, the textual addition “New matching” is included (expert 14) to make new customer matching configurations more understandable.

Figure 66. Solution Design BBE 3.0 (M1.21st)



Another improvement in the visual separation or highlighting of the market side with market research on one side and the ecosystem on the other (expert 14) is rejected because the market side is not solely driven by the customer dimension

with data filtering alone (left in the model). Instead, the provider who offers a BBS, as well as other providers, can be assigned to the provider side, but these can also be treated on the market side to support customer acceptance through their own research, success stories, or business cases. In this dynamic and complex environment, dividing the model into market and ecosystem is not advisable.

In the last subcode, “Framework factors” of the category “Evaluation design specifications,” all experts agree that the framework factors from this model M1.1 should be removed and incorporated into a separate, simple model designed for management use. Therefore, all four framework factors A8, A9, A10, and A11 are removed from M1.1.

For Category 2 “Research hypotheses design objectives” (Table 63), improvement suggestions are mentioned by all experts for the current design; however, these touch on overarching questions related to the Business Case (see experts 12 and 13), the MVP concept of quick feedback from live or rapid prototyping (expert 13), or how critical (framework) factors can be implemented and measured (experts 11, 12, and 13). All of this feedback can be considered in a separate design for management to address.

In the last category, “Further evaluation criteria” under the subcode “Feasibility” (Table 64), expert 11 criticizes that an opt-out process was not considered in the model. This was presented in a very simplified form to avoid excessive complexity. If the customer now wishes to delete or revoke the previously agreed consent in P5 at A4, this can be addressed through the newly created optional process P8. Upon revocation of the consent, this data is forwarded to the Consent Management A4 and also to the central Data Hub A12. The customer receives confirmation of the revocation as a form of feedback. If a provider is involved as a third-party partner for contract or service fulfillment, the revocation is also sent to the provider (P8a).

For the subcode “Level of detail,” (Table 65) expert 11 advocates, in addition to using “values or colors,” reducing many misunderstood abbreviations to improve readability. Details such as “Detailed view” and “New matching” have now been added, but the abbreviations BBE2.0 and 3.0 have not yet been explained in the legend. This will be addressed. Based on the experts' fundamental argument that increased traceability and comprehensibility of the model can only be ensured

through explanations and context, the legend will be extensively supplemented with explanations of all artefacts (A) and phases (P).

Expert 14 mentions “Internal consistency/Correctness” regarding how partners or providers are selected and which “need vs. qualitative factors” are used in detail. This expanded perspective on developing partner selection and its criteria can be incorporated into the management model. Lastly, expert 11 advocates for a simple, essentialized representation of customer matching between Customer A and B under “Applicability,” which is understandable for management. Regarding the “Framework factors” of the category “Evaluation design specifications,” all experts agree that the framework factors from this model, M1.1, should be considered in the new model.

The now discussed and critically evaluated changes and additions to iteration M1.1 result in the artefact numbering no longer appearing logical and showing gaps in the sequence. Because the framework factors (A8-11) have been removed from this model and will be integrated into the new management model to be created, the central data hub, which is still declared with A12 and new matching configurations based on network effects with A9, will now be changed in A8, following the BBSS artefacts (A7). The new matching artefact under A9 can then remain as a product of the network effect and improved model training for ABBS1.

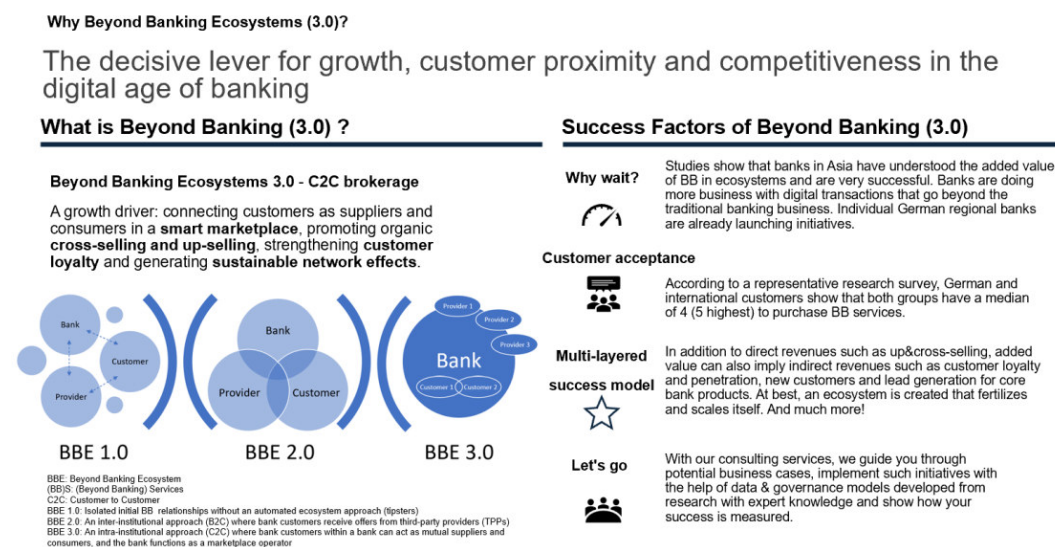
Regarding the target design proposal M1.2m, which is addressed to management, many wishes and suggestions from the experts are already mentioned in the Eval 2 iteration. However, for clarity, the amount of feedback must first be clustered or organized by topics. In the next step, a critical review will determine which topics can be incorporated into the next iteration M1.2m and which should be rejected or set aside as potential research topics for future exploration.

Thus, three main areas of expert feedback have emerged overall. The first focus is on motivating and convincing management that BBE 3.0 is being strategically initiated and implemented in the first place. Under the category “Design tools and methods,” expert 13 notes that management should be informed and inspired about this topic. Expert 12 also mentions “what benefits” and “what motivation” are behind it. Under the subcode “Simplicity” within the category “Further evaluation criteria,” where “basic business relationship is hidden” (expert

12), this should initially be communicated to management. Additionally, "management board lacks information on added value, advantages for the bank, and profit potential" (expert 14).

To inform, inspire, and convince management with arguments for the implementation of BBE 3.0, the most important points from the experts are initially summarized in an introduction slide (Figure 67). The addition "i" in model M1.2mi stands for the "introduction" part of this iteration.

Figure 67. Introduction of BBE 3.0 for Management (M1.2mi)

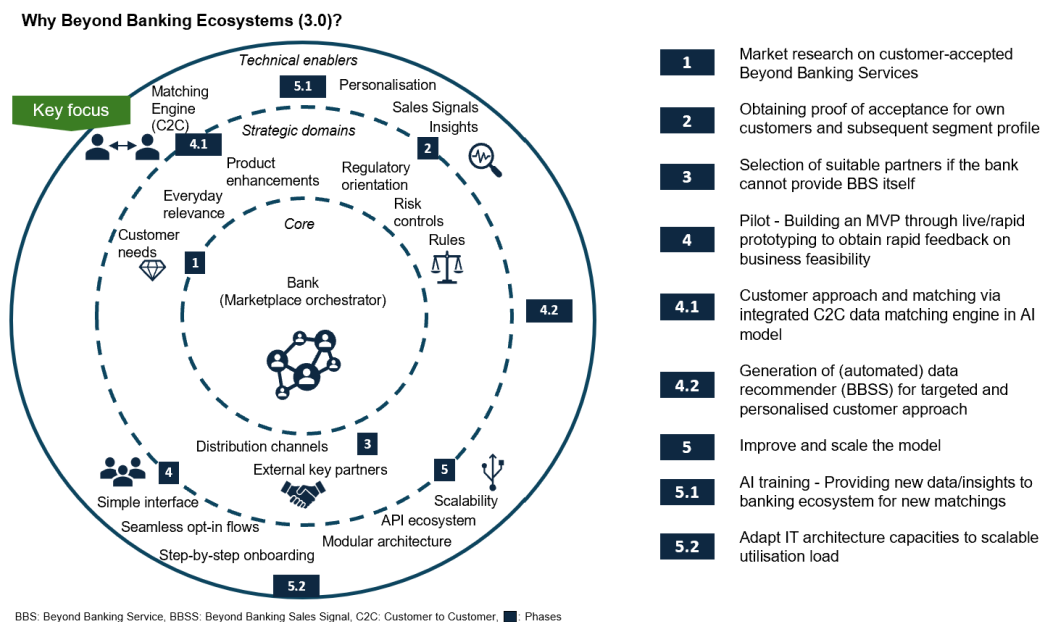


In this introduction model M1.2mi, the guiding question "Why Beyond Banking Ecosystems (3.0)?" is addressed. After discussing the essential advantages, such as "growth, customer proximity, and competitiveness" in a digital banking era, it first explains what BB (3.0) actually is (on the left side). Here, the phenomenon of Beyond Banking Ecosystems 3.0 is initially described as C2C brokerage, and then visualized with a historical development (similar to Chapter 3.1.) based on observations in research, to provide management with contextual knowledge and (temporal) classification of BB ecosystems. On the right side of this overview, under the heading "Success Factors of Beyond Banking (3.0)," the benefits or added values, motivations, and acceptance from both banks and customers are discussed, along with possible support services such as assistance

with business case development and the implementation of metrics for project execution.

The second focus is the central core of the experts' feedback comments. This concerns the actual desire for a (very) simplified model, which is intended for management or an uninformed audience. This simplified model is illustrated in the following Figure 68. The addition “d” in this model M1.2md stands for “Design”.

Figure 68. Solution Design BBE 3.0 (M1.2md) based on Adner (2017) and Talmar et al. (2020)



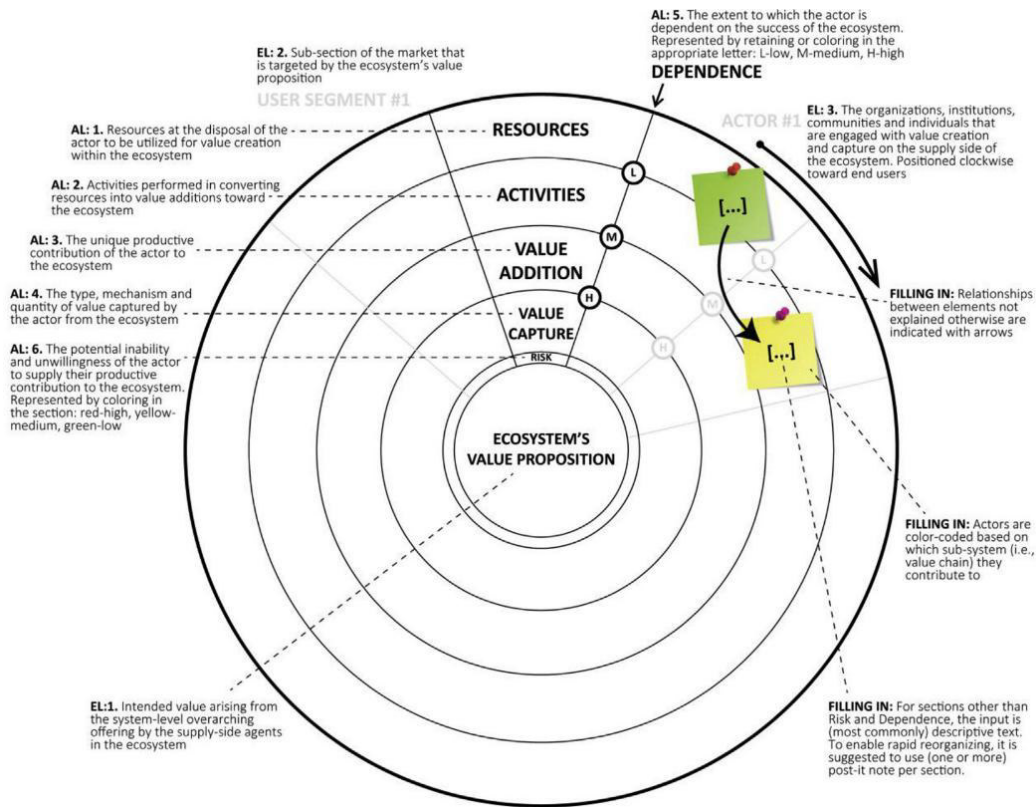
Under the category “Design tools and methods,” expert 13 requested a holistic, easy-to-understand model that captures customer and company value as well as the question of how it can be implemented. Under category 2, “Research hypotheses design objectives,” the subcode “H3.3” (expert 12) and the subcode “H3.5” (expert 13) are addressed, and under category 3, “Further evaluation criteria,” the subcode “Operationality” (expert 11) emphasizes early feedback on customer acceptance and understanding through rapid development and testing of MVPs, live or rapid prototyping approaches, to identify a valid and sustainable business model early on and to be able to stop it early if necessary. Additionally, for the subcode “Feasibility,” business requirements and customer acceptance (experts 12 and 13) must be met, which can be considered within the model under

strategic domains. Furthermore, “technological challenges” (expert 14) under technical enablers must also be addressed. Expert 11 also mentioned an application example under “Level of detail” and “Applicability,” where a simplified scenario is described: “Customer A and B interact with each other. The bank acts as a contact initiator and mediator.”

Building on the prioritized clustered expert feedback on the model, a memorable, three-layered, radial diagram was chosen as a pattern. It consists of the “Core” with the bank as the marketplace orchestrator, the middle layer with strategic domains such as value proposition, partnerships, and channels, governance and compliance, and the outer layer with technical enablers from data and analytics, platform technology, user experience, and opt-in, as well as the matching engine (C2C) as a technical component that automatically connects customers as suppliers (providers) and buyers (demanders). As a reference model for this ecosystem, literature on ecosystem management was referenced, which was already identified as a possible instrument for finding a reference model M0 for the DSR in the literature review (Chapter 4.5.2.3.). The approach by Adner (2017), which is a “structuralist approach to conceptualizing the ecosystem construct” (p. 1, para. 1), is used from a strategic perspective for decision-makers. Coupled with the visual instrument developed by Talmar et al. (2020) for analyzing and constructing ecosystems—a radial blueprint („Pie”) with a central focal actor and multiple radially arranged components (Figure 69)—a modified, less complex model with three layers was developed and summarized.

On the right side of model M1.2md (Figure 68), in contrast to the detailed, complex model M1.21st (Figure 66), the phases are overall reduced, more compact, and described with less detail in Phases 1 to 5.2. In addition to the initial phases of market research, obtaining proof of acceptance for one's own customer, and up to the optional partner selection (Phases 1 to 3), Phase 4 involves the pilot through building an MVP to quickly gather customer feedback on business feasibility, which is attributed to the expert feedbacks (11 to 13), and is thus included and depicted here.

Figure 69. The Ecosystem Pie Model Tool (Talmar et al., 2020)



Following this, the actual Customer Data Matching occurs (Phase 4.1), and Data Recommenders (BBSS) are produced as a result (Phase 4.2). In Phase 5, the Ecosystem Model and its Matching Process are enhanced and scaled, which, through AI training, results in more accurate and/or new matching configurations (Phase 5.1). Because of possible increased load during scaling, the IT architecture capacities must also be adjusted dynamically accordingly (Phase 5.2).

The third focus area, which has emerged from expert feedback, concerns the objectives and performance measurement of a developed, sustainably successful BBE 3.0. Here, the framework factors should also be considered. According to experts (subcode "Framework factors" in the category "Evaluation design specifications"), these factors are derived from the scientific, technical model (M1.21st) and integrated into a separate, clearly presented model. Additionally, they should demonstrate a higher level of detail and explanation (expert 11) and be measurable and evaluable (expert 12).

Therefore, a KPI overview page (Figure 70) was created. This part of the overall model is labeled with the suffix “m” for measurement. Following the claim to make BBS as a value-added solution transparent and controllable, a matrix was added with the initially three focus areas: “Increase in everyday use and active interactions,” “Increase in cross-sell conversions to core bank products,” and “Increase customer retention and loyalty,” based on the most frequently mentioned target achievements from the expert feedback in Chapter 3.3.3.

Figure 70. Objectives and Performance Measurement of BBE 3.0 (M1.2mm)



The fourth target achievement, “Increase and scale BBE (3.0) and its interactions between customers,” was based on the framework factor “Network Effects,” which are the theoretical prerequisite for multi-sided markets and platform dynamics (Schüler & Petrik, 2023; Wirtz et al., 2019). Additionally, it was expanded to include “Ecosystem Virality” as a newly added framework factor, emphasizing essential growth effects and self-reinforcing mechanisms within the ecosystem (particularly as a marketplace orchestrator in the BBE 3.0 environment), as explained in marketing literature by Theodorakopoulos et al. (2025), with appropriate, exemplary KPIs outlined by FasterCapital (2025). These metrics measure how the ecosystem sustains itself through user interaction, leading to exponential growth.

In the vertical, left-oriented row, the KPIs are selected based on user and bank-related criteria. In the last row of the matrix, each target achievement is explained in terms of the impact that the KPIs assigned to the total contribute to achieving each target. The contextual factors “Scaling,” “Context-based,” “Organizational,” “Network Effects,” and the newly created contextual factor “Ecosystem Virality” are color-coded to the different KPIs, indicating which contextual factor can be achieved or influenced by specific KPIs. The star symbol also indicates which KPI was considered important and/or frequently mentioned from the experts' perspective (from Chapter 3.3.3.). Even if experts did not explicitly name some KPIs, their measurement goals or intentions can be associated with or transformed into KPIs (Steinhardt, 2024). Examples from the experts include lead generation or forwarding to core banking products via BBS, which relate to cross-sell leads or cross-sell conversion rates. The referral rate, in turn, can provide insights into new customer acquisition that was recommended by another customer in the BBE. This also relates to the interest of expert 11 (Category 2 “Research hypotheses design objectives” under “H3.4”) regarding how non-customers are handled and how they can then be converted into customers. Paired with the Viral Coefficient and other KPIs marked as “Scaling,” scaling can be managed, which is “dependent on and simultaneously limited by the number of customers in the ecosystem” (expert 11).

The Multiple Utilization Rate can counteract the criticism from expert 12 (Category 3 “Further evaluation criteria” under “Accessibility”) because this KPI tracks the frequency of accessibility of a BBS and can be adjusted if necessary when the accessibility does not demonstrate the desired multiple use or activity within the product, customer journey, etc. The Adoption Rate, in turn, provides information about customer acceptance of a product and the potential confirmed opt-ins for it, which the same expert inquired about under the subcode “Simplicity.” Additionally, the NPS can reveal customer satisfaction and trends or differences across various customer groups over different periods.

It should also be noted that this KPI overview is an extract of the most important KPIs for these four target achievements. The decision to highlight the most relevant KPIs in this overview is based on expert feedback from Chapter 3.3.3., indicated by the star symbol, and relevant literature from Wirtz et al. (2019),

Theodorakopoulos et al. (2025), Schüler & Petrik (2023), and Steinhardt (2024). A comprehensive exemplary list of all potentially applicable KPIs for measuring BBS and (BB) ecosystems is provided in the Appendix 29.

The models M1.21st and M1.2m(x), which address both the scientific and technical components for business analysts and IT experts, as well as the strategic components for management and an uninformed audience, primarily serve to initiate scalable BBEs 3.0 and potentially implement them in real-world settings through an evaluated, designed implementation blueprint (prospectively at the end of the Eval 4 cycle). Not every critique, wish, or feedback can be considered within the limited model framework. On the other hand, additional content can potentially be delineated as possible future research streams.

Explicit business cases are not considered or addressed in detail, as expert 13 (Category 2 “Research hypotheses design objectives” under “H3.1”) discusses an expected output and the amount of investment to be planned. Under “H3.4,” experts 12 and 14 support expert 13's argument with the “ratio of costs and potential profit to scaling.” Additionally, in Category 3 subcode “Operationality,” the velocity and capabilities are mentioned, which are to be determined by operationality (experts 13 and 14). These components are also not considered, as they are regarded as resources that contribute to the overall business case calculations.

The mindset change or „customer's usage behavior” (expert 11 and 12 under „Accessibility” and expert 11 under “Feasibility”) directed at customers is also mentioned; however, a necessary mindset change for the acceptance of such BBS is vaguely formulated and requires further specification of the problem. Expert 14 criticizes under “H3.3” that the partner side has been insufficiently considered in model M1.1 and that partner management (“Operationality”) is now necessary, as well as under “Internal consistency/Correctness,” how the providers or partners are selected and which “need vs. qualitative factors” are used in detail for this partner selection. This line of thought regarding partner management is neglected because this thesis focuses on customer acceptance (validated through the survey) and is established as one of the first critical phases in model M1.21. Here, partners can only establish themselves as potential BBS providers if they can already demonstrate validated and/or successfully implemented business models.

Another feedback thread is provided by expert 13 under “H3.4.” Here, the scaling potential, the creation of key design elements for the successful development of a customer-accepted BBE, and the associated communication to the customer can be understood as downstream work packages. These can be defined as components of the business case development described above, to be evaluated according to the ABBS. This means that the primary creation and support of business cases with revenue and cost breakdowns, integrated customer journey designs, as well as the subsequent activities in implementation and communication, could be a comprehensive research approach. This approach can be concretely carried out, supported by practical examples that serve as concrete illustrations.

After delineating and critically examining the content that has not been further addressed and that can potentially be further researched (expert content), the final design M2 can now be definitively declared in this Eval-2 cycle. Thus, the models M1.21st and M1.2mx (x = “i” or “d” or “m”) together form the overall model M2. M2 thus serves as the starting point for the subsequent Eval-3 research cycle.

4.5.4. Eval 3 – Focus Group (M3)

In the next evaluation cycle, Eval 3, the solution instantiation from M2 will now be evaluated. After the new designs M1.21st and M1.2mx are each re-evaluated in this iteration with additional evaluation criteria, the next step is the validation of both artefact instances (prototyping through proof of applicability) in an artificial setting (Venable, 2006). In the aforementioned Chapter 1.3., based on the Methodology by Henriques & O’Neill (2023), not only can the effectiveness of entire artefacts be reassessed, but also individual aspects such as the effectiveness of specific design principles, functionalities, mechanisms, software features, or scalability.

According to Hevner & Chatterjee (2010), this focus group evaluation will center on exploratory FGs (EFGs) to assess an artefact's design. The process involves studying the artefact to suggest improvements, with the evaluation results used to refine the design. This build and evaluate cycle with EFGs continues until the artefact is ready for field testing in the application environment.

The focus group session follows Krueger & Casey (2014), where the social scientist adopts a less directive role. Instead of leading, the researcher shifts focus from the interviewer to the respondent, using open-ended questions to encourage free responses. This approach allows participants to comment, explain, and share their experiences and attitudes without restrictions. Accordingly, the focus group can serve as a newly introduced interview format (Appendix 22) and approach within the DSR, providing new insights and perspectives through the direct exchange and discussion framework in the expert group that might not be achieved through individual interviews. In this process, disagreements or differing opinions can be confirmed, supplemented, or rejected during discussions.

The setup of this evaluation consists of a focus group of 6 experts out of a total of 14 possible experts. The optimal time was found when most experts could allocate their resources to the focus group. Accordingly, the six experts include Expert 1 (SPM), Expert 2 (CLBC), and Expert 6 (CEO) from Chapter 3.3.3., as well as Expert 11 (CL), Expert 12 (CEO+CF), and Expert 13 (CJO) from the previous evaluation cycle 2, who have already been introduced and described in their respective chapters. The three experts from Chapter 3.3.3. can be classified into the “Business” group. Therefore, experts 1, 2, 6, and 13 belong to the “Business” group, while experts 11 and 12 belong to the “Technology” group. Although the division of group members is uneven with 4/2, this allows for a consistent continuation from the Evaluation 2 cycle.

The starting point of the Eval 3 cycle is the M2 model, which was assembled for the focus group interview on a board for clarity and direct comparability based on the results of the Eval 2 cycle (Figure 71 und Appendix 21). The overall overview cannot be displayed in detail and at a larger size due to the limited format of the thesis. However, this is not necessary, as all components and models of this overview have already been visualized and explained in detail throughout the thesis. A larger version can be viewed in the appendix.

Target group: Business Analysts and IT

Design M1.1 (scientific/technical)

Design M1.21 (scientific/technical)

Target group: Business Analysts and IT

Design M1.1 (scientific/technical)

Design M1.21 (scientific/technical)

Target group: Business Analysts and IT

Design M1.1 (scientific/technical)

Design M1.21 (scientific/technical)

Target group: Business Analysts and IT

Design M1.1 (scientific/technical)

Design M1.21 (scientific/technical)

Target group: Business Analysts and IT

Design M1.1 (scientific/technical)

Design M1.21 (scientific/technical)

Target group: Business Analysts and IT

Design M1.1 (scientific/technical)

Design M1.21 (scientific/technical)

After the setup for the focus group has been described, the interview guide is now explained in more detail as a basis for the conversation. The interview guide is aligned with the overall overview described above and initially subdivides into the further evaluation of the design M1.21st, addressing all adjustments from the previous iteration of M1.1 to M1.21st concerning artefacts, processes/phases, design tools and methods, and contextual factors. Afterwards, adjustments related

to additional evaluation criteria, such as feasibility, level of detail, and further modifications to the design, are discussed.

Subsequently, the newly created design M1.2mx with its three components will be discussed: the introduction to BBE 3.0 and its success factors, the simplified visualization addressed to management for implementing BBE 3.0, and the overview for measuring BBS using KPIs. Eleven additional evaluation criteria (similar to those in the Eval 2 cycle for design M1.1) complete the assessment.

In the third part, the two artefact instances (M1.21st and M1.2mx) are validated in their totality (M2) within an artificial setting (proof of applicability). Here, a “constructed” artefact (Table 66) is created, which is then transferred to M2 regarding its applicability and thus evaluated (=prototyping). The constructed artefact is a marketplace for “craft services,” designed to connect Customer A, a demand-side user of handcrafted services, with Customer B, a provider of handcrafted services, within a BBE 3.0 (C2C) context. This can be explained through 7 phases along a customer journey: 1. Awareness, 2. Onboarding, 3. Matching, 4. Offer & Negotiation, 5. Booking & Payment, 6. Service Provision, and 7. Feedback & Cross-selling. Participants in this customer journey consist of Customer A as the demander, the platform/Beyond Banking Service, and Customer B as the supplier.

Table 65. Constructed Artefact for “Craft Services” Marketplace

Phase	Customer A (demander)	Platform / Beyond-banking service	Customer B (supplier)
1. Awareness	Aware via push notification or newsletter that tradespeople are available in the banking app	Sends personalised messages (e.g. "Looking to renovate?") based on payment history and profile	–
2. Onboarding	Opens the marketplace section in the app and enters service details (location, time, service)	Guides A through a short consent form and explains the matching process	–
3. Matching	Confirms general conditions (e.g. budget, time window)	Uses the matching engine (C2C) and suggests suitable B profiles	Receives notification with request and can signal interest
4. Offer & negotiation	Selects a suitable tradesperson from 2–3 suggestions and sends a request	Provides chat interface and displays ratings, availability, prices	Checks the request, sends a counterproposal or accepts
5. Booking & payment	Accept the final proposal and pay via the integrated payment escrow	Manages escrow account, books appointment and reserves payment release	Views booking, appointment and payment status in dashboard
6. Service provision	Receives the tradesman's service on the booked date	Sends reminders, rates service immediately after completion	Provides service, receives feedback reminder
7. Feedback & cross-selling	Provides final rating (CSAT/NPS) and sees suitable additional services (e.g. material delivery)	Generates cross-selling offers (e.g. renovation package, insurance add-on)	Sees upsell suggestions (e.g. follow-up order, premium listing)

The following coding system (Table 67) is based on the three-part division of content described above, which, similar to the individual expert interviews in Eval 2, follows a deductive category approach according to Mayring (2022).

Table 66. Coding System for Focus Group Findings (Eval 3)

Categories	Subcodes	Number of citations (frequency)	Frequency in % of 90 citations
		90	100,00%
Evaluation of the design M1.21 (scientific/technical)		5	5,56%
	Adjustments to artefacts (A0-9)	1	1,11%
	Adjustments to processes/phases (P0-8)	0	0,00%
	Customisation of design tools and methods	0	0,00%
	Adjustments to the framework factors	4	4,44%
Further evaluation criteria for design M1.21 (scientific/technical)		0	0,00%
	Adjustments for feasibility	0	0,00%
	Adjustments to the level of detail	0	0,00%
	Additional adjustments	0	0,00%
Evaluation of the design M1.2 (Management)		35	38,89%
	Introduction to BBE 3.0 and its success factors	23	25,56%
	Simple visualisation for the implementation of a BBE 3.0	4	4,44%
	Overview of the measurement of BBS using KPIs	8	8,89%
Evaluation criteria for design M1.2 (Management)		32	35,56%
	Feasibility	9	10,00%
	Accessibility	5	5,56%
	Comprehensibility/Meaningfulness	1	1,11%
	Clarity	3	3,33%
	Simplicity	2	2,22%
	Elegance	2	2,22%
	Completeness	1	1,11%
	Level of detail	2	2,22%
	Internal consistency/Correctness	4	4,44%
	Applicability	2	2,22%
	Operationality	1	1,11%
Observable 'realities'		8	8,89%
	real tasks	4	4,44%
	real systems	2	2,22%
	real users	2	2,22%
Evaluation of the artefacts' capability		10	11,11%
	Purpose	4	4,44%
	Scope/area of application	6	6,67%

Accordingly, the evaluation of the design M1.21st will be conducted in another iteration through the first categories “Evaluation of the design M1.21 (scientific/technical)” with four subcodes and “Further evaluation criteria for design M1.21 (scientific/technical)” with three subcodes, the initial evaluation of the new design M1.2mx through category three “Evaluation of the design M1.2 (Management)” with three subcodes, and category four “Evaluation criteria for design M1.2 (Management)” with 11 subcodes, as well as the validation of the overall design (M2) using a constructed artefact in an artificial setting, assigned to category five “Observable ‘realities’” with three subcodes and category six “Evaluation of the artefacts’ capability” with two subcodes, which are addressed and handled.

In the first section of the further evaluation iteration of M1.21st (Categories 1 and 2), the adjustments from M1.1 to M1.21st were accepted by all experts, and no additions have been made since then, which initially indicates a model saturation based on the experts’ responses. However, there were hints and comments regarding the first category, “Evaluation of the design M1.21 (scientific/technical).” Here, expert 12 raised the question (regarding subcode “Adjustments to artefacts (A0-9)”), whether the customer can actively choose different BBSs in the bank’s marketplace, or if only targeted, passive matching occurs in the background and is then presented to the customer. Initially, the customer is matched with all possible BBSs in the background, and thus a data recommender (BBSS) is automatically sent to the customer as a buyer (or also a supplier) with a high probability rate, since the focus of the model is on the matching and the data recommender as the product of the matching. Nevertheless, it is possible that the bank, depending on the need, can provide a marketplace overview with BBSs to customers independently, allowing them to select and conclude specific services according to their preferences, regardless of the matching. These activities can then feed back into the feedback loops to improve the model training of the BBS and matching.

For the subcode “Adjustments to the framework factors,” expert 13 listed new technologies that can significantly alter the customer journey or value chain of the BBE 3.0 model, where a natural person typically no longer interacts directly with a website, but rather an agent acts on their behalf. Here, expert 2 notes that a solid API-first strategy, which covers all processes externally for the agents, is

crucial. These ideas are not the primary focus of this thesis but are briefly discussed in Chapter 4.3.1. (Relevance for the conceptual design), where disruptive AI approaches can be considered within a modular model. Additionally, in Chapter 4.4.2. (Fundamental key influencing factors and evaluation criteria for a successful Beyond Banking Ecosystem), Open Banking KPIs for Business Value are mentioned as a possible platform offering and thus associated monetization of APIs (Mallick et al., 2020), as well as in Chapter 4.4.3. (Derivation of context-based influencing factors and evaluation criteria for a successful Beyond Banking Ecosystem), the fundamental consideration and implementation of “Advanced APIs and Apps” as a modern architectural standard when building or further developing a BBE 3.0 (Sironi, 2022). This method expands the service portfolio by openly integrating third-party providers (non-bank providers) and other banks. Additionally, the API-driven structure enhances interoperability and facilitates the incorporation of context-specific services (such as handyman reviews or regional deals) directly within current banking applications.

The experts provided no feedback or comments for the second category; therefore, the adjustments related to this category are also considered to be in place. Due to the low response rate (5 codes for the first subcode and no codes for the second subcode), tabular summaries for the first two categories are unnecessary.

The third category “Evaluation of the design M1.2 (Management)” (Table 68) deals with the subcode “Introduction to BBE 3.0 and its success factors,” “Simple visualization for the implementation of a BBE 3.0,” and “Overview of the measurement of BBS using KPIs” addresses the three new concepts for the first-time evaluation of the M1.2mx design aimed at management.

Table 67. Focus Group Feedback on the Category “Evaluation of the design M1.2 (Management)”

	Categories Subcodes Expert	Evaluation of the design M1.2 (Management)		
		Introduction to BBE 3.0 and its success factors	Simple visualisation for the implementation of a BBE 3.0	Overview of the measurement of BBS using KPIs
Technology	Expert 11 (CL)	BBE 3.0 is a temporary phenomenon; with democratized customer data, customers will switch banks if a service is better. Future BBE 4.0 may see banks as part of an ecosystem offering inter-institutional services without changing banks, highlighting the overrated importance of banks.	The phase descriptions are excellent and fill a gap. Clarify why radial representation was used. The core, strategic, and technical areas are not clear or readable.	
	Expert 12 (CEO+CF)	Questions arise about why banks must perform their own matching to offer customers services, given the abundance of available platforms. Customers may fear sharing data due to trust issues. As a BBS consumer and provider, there's no direct benefit from pre-selection or exclusion.	This makes sense given banks' reputation as intermediaries for services like insurance or payment guarantees. A use case is missing—scenarios explaining why the customer should buy it.	Every bank will want this and invest in it, but at least half will fail because they haven't recognized customer needs. They follow others' lead. What are the success factors for banks to introduce this? To Expert 6: Start small, avoid large initial investments, and keep implementation plans brief.
Business	Expert 1 (SPM)	Provides a good overview of ecosystem benefits but lacks a core message like reputation gains. Some CEOs focus on monetary or indirect revenue. Including references from other DACH banks would help. The China example is too abstract; instead, use smaller, quick success stories relevant to local banks.		
	Expert 2 (CLBC)	The combination of beyond banking and ecosystems is broad, as bank ecosystems vary. Which customer groups are targeted? It's suitable for regional banks due to their local roots, but not for large, non-regional banks. Defining a clear value proposition is crucial; currently, only a rough idea exists. Start small; no ecosystem is in place yet. PSD, PSR, and FIDA regulation can influence or reshape the model.		
	Expert 6 (CEO)	To Expert 12: Banks can gain trust by recognizing customer needs early and offering unseen solutions, like connecting neighbors or providing information they'd miss. Currently, they are not yet there, but this is desirable.		Bank managers wonder about earnings and required investments. They should calculate values for matching or empirical charges. As a manager, patience and upfront investment are vital to profit. The project should be tested first. What to expect now? Perseverance is crucial in building a network, which is challenging and labor-intensive. KPIs are premature at this stage. To Expert 12: Success factors matter more; perseverance is key.
	Expert 13 (CJO)	Asian systems shouldn't be directly copied to Germany or Europe, as acceptance of super apps and monopolistic data collection varies. We should model governance differently, emphasizing regional trust and a strong value proposition. Focus on the customer perspective, explaining why banks must reinvent themselves as life companions—like helping with job searches or neighborhood tasks—to build trust. This approach can create new revenue streams, making banking more sustainable and less regulated. Start small with pilots and clear exit milestones, rather than large projects, to test and refine the approach.		

This initial concept, as an overview page for BBE 3.0 and its success factors, presents a heterogeneous picture of the experts. While expert 12 continues to ask

(see also Eval 2), “why banks themselves need to do matching to provide the right service to customers. There are enough platforms on the market that... can offer a service.” Furthermore, they argue that banks could lose trust by sharing customer data. Expert 6 responds to expert 12 by saying that banks can actually score points through their dominance as trusted institutions, unlike platforms like eBay Kleinanzeigen (classified ads), where many fraud cases occur. The key added value lies more in predicting the services in demand—what the customer is searching for next, before they even know it—or in recognizing solutions that they (still) do not know about, such as a neighbor looking for a side job, thereby connecting people and providing information that the customer probably would not find on another platform. This scenario is desirable, but regional banks are not yet at that point.

Expert 1 praises the good overview of the benefits that an ecosystem can provide. However, they criticize the missing core benefit or core message, which monetary or indirect revenue sources can explain. This also relates to the statements of expert 2, who criticizes the only roughly defined purpose of value in the ecosystem. Due to the composition of the topics here—beyond banking and ecosystems—the overall subject becomes very large and complex, as “the ecosystems of banks are very different.” Therefore, it is advisable to position the concept of BBE 3.0 based on its regional anchoring in a regional bank, but not with a German large bank. Additionally, current regulatory requirements from PSD and PSR, as well as the new future FIDA, should be considered, as they could influence or alter the entire model. The regulatory requirements have already been examined in Chapter 3.5., but a forward-looking perspective on FIDA could justify further relevant research once the EU concretely develops the directive and transposes it into law.

References would be helped by example cases from other banks in the DACH (Germany, Austria, Switzerland) region to convince management better (expert 1). “The example of China is too abstract.” Banks here (in Germany) have different needs, so the references should be scaled down to smaller, quicker, simpler success stories. Expert 13 agrees, as the Asian system cannot be directly transferred to Germany. “The acceptance of super apps and monopolistic data collection is completely different there (sometimes also forcibly).” The regional anchoring is also emphasized here, which is only mentioned when a locally cultivated trust

environment exists (similar to experts 2 and 6). Therefore, the Asian example from this overview should be removed and replaced with a use case from the DACH region (preferably from regional banks). Accordingly, expert 13 proposes the following storyline, which is supplemented with the content from the experts of this evaluation cycle and could be suitable for communication with management:

1. Current situation and need for action: From the customer's perspective, explain why banks need to reinvent themselves. There is a risk of losing the customer interface or customer relationship because banks are simply too irrelevant in the daily lives of many customers. This means a loss of revenue shares that are shifting to players who are more relevant to customers.
2. Solution and value purpose: Bank as a life companion (e.g., for job search or neighborhood assistance) without the need for switching banks
3. Maintain and promote trust as a key advantage of the bank
4. Generation of new, independent revenue structures to strengthen interest rate-independent business, generate sustainable and predictable revenues in the long term, and become less dependent on regulation.
5. Implementation takes place in small steps through small pilots (MVPs) and potential expansion and transfer of solutions. No large project is being sold; instead, an established approach with clearly defined exit milestones is outlined.

Expert 11 once again provides an outlook on the future development of BBE 3.0. The expert sees BBE 3.0 as a temporary phenomenon. Due to the democratization of customer data, customers can switch to another bank if that bank offers this service. In the future, there could be BBE 4.0, where the bank is just one of many within the ecosystem, and services are offered inter-institutionally without changing banks.

For the second subcode “Simple visualization for the implementation of a BBE 3.0,” expert 11 rates the phase descriptions as excellent. “The areas of core, strategic domains, and technical level are not recognizable or readable.” These areas are therefore better highlighted in this iteration. Expert 12 confirms the meaningfulness of the model and now better understands the value that the bank can offer to customers in this construct, such as “banks ... as intermediaries for

services such as insurance or payment guarantees.” A use case would be missing at this point for better comprehensibility, but this will be addressed later in the third part (“constructed artefact”).

For the third subcode “Overview of the measurement of BBS using KPIs,” expert 12 describes herd behavior among banks, where all banks want to have BBE 3.0, but many of them (about half) will fail again because the customer need was not sufficiently recognized. Therefore, expert 12 argues to expert 6 that such projects should be started small, with not much money invested upfront, and without predicting overly long implementation plans. Expert 6 responds that success factors for implementation and perseverance are crucial. Bank managers would not be convinced by this KPI overview and would ask how much money they could make (with the matching). Other experiences where this service is billed are desirable. It actually requires patience and upfront investment to generate a profit. The project must already be tested. Additionally, it is important to know what specific steps will follow next. “Building a network nowadays is not easy and requires a lot of work” (expert 6). In the phase where management is first informed about and convinced of a BBE 3.0 project, KPIs are too early for decision-making. This should be taken into account and seen later as a next step when developing the business case or during implementation.

The fourth category, “Evaluation criteria for design M1.2 (Management),” initially covers 5 of the 11 evaluation criteria in the following Table 69. From the managers' perspective, the majority of experts (5 out of 6) say they cannot answer the “feasibility” because steps and contents are still missing. On one hand, there is a lack of information about the timeframe and the (IT) resource investment needed for implementation (experts 1, 6, 11, and 12), and what exactly is planned next (expert 13). Furthermore, there is a question about whether the bank itself is ready for this step, along with the missing or preliminary necessary analysis of the bank's capabilities and knowledge (experts 11, 6, and 13). Additionally, it is mentioned that “which regulatory hurdles... may exist” (expert 11). For expert 12, the timing aspect is not the primary concern, but rather when the first positive figure from the value perspective will be generated.

Table 68. Focus Group Feedback on the Category “Evaluation criteria for design M1.2 (M.)” (subcodes 1-5)

	Categories Subcodes Expert	Evaluation criteria for design M1.2 (Management)				
		Feasibility	Accessibility	Comprehensibility /Meaningfulness	Clarity	Simplicity
Technology	Expert 11 (CL)	To expert 13: I agree. Am I ready for this bank? What are my resources? The bank's capabilities analysis is missing. Also, what regulatory hurdles might exist?				Not so easy, you need instructions.
	Expert 12 (CEO+CF)	It doesn't matter how long it takes. When will I see positive value figures? How many resources will be used?	No, not convincing as a manager		Yes	
Business	Expert 1 (SPM)	There is no time perspective or resource assessment. How long will it take? How many employees are needed for the new ecosystem?				
	Expert 2 (CLBC)					
	Expert 6 (CEO)	Question cannot be answered; the intended information is missing. Are you seeking funds to hire a consultant? Do we have in-house knowledge? What IT capacities will be affected and for how long?		It is completely understandable, but very scientific. There is no emotional enthusiasm. It is too clean.		
	Expert 13 (CJO)	No, that question cannot be answered. I don't know if I have the skills. And I don't see what exactly is planned.	The three slides for management are good, but the messages lack details like why, next steps, resources needed, deadlines, and revisit schedule. KPIs are included later.		Sure, it doesn't tell a story. If you want to convince people, you need a story.	Regarding expert 11: I agree. The middle part is understandable, but not really simple.

Experts 12 and 13 are not convinced about the subcode “Accessibility.” The three slides for management are good (expert 13), but “the messages like Why? What is the concrete next step? What resources are needed, and what do we want to do by when, and when will we follow up?” are missing. The KPIs are supposed

to be addressed afterward (similar to expert 6, category 3, subcode 3) and not at the time of management's decision-making.

Expert 6 states that the additional subcode "Comprehensibility/Meaningfulness" indicates that the design "is completely understandable, but very scientific. There is no emotional enthusiasm. It is too clean." The subcode "Clarity" is considered by experts 12 and 13 to be present, but "it does not tell a story" (expert 13). Regarding the subcode "Simplicity," expert 11 evaluates that the design is not easy to understand and requires instructions for comprehension. Expert 13 agrees, stating that this is understandable but "not really simple."

The second part of the category "Evaluation criteria for design M1.2 (Management)" with the last subcodes 6-11 is shown in Table 70. Here, experts 11 and 13 suggest that the subcode "Elegance" could be more elegant in design. Expert 6 explains regarding "Completeness" that the arguments have already been mentioned in category 3 (e.g., missing core benefits or core message or German (locale) references). Under "Level of detail," expert 12 rates the design as "too detailed," and expert 13 as "too fine-grained." "The goal would be to create emotionality and a willingness to spend money" (expert 12).

For the subcode "Internal consistency/correctness," experts 11, 12, and 13 criticize a lack of smooth transition between the individual slides (from 1 to 2 to 3) and a less prominent storytelling. Additionally, expert 11 suggests a "recommendation for an executive summary: What is the takeaway from each of these three slides?" Furthermore, expert 12 asks, "What is needed to implement this successfully? Alternatively, what are the success factors for the German market?"

Regarding "Applicability," the missing next steps are again criticized (expert 11): "What do I do first? Where do I start?" (see also "Feasibility" and "Accessibility"). Additionally, similar to category 3 subcode 1, it is argued that "the purpose of convincing people to spend money is not really there" (expert 6). Lastly, "Operationality" is considered missing (expert 1): "It's been presented at a relatively high level."

Table 69. Focus Group Feedback on the Category “Evaluation criteria for design M1.2 (M.)” (subcodes 6-11)

	Categories Subcodes	Evaluation criteria for design M1.2 (Management)					
		Elegance	Completeness	Level of detail	Internal consistency/correctness	Applicability	Operationality
Technology	Expert 11 (CL)	It could be more elegant.			I'm missing the transition from slide one to three. Suggest an executive summary: What is the key takeaway from each slide?	As a manager, I am missing the next steps. What do I do first? Where do I start?	
	Expert 12 (CEO+CF)			Yes, it's too detailed; the goal is to evoke emotion and encourage spending.	What is needed to successfully implement this or the success factors for the German market?		
Business	Expert 1 (SPM)						This is missing. It has been presented at a high level.
	Expert 2 (CLBC)						
	Expert 6 (CEO)		Was listed in cat. 3			The purpose of convincing people to spend money is not really there	
	Expert 13 (CJO)	To expert 11: Agree.		Too deep, i.e. too fine-grained	I would structure the three slides as follows: Why? How was it really? Follow the Golden Circle.		

In the next step of this evaluation cycle, a artificially constructed artefact (see Table 66) (Sonnenberg & vom Brocke, 2012), which is of a fictional nature and based on the example from Chapters 3.3.6. and 3.3.6.2., will be evaluated in terms of its applicability through the existing designs in total from M2 (=prototyping). According to Walls et al. (1992), the observed “realities” should be evaluated as a sum of subsets based on “real tasks,” “real systems,” and “real users.” Subsequently, the capability of the artefacts regarding purpose and scope/application area will be assessed using the application. Thus, under the fifth category “Observable ‘realities’,” the following subcodes “real tasks,” “real systems,” and “real users” (Table 71) are accordingly represented.

Table 70. Focus Group Feedback on the Category “Observable ‘realities’”

	Categories Subcodes Expert	Observable ‘realities’		
		real tasks	real systems	real users
Technology	Expert 11 (CL)	The example is good. Why filtering? Let the customer decide. I don't want to be limited to what the bank finds. AI is useful here. Data is provided by the bank, but the customer can match it via any interface, not dictated by the bank. The matching happens through my effort, increasing acceptance.		Expert 13: Agreed.
	Expert 12 (CEO+CF)		In terms of the process, you can take that as a starting point.	
Business	Expert 1 (SPM)			
	Expert 2 (CLBC)			
	Expert 6 (CEO)			
	Expert 13 (CJO)	Clear explanation via customer journey; earlier management communication needed. Enhanced visuals and touchpoint availability recommended. Open design with embedded finance scales better.	Yes, but many layers are missing; that's just the tip of the iceberg. There are unseen levels in between, and eventually, the left level comes into play for implementation.	Yes, you can validate customer acceptance by turning it into a prototype.

According to experts 11 and 13, the “real tasks” can be very well and clearly realized with the help of the constructed artefact through the evaluated models. The example is also well chosen. This example, which is to be understood as a customer journey (expert 13), should have been communicated to management earlier in the process. A more visually appealing representation of the customer journey will be presented here and considered in further development. Additionally, there is potential in embedded finance (Hensen & Kötting, 2022), which involves integrating financial services directly into the products or platforms of non-financial companies, thereby bringing bank-related services seamlessly and contextually to the point of need for customers. This can be linked with BBE 3.0, so that “it should also be available for touchpoints. It scales much better when designed openly through embedding finance approaches.”

Expert 11 also considers another idea, where matching and filtering are questioned across the board. In this case, an open AI approach is chosen. “This means that the data is provided by the bank, and the customer can be matched to profiles through any interface, without the bank dictating it.” The matching thus occurs through the active actions of the customer, which is intended to generate

higher acceptance. This also runs in parallel with the implementation by expert 12 (category 1, subcode 1).

Regarding the “real systems,” experts 12 and 13 confirm the connection to the models. In addition to using the models as a starting point (expert 12), there would be some (technical) hidden layers in between (expert 13), and at some point, the level on the left comes into play for implementation.

According to experts, “real users” would be used for models 11 and 13. Expert 13 adds a condition to his confirmation: “if you turn it into a prototype. And then you can validate whether customers accept it.”

In the sixth and final category, “Evaluation of the artefacts' capability,” the subcodes are divided into “Purpose” and “Scope/area of application” (Table 72). Here, a similarly strong participation and response ratio is observed from experts 11, 12, and 13, which can also be attributed to the previous category. The other three experts did not provide any additional feedback on this.

Experts 12 and 13 see the “Purpose” as given in this model, although it should be considered a starting point (expert 12). Experts 11 and 13 agree that the “role and importance of the bank in the designs is overstated” (expert 11) and that the bank does not necessarily have to act as the orchestrator in this BBE, since it can also take on other roles within the ecosystem. In the past, “banks did much orchestration, but they neither had the capabilities nor did they gain acceptance” (expert 13). Additionally, “the ecosystem approach and the associated frameworks have never worked” for other types or preliminary stages of banking ecosystems.

The experts 11, 12, and 13 consider the “Scope/area of application” to be (rather) given. Here, expert 11 (in parallel with the previous subcode) criticizes this and quotes as follows:

The bank, as the centre of the universe, cannot play a significant role here. The bank does not have any of these capabilities and probably cannot achieve them on its own. What is needed is the grey eminence with the technical capabilities, an independent partner who can deliver this.

Table 71. Focus Group Feedback on the Category “Evaluation of the artefacts’ capability”

	Categories Subcodes Expert	Evaluation of the artefacts' capability	
		Purpose	Scope/area of application
Technology		The role of the bank in the designs is overstated in the example. This Beyond Banking Service platform doesn't have to be run by a bank, and a bank can also be a customer key, acting as a supplier of financial services.	The bank, as the center of the universe, can't play a major role here. It lacks the capabilities and likely can't achieve them alone. What is needed is a technically capable, independent partner—like a grey eminence—to deliver this. The business-to-business aspect is missing. For example, two large corporations could benefit because money has been invested there, and banks can meet their complex requirements.
	Expert 11 (CL)		
	Expert 12 (CEO+CF)	Yes, same statement as before in the architecture overview. It is a starting point.	Yes
Business	Expert 1 (SPM)		
	Expert 2 (CLBC)		
	Expert 6 (CEO)		
		Yes, I agree. Regarding expert 11: Your point is crucial. Banks previously did a lot of orchestration but lacked the capability and acceptance. Our goal is to simplify life for customers, not seek attention. The ecosystem approach and frameworks haven't worked, but implications might differ.	With good intentions, yes. Regarding Expert 11: That's not the scope. But companies like Siemens would be good discussion partners; that would probably be interesting.
	Expert 13 (CJO)		

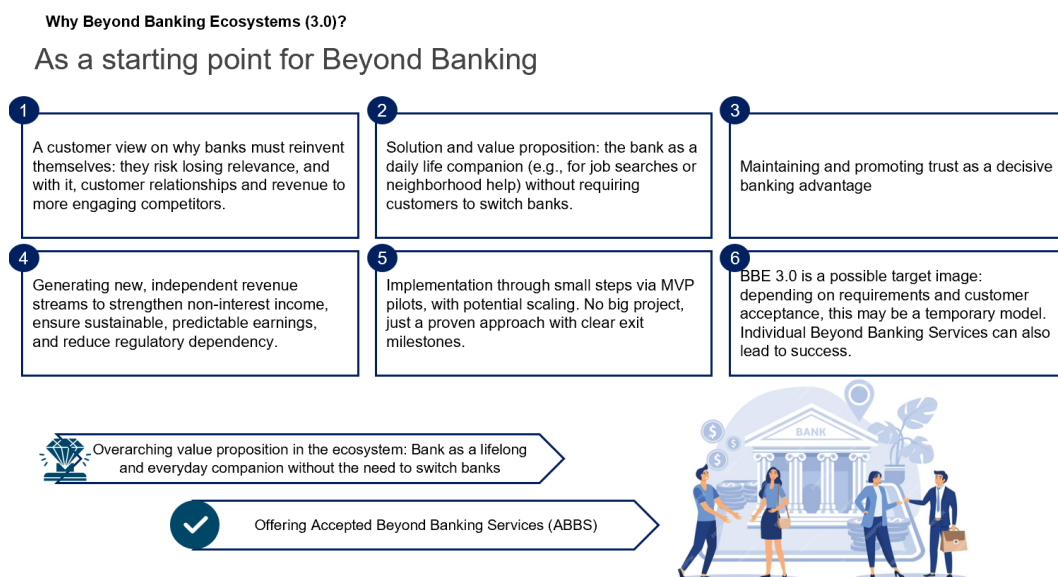
Due to the lack of banking capabilities, a technically capable partner is needed who can produce and provide this BBS. However, this can already be traced and implemented in the optional process P3a-c within the scientific technical model by selecting a suitable partner for the provision of a BBS.

Another aspect of expert 11 is the lack of consideration of the business-to-business side, such as how other large companies can benefit from these ecosystem constructs, “because money has been invested there and the banks can meet their complicated requirements.” Here, expert 13 responds that this is not within the scope of the model. However, an expanded view of large corporations, e.g., Siemens, embedded in the BBE, could open new perspectives and dimensions in the further development of the BBE. “That would probably be interesting” (expert 13).

In the next section, the design adjustments will be made based on the experts' feedback. The M2 model will be evaluated in the Eval 3 cycle over two iterations. The first iteration, M2.1, is based on the results from the first four categories, where the scientific design M1.21st is reevaluated after the adjustments, and the newly added part for the addressed management, M1.2mx, is evaluated for the first time. The second iteration is tested for applicability using the fictional, artificially constructed artefact (M2.2).

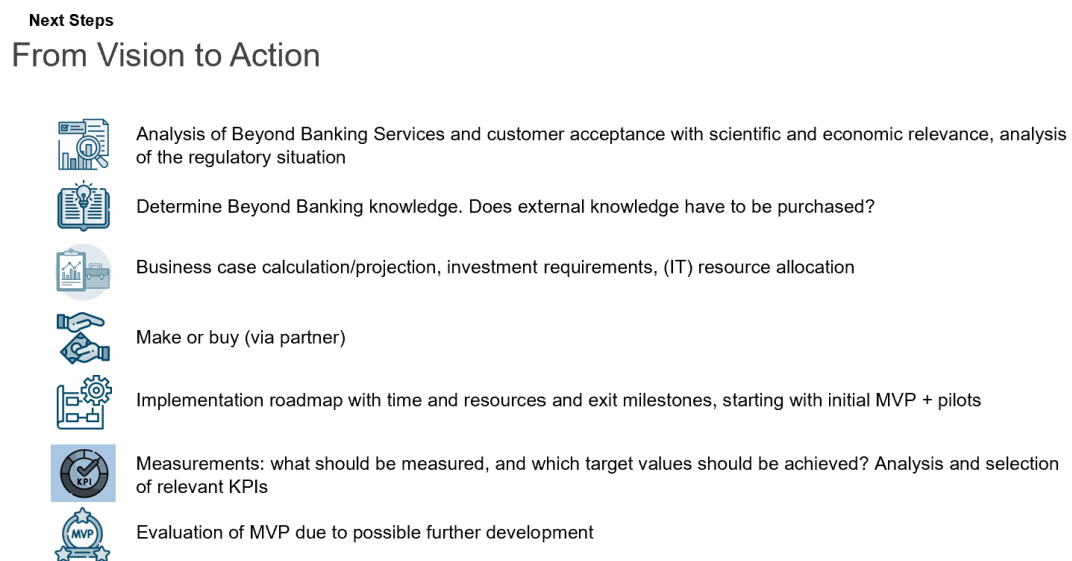
Since no new developments or suggestions for improvement were mentioned in the first two categories, the first change for M2.1 is the storyline proposed primarily by expert 13 in category 3 (subcode "Introduction to BBE 3.0 and its success factors"). This involves a total of five reasons or arguments (see the listed storyline from expert 13) and "BBE 3.0 is a possible target image" from expert 11 as a starting point for the current situation and the potential need for action regarding (Beyond Banking) ecosystems. This overview (Figure 72) is supplemented with the overarching value proposition in the ecosystem (criticized by experts 1 and 2): "Bank as a lifelong and everyday companion without the need to switch banks," and the subordinate, bank-specific value proposition "Offering Accepted Beyond Banking Services (ABBS)."

Figure 72. Current Situation and Need for Action (M2.1)



Expert 6 criticized under the third subcode “Overview of the measurement of BBS using KPIs” (and expert 13 under category 4, subcode 1) that the specific steps outlining what needs to be done next are missing. Therefore, another slide (Figure 75) was created, where the vision from “Analysis of Beyond Banking Services and customer acceptance...” to the implementation “Evaluation of MVP due to possible further development” has been defined as the following task packages. These also include task packages that involve the implementation of a project roadmap with a time horizon (IT) resource deployment necessary for execution (experts 1, 6, 11, and 12). Additionally, the necessary analyses of bank capabilities and knowledge (experts 11, 6, and 13), as well as regulatory challenges (expert 11) and business case calculation (expert 12), are also considered.

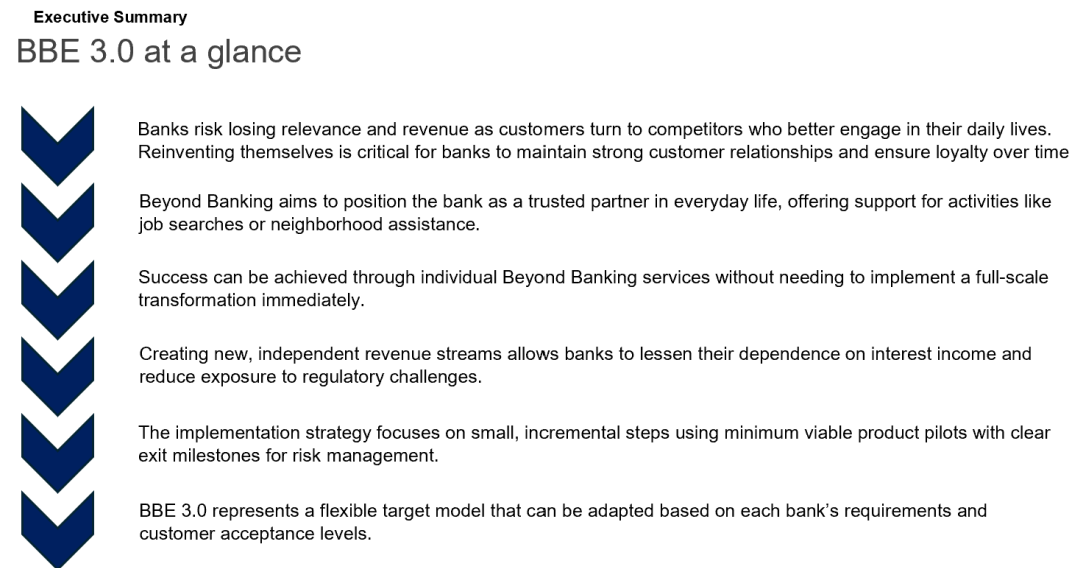
Figure 75. Next Steps as Task Packages (M2.1)



Regarding “Internal consistency/correctness” (cat. 4, sc. 9), expert 11 has requested a “suggestion for an executive summary.” Accordingly, an executive summary has been created (Figure 76), where various key takeaways for management are briefly and concisely summarized. The key takeaways include the risk and potential loss of relevance to customers and the customer interface, and that the bank is now positioning itself as a trusted partner for its customers' everyday needs, enabling new revenue streams and implementing an incremental

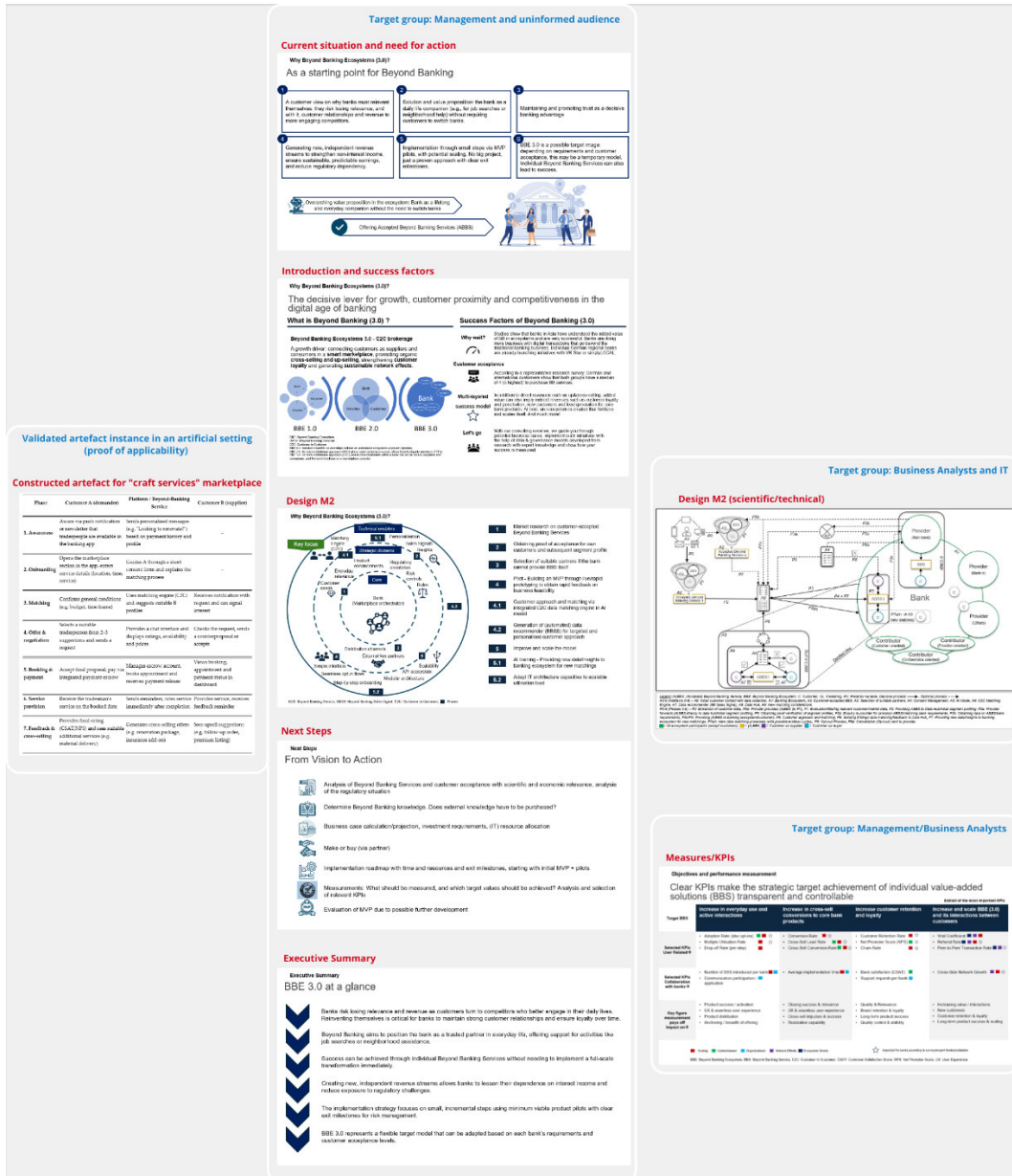
approach without the need for a direct platform transformation, thus providing predictable, clear exit options for risk management.

Figure 76. Executive Summary (M2.1)



When all the listed adjustments for the new design M2.1 are summarized, the following overall overview of all models and slides (Figure 77) is presented. The arrangement of the overall constellation has been changed due to new and modified slides or overviews. This means that the scientific, technical model is now placed on the right side and the constructed artefact on the left side at the height of the simplified management model for direct comparison. Design M1.1 has been removed because the changes have now been incorporated into the new design M2.1, and a comparison of changes from M1.1 to M1.21 is no longer necessary. The new slides "Current Situation and Need for Action" as the first position and the slides "Next Steps" and "Executive Summary" as the last positions have been added under the section "Management."

Figure 77. Compiled Solution Design BBE 3.0 (M2.1) after the Focus Group

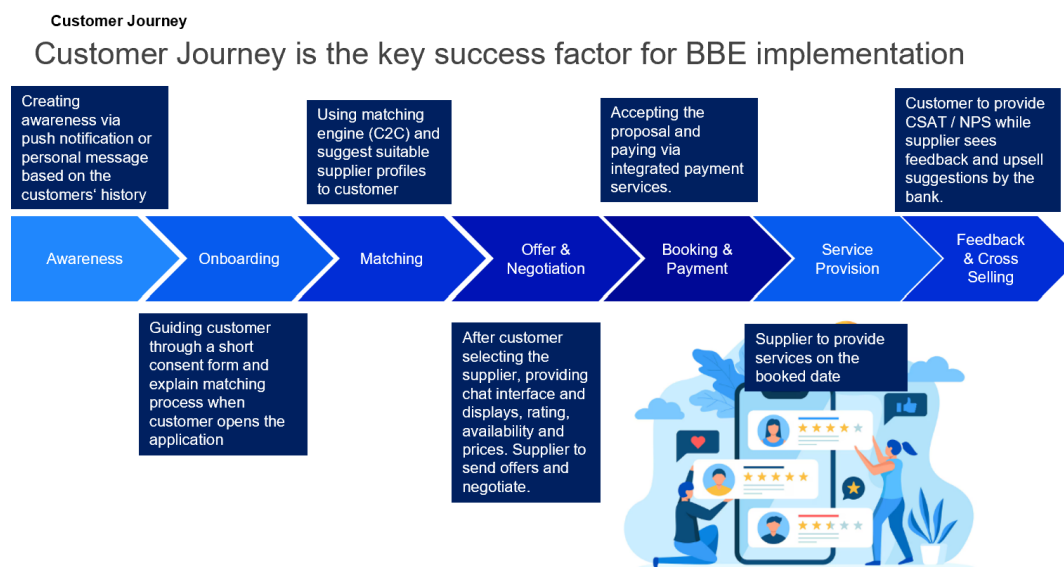


Furthermore, expert 6 (cat. 3, sc. 3) and expert 13 (cat. 4, sc. 2) criticized that the KPI overview page was communicated too early to management, as management first needs to be informed and convinced about BBE (3.0). In the decision-making process, this slide was therefore placed too early. As a result, it was positioned between “Next Steps” and the “Executive Summary” on the right

side to visualize a downstream, not directly dependent flow of information. The missing transitions between slides and the resulting less prominent and inconsistent storytelling (experts 11, 12, and 13 of subcode “Internal consistency/correctness”) have now been addressed by providing more information and changing the headings.

The next step is to incorporate the insights from the feedback, which applied and interpreted the designs to the constructed artefact “craft services marketplace,” into the iteration stage M2.2. Two additions from expert 13 under category five “Observable ‘realities’” in subcode “real tasks” were mentioned here and are taken into account. The first point is a more visually appealing representation of the customer journey, with the constructed artefact serving as the basis. Accordingly, the illustration in Figure 78 translates the phases of the constructed artefact into visual process steps, enriched with additional summarized information from the constructed artefact.

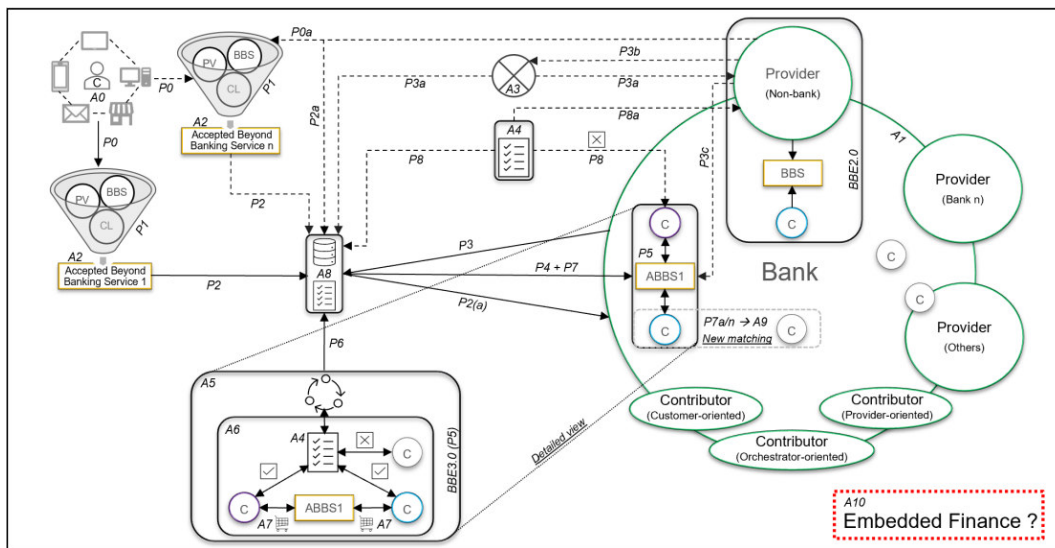
Figure 78. Visualized Customer Journey of the Constructed Artefact “Craft Services Marketplace” (M2.2)



The second proposal from the same expert is the consideration of “Embedded Finance,” which can serve as a new entry point to the banking ecosystem, enabling new digital touchpoints and attracting new customers. Since no further details have

been provided about this iteration cycle regarding how the potentially new artefact A10 “Embedded Finance” might be incorporated into the model M2.1 and interact within it, the new artefact is noted in the bottom right corner of the model within a red dashed box, with no connection to the model in Figure 79.

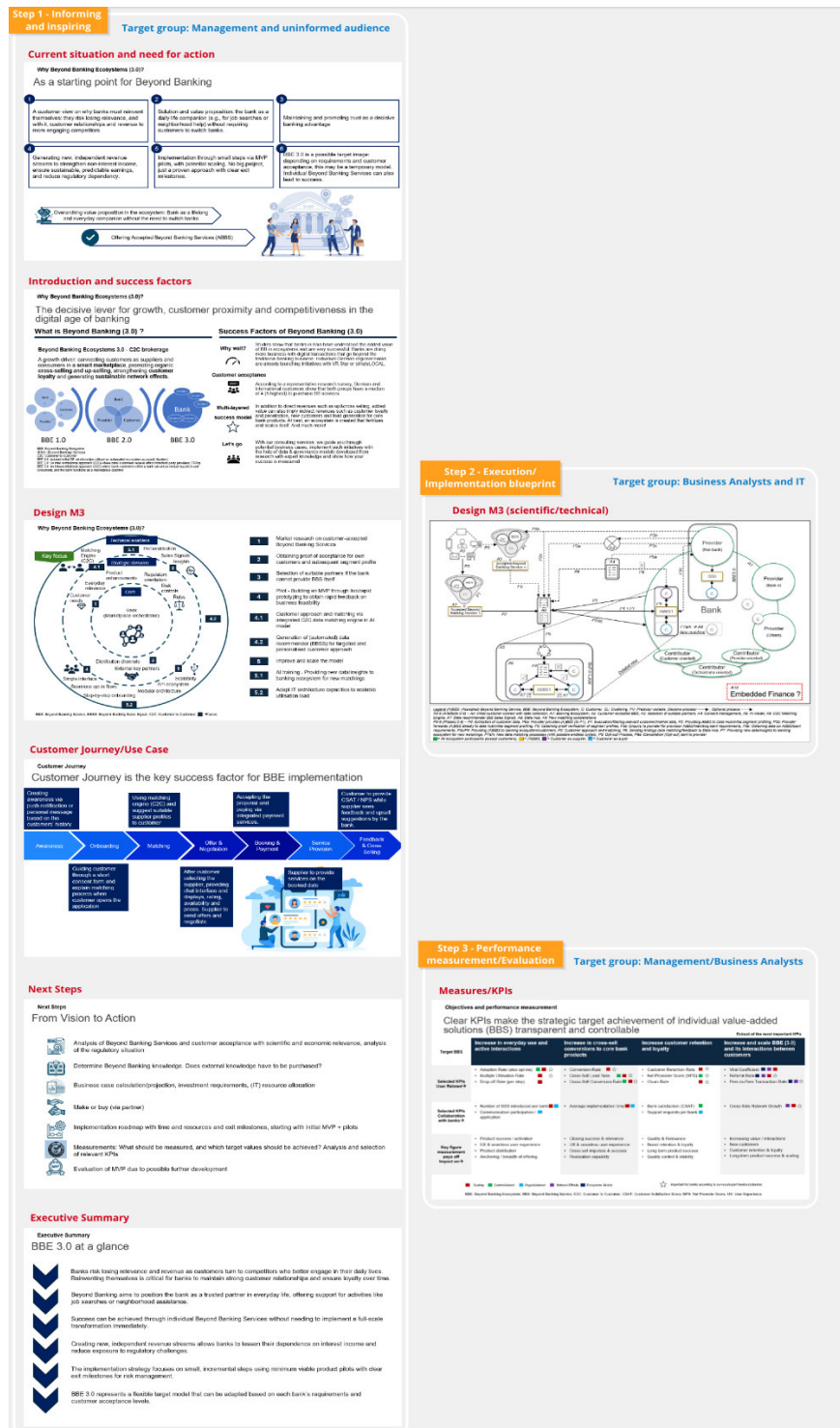
Figure 79. Solution Design BBE 3.0 (M2.2)



Thus, embedded finance is initially incorporated into the new model M2.2. The extent to which embedded finance is justified and how it should be integrated into the model will be determined through expert surveys in the final evaluation iteration 4.

The combined overview from the focus group of the Eval 3 cycle can be represented as the overall result of M3 (Figure 80 und Appendix 24). The constructed artefact from M2.1 (Figure 77) was removed from the constellation on the left and transformed into the visual “Customer Journey/Use Case” Illustration. This is now positioned after the slide “Design M3” as an example to make both designs, M3 and M3 (scientific/technical), more visually and explanatorily clear through a use case. The older version of the M2 model (scientific/technical) was replaced with the new version M3, where the artefact A10 “Embedded Finance” was added for the subsequent evaluation.

Figure 80. Compiled Solution Design BBE 3.0 (M3)



Finally, the slides are grouped into three sequential sections. “Step 1 – Informing and inspiring” aims to introduce management and the uninformed audience to the topic of BBE (3.0). “Step 2 – Execution/Implementation blueprint” then shows how a BBE 3.0 can be initiated and developed, targeting business analysts and the IT project team. “Step 3 – Performance measurement/Evaluation” is a subsequent process linked to “Next Steps” that involves measuring the success of a BBS or MVP using predefined KPIs to determine whether further evaluation and development of a BBE 3.0 or individual BBS make sense in terms of business feasibility. Here, business analysts from the implementing project team serve as the interface to management, which is responsible for shaping the product lifecycle. The now-complete overall model M3 acts as a knowledge base for the final Eval 4 cycle.

4.5.5. Eval 4 – Expert Survey (M4)

In the evaluation cycle Eval 4, the design artefact is finally evaluated by potentially all 14 experts using an expert survey. It should be noted that this survey cannot be statistically analyzed to the same extent as in Chapter 3.3.4.2. due to the small overall number of participants. Therefore, the representativeness is assessed differently than in quantitative studies with large samples. The goal here is not statistical representativeness but rather depth of content and a variety of perspectives.

Out of a total of 14 experts, 10 experts conducted this survey, which corresponds to a response rate of approximately 71% and is to be considered very good despite the argument for focusing on content depth (Fincham, 2008). According to Fincham (2008), a survey response rate of at least 60% is recommended to minimize nonresponse bias as much as possible. Because a “lack of response to the questionnaire by potential respondents in a sample or population is referred to as nonresponse bias. Nonresponse bias is a deadly blow to both the reliability and validity of survey study findings” (p. 1, para. 5).

The expert survey (Appendix 25) can be divided into four sections and an introduction. After introducing the thesis's narrative of intent and the final evaluation iteration, the first section discusses the treatment of embedded finance as a potential artefact (A10) and where and how it should be precisely incorporated

into the model. The second section, “Assessment of applicability (=proof of usefulness),” constitutes the most significant part of the survey. Here, the model M3 under Step 2 (Figure 80) is first isolated, and then the entire model (all steps together) is evaluated based on the criteria of usefulness, technical feasibility, and problem relevance. Afterwards, it is examined to what extent both model variants are applicable in banks of experts or in other companies (banks), based on the likelihood. The third section focuses on performance measurement, meaning which of the 20 KPIs for measuring BBS and (banking) ecosystems are rated according to relevance or importance. In the final section, hypotheses H3.1 and H3.3 to H3.5 are verified for the last time to track any possible changes in their classification compared to Eval 2.

The evaluation of the results (Appendix 26) is now underway. For the first section on the treatment of embedded finance as A10 (Figure 81) in the model design, most experts, 40%, favored considering it within the model areas under steps 1 and 2, followed by consideration under step 1 with 20%, which, strictly speaking, falls under the answer “Yes, under step 1 and 2.” Additionally, two people do not know what embedded finance is, and another two are against considering the artefact.

Figure 81. Expert Survey Results: Handling of Embedded Finance

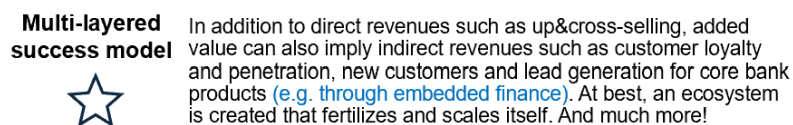


The classification and relationship of the potentially new artefact A10 within the overall model are mostly viewed by the experts as an optional value enabler among the Success Factors (step 1). It can also be integrated as an optional technical

integration module/component in the technical scientific design (step 2). Additionally, “Embedded Finance ensures the customer interactions through touchpoints owned by third parties, is key for implementing a better customer experience and important in order to scale services and gain more reach and other customer segments through [new possible] channels.”

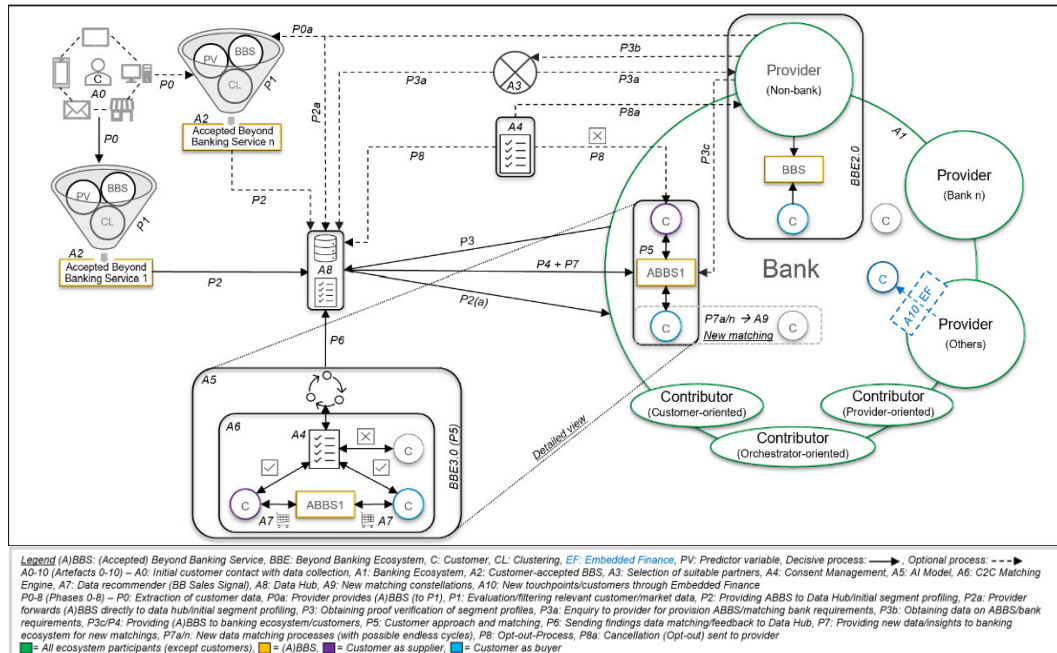
Thus, under the Success Factors in the slide “Introduction and Success Factors,” the “Multi-layered success model” (Figure 82) mentions embedded finance insofar as it can serve as a new channel component to increase reach, for example, by contributing to customer loyalty and penetration, acquiring new customers, and lead generation for core banking products. This has been updated in the text section.

Figure 82. Excerpt from Success Factors (M3.1)



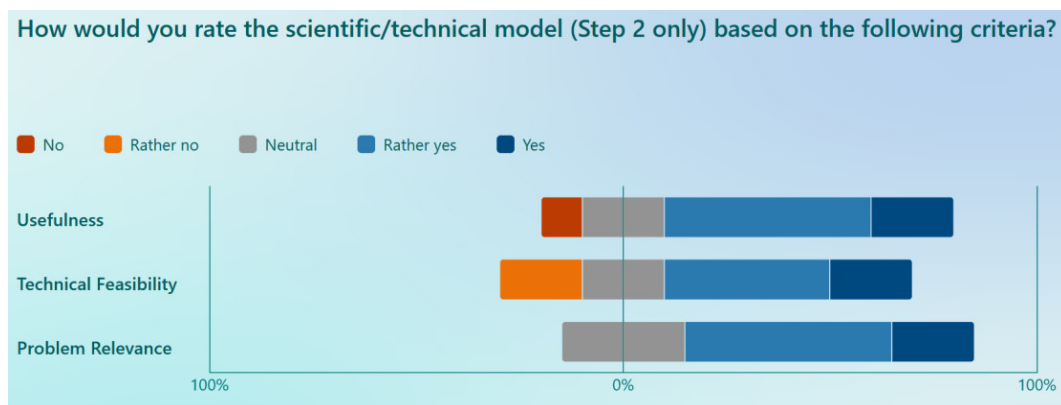
Below Figure 83, the technical component A10, “Embedded Finance,” is added as an extra entry point to the bank. This element is shown with dashed lines to indicate that it is optional. It features a one-sided dashed arrow to show that new customers (C) or touchpoints can enter the banking ecosystem through a potential third-party provider. In this case, the “Provider (Others)” option was selected as an example for integrating A10 into the model. The Embedded Finance entry channel can also be provided just as easily through the “Provider (Non-bank)”. Here, new customers or prospects with new touchpoints can connect to traditional banking services such as lending (core banking) and/or supplementary services like BBS, thereby increasing customer penetration. The legend has also been updated with the abbreviation “EF” for “Embedded Finance” as well as for artefact A10.

Figure 83. Solution Design BBE 3.0 (M3.1)



In the next section, the focus will be on the assessment of applicability, and both model variants will be compared with isolated consideration of step 2 (the scientific technical design) and the overall model, including all steps. When evaluating the model in isolation after step 2 (Figure 84), the experts state that the “Usefulness” is rated as yes and rather yes by 70% of the responses, neutral by 20%, and no by 10%.

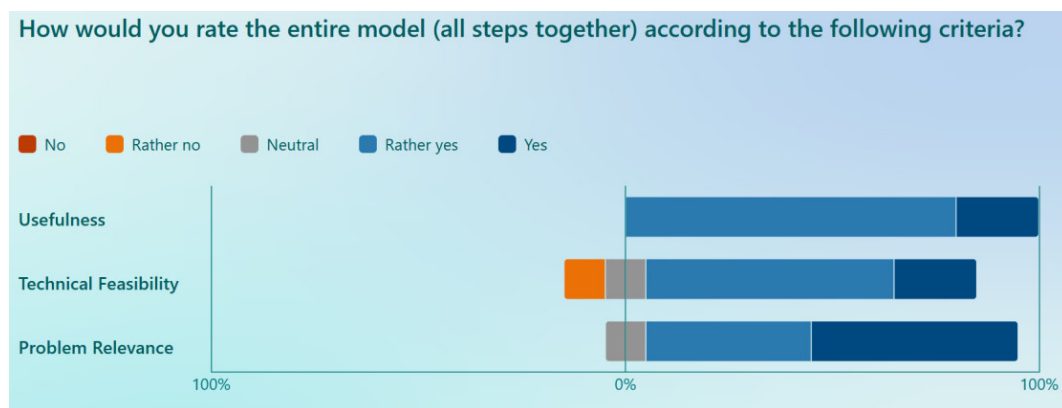
Figure 84. Expert Survey Results: Assessment of Applicability (Step 2)



The “Technical Feasibility” is rated at 60% as rather yes and yes, also 20% neutral, and 20% as rather no. The “Problem Relevance” is rated the highest with 70% as rather yes and yes, and 30% neutral. It can thus be concluded that the majority has verified all criteria for the model in step 2.

Now, when the same question is asked about the entire model (all steps together), an even more positive picture emerges based on the evaluation of the same criteria (Figure 85). The “Usefulness” of this model is rated with 20% as yes and 80% as rather yes. The “Technical Feasibility” is rated with 80% as rather yes and yes combined, and 10% each as neutral and rather no. The “Problem Relevance” is seen with 90% as yes, or rather yes, and 10% as neutral. It can thus be concluded that the overall model performs significantly better in all three criteria than the model with the isolated scientific and technical dimension. This is probably due to the additional context and information regarding the implementation of BBE (3.0), which, on the one hand, supports decision-making at the management level for such a project, and on the other hand, provides understanding and convincing arguments with storyline and customer journey for the experts, who, even if they have technical know-how, all hold senior, lead, or management/C-level positions.

Figure 85. Expert Survey Results: Assessment of Applicability (All Steps Together)



In the previous evaluation cycle Eval 3, the three realities to be observed — “real tasks,” “real systems,” and “real users” — were individually assessed in the focus group according to Walls et al. (1992). Now, in this cycle, it is determined to what extent these three realities, in their interplay, reflect the organizational context

(Sonnenberg & vom Brocke, 2012). The result (question 5) is 3.90 out of 5 possible points, which, when rounded up, corresponds to “rather yes.” Of the experts, 30% answered yes, 30% answered rather yes, and 40% answered neutral. This result also aligns with the statements from the focus group experts in Eval 3 (category 5 “Observable ‘realities’”), where all realities were also validated as given (despite further additions and criticisms) concerning the design M3 that was being evaluated at that time.

In the last part of this survey section, the two model variants (step 2 and all steps) are compared in terms of how likely experts can imagine using the model in their own company (bank) or other companies (banks). The model variant (step 2) is rated with an average of 3.10 out of 5 (question 6), with 10% of experts saying yes, 30% rather yes, 30% neutral, 20% rather no, and 10% no. When considering the entire model overall, this value increases to 3.80 (question 7), which leans more towards rather yes overall. Here, 20% of experts responded with yes, 50% with rather yes, 20% neutral, and 10% rather no. This trend can also be consistently reflected in questions 3 (step 2) and 4 (all steps), where the step 2 model variant was rated weaker than the overall model.

In the third survey section, the focus is on measuring BBS and (banking) ecosystems using relevant KPIs. Here, 20 KPIs (Figure 86) were identified, consisting of all 18 KPIs from the “Measures/KPIs” overview, supplemented by two additional KPIs: “Multi-Service Usage Rate” (number of services used per customer) and “Service Penetration Rate” (percentage of customers who use at least one BBS) from the KPI list (see appendix).

Figure 86. Expert Survey Results: Evaluation of KPIs



The following top 3 KPIs can be filtered out, which experts consider to be particularly important for measuring BBS and (banking) ecosystems:

1. Adoption Rate (also opt-ins) with 50% considered important, 40% rather important, and 10% neutral.

2. Bank satisfaction is 40% important, 40% rather important, and 20% neutral, while the Conversion Rate is 70% important, 20% rather important, and 10% rather not important.

The top 3 least important KPIs are therefore listed:

1. Number of BBS introduced per bank: 30% not important, 10% rather not important, 40% neutral, and 20% important.
2. Support requests rate with 10% not important, 30% rather not important, 30% neutral, and 30% rather important.
3. Average implementation time with 30% rather not important, 50% neutral, and 20% rather important.

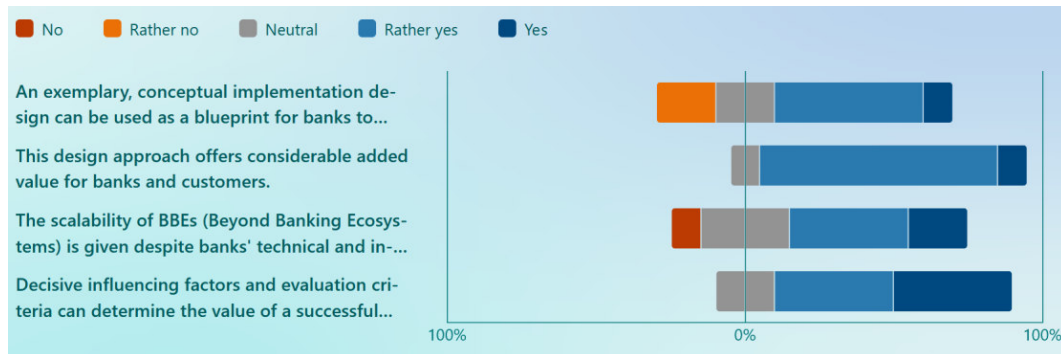
Therefore, it can be said that for experts, the acceptance of BBS, with an increase in opt-ins and direct revenue success (conversions), as well as bank satisfaction, acts as an indirect indicator of reputation and is the primary KPI. Meanwhile, the average implementation time and support effort should be viewed as secondary, potential cost drivers.

In question 9, the experts also mentioned additional relevant KPIs that were not previously listed. These mentions can be divided into two groups. The first group includes KPIs that determine the value of ecosystems. These are the number of users, number of service providers, number of services, length of stay on the platform, willingness to leave other existing competing platforms, and the time from first contact to completion. The second group includes KPIs that directly determine revenues or measure financial impacts, such as ROI (Return on Investment), ARR (Annual Recurring Revenue) (de Oliveira et al., 2025), commission revenues, or average revenue per customer for the supplier and the bank, as well as the increase in revenue per customer after using BBS. Additionally, the Customer Effort Score (CES) can be mentioned, which measures the effort customers must put into interacting with a company or resolving an issue.

In the last section, hypotheses H3.1 and H3.3 to H3.5 are re-verified, which were initially verified with the experts in Eval 2. However, it should be clarified that direct comparability is not guaranteed, as Eval 2 involved four experts and Eval 4 involved nine experts, three of whom participated in the Eval 2 cycle. Nevertheless, it may indicate a trend and/or confirm the result. In the following

Figure 87, the four hypotheses are evaluated. The experts mainly verify all four hypotheses.

Figure 87. Expert Survey Results: Hypotheses Verification



The hypothesis H3.1, “An exemplary, conceptual implementation design can be used as a blueprint for banks to align scalable Beyond Banking Ecosystems strategically,” received 10% yes, 50% rather yes, 20% neutral, and 20% rather no. In Eval 2, however, two votes were for yes, one for no, and one abstention, which can be transferred to the result of Eval 4 with a similar distribution.

The hypothesis H3.3, “This design approach offers considerable added value for banks and customers,” received 10% yes, 80% rather yes, and 10% neutral. In contrast, in Eval 2, it had two yes votes, one abstention, and a nuanced opinion for certain target groups (business analysts with yes, management with no). In Eval 4, a more positive voting pattern emerges, indicating that the design has been able to generate greater value for banks and customers across the evaluation cycles.

The hypothesis H3.4, “The scalability of BBEs (Beyond Banking Ecosystems) is given despite banks' technical and infrastructural challenges,” is rated with 20% yes, 40% rather yes, 30% neutral, and 10% no. In Eval 2, however, it received one yes vote, one no vote, a limited perspective, and one interpretable rather-yes vote. This picture generally applies to the evaluation in Eval 4, although the distribution there is somewhat more positive.

The hypothesis H3.5, “Decisive influencing factors and evaluation criteria can determine the value of a successful BBE,” received 40% yes, 40% rather yes, and 20% neutral responses. In Eval 2, there was one yes vote, one non-vote

(interpreted as an abstention), and two votes with rather yes that were weighted. Therefore, the results from Eval 2 can be applied to the outcome of Eval 4 despite the low response rate, although the overall result of Eval 4 is slightly better.

In summary, it can be said that the M4 model, after completing the final Eval 4 cycle, has been sufficiently verified regarding applicability across various criteria and the hypotheses H3.1 and H3.3 to H3.5 overall. Notably, but not surprisingly, the overall model with context knowledge and information shows a higher acceptance value among experts than the purely scientific, technical model (step 2). The theoretical saturation of the scientific, technical model tends to increase with each evaluation stage, with the best saturation occurring between Eval 2 and 3. Finally, the combined overall model M4 can be represented as follows (Figure 88, Appendix 27 and 28). The slide “Introduction and success factors” was updated with the textual addition of the embedded finance approach, and the slide on the scientific-technical design was updated with the addition of artefact A10 “Embedded Finance” to the “Design M4 (scientific/technical).”

Finally, for traceability, a versioning overview of all evaluation levels across maturities is listed in Table 73. For each evaluation level, the maturity levels from M0 to M4 and their sub-versions are described explicitly according to the model variant, versions, changes/new features, evaluation type, and feedback source.

Figure 88. Final Compiled Solution Design BBE 3.0 (M4) after Expert Survey

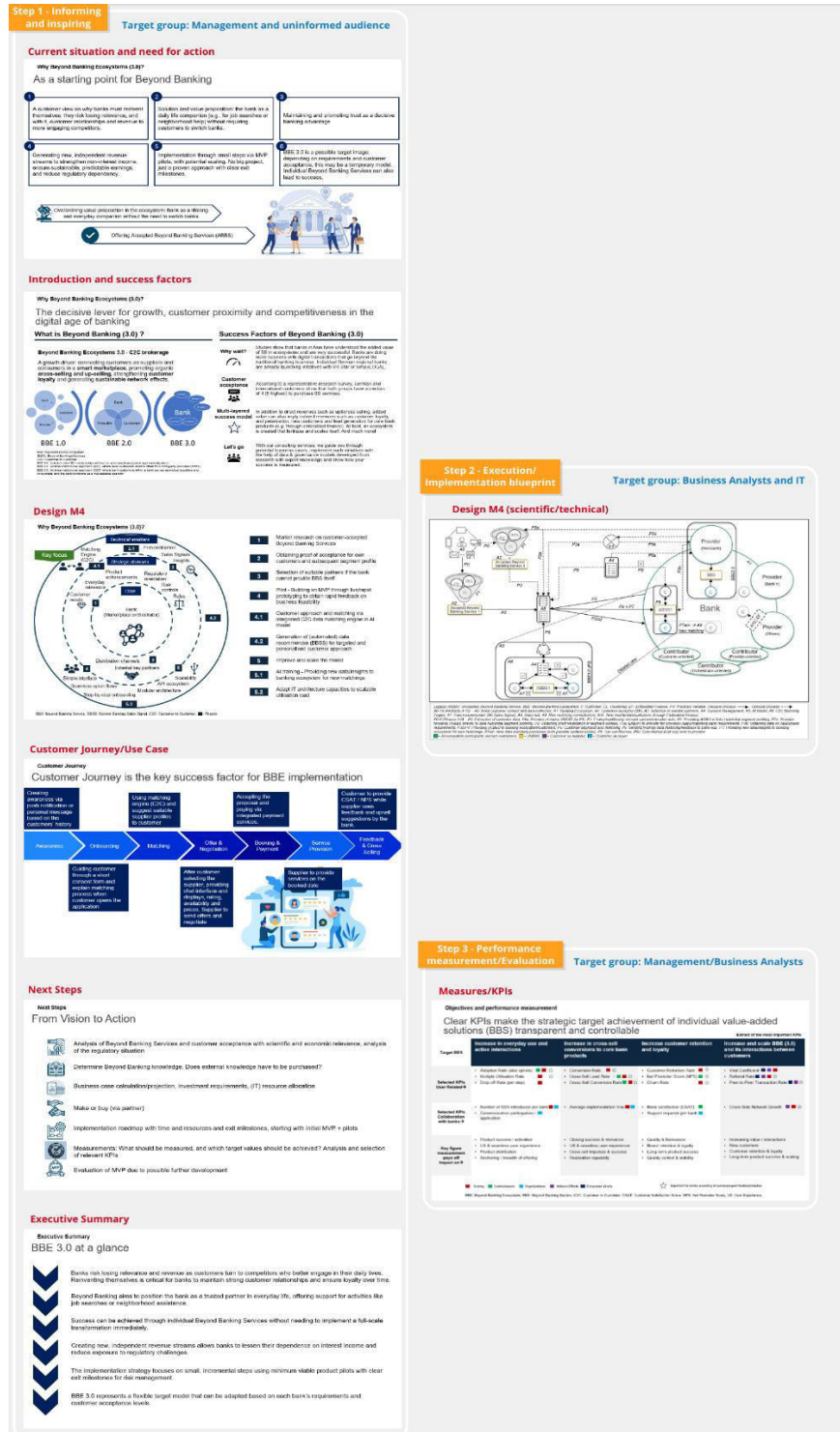


Table 72. Version Overview by Maturity Level

Cycle	Model variants	Version	Maturity level	Changes/New features	Evaluation type	Feedback source
Eval 1		M0	Reference model	Basic model according to Burkhalter (2020)	Literature research/analysis	Literature/scientific publications
		M1	Initial concept	Rough initial draft based on the design specifications (artefacts and phases)	Studies, case studies, expert interviews, survey	Literature/scientific publications, 3 case studies, 10 experts, 584 survey participants
Eval 2		M1.1	Initial concept with artificial evaluation	Artifact A12 added, phases changed/supplemented	Artificial evaluation through self-critical reflection on the current design	Self-reflection, Venable (2006)
	Scientific/technical path	M1.2st	Scientific/technical meta-model (low fidelity) for business analysts/IT experts	Customer initial touchpoints A0 and P0, expansion of provider phases P0a and P2a, establishment of opt-out process P8(a), new new data matching process P7a/n, addition of details and labels, addition of legend with detailed artefact and phase descriptions	Expert interviews	4 experts
		M1.21st	Colour coding of the meta model	Participants and interactions highlighted in different colours	Expert interviews	4 experts
	Management path (M1.2mx)	M1.2mi	Information basis for management	Introduction overview to BB (3.0) and success factors addressed to management	Expert interviews	4 experts
		M1.2md	Simplified model for management	Selection of a memorable, three-layered, radial diagram as a template with phase descriptions	Expert interviews, literature research/analysis	4 experts, Adner (2017), Talmar et al. (2020)
		M1.2m m	Objectives and performance measurement	Development of a relevant KPI overview page based on the importance of banks and framework factors	Expert interviews, literature research/analysis	14 experts, Schüler & Petrik (2023), Steinhardt (2024), Theodorakopoulos et al. (2025) and Wirtz et al. (2019)
		M2	Compiled Solution Design BBE 3.0 (ready for applicability)	Compilation of all models and designs in an overview with the addition of a fictitious constructed artefact	Formative evaluation	Self-reflection, own presentation
	Eval 3	Compiled solution design	M2.1	Compiled Solution Design BBE 3.0 after initial evaluation	Addition to slide "Current situation and need for action", inclusion of regional use cases in M1.2mi, visual improvement of M1.2md, new slide "Next Steps", new slide "Executive Summary", KPI slide placed as last slide in the ranking. Fundamental repositioning of all slides in the overview	Focus group
M2.2			Validation of applicability through constructed artefact (prototype = proof of applicability)	Conversion of the tabular constructed artefact into a visual customer journey, inclusion of new artefact A10 "Embedded Finance"	Focus group, constructed artefact in artificial setting	6 experts from the entire pool of 14 experts, Sonnenberg & vom Brocke (2012), Venable (2006)
M3			Compiled solution design BBE 3.0 after second evaluation	Updating and reorganising the compiled model, grouping the slides into three sequences/areas	Formative evaluation	Self-reflection, own presentation
Eval 4			M3.1	Validation for applicability (proof of usefulness)	Addition of "embedded finance" in the slide "Introduction and success factors", final positioning of artefact A10 in the model, verification of testable propositions (hypotheses)	Expert survey, final instance of artefact in naturalistic setting
	M4	Final compiled solution design BBE 3.0 (applicable and useful)	Final update of the compiled model	Formative evaluation	Self-reflection, own presentation	

Furthermore, this overview also makes transparent that starting from M1.1, the model splits into two paths: the scientific/technical path with M1.2st and M1.21st, and the management path with M1.2mx. With M2, these two paths are combined into a compiled solution design, and from that point onward, this variant is maintained.

4.5.6. Overall Evaluation of the Concept Model

The purpose of this structured reflection is to evaluate the artefact's quality, the suitability of the evaluation, and the significance of the generated knowledge, as recommended by Gregor & Hevner (2013), to accurately position and assess DSR contributions. First, a structured artefact reflection takes place, which confirms that weaknesses have been identified. Under the Eval 2 cycle, "Evaluation design specifications" under the subcode "Artefacts," all experts initially describe that the artefacts are understandable, have a logical contextual meaning, and represent an overarching overall fit. In the next subcode "Processes/Phases," the phases are rated as comprehensible, coherent, and appropriate. The model is regarded as a meta-model and can be used as a blueprint, which is to be addressed to business analysts and IT experts. The evaluation criteria of feasibility, accessibility, comprehensibility/meaningfulness, clarity, simplicity, completeness, internal consistency/correctness, and applicability are mainly considered in relation to the scientific technical model.

Under Evaluation 3, the first slide, "Introduction to BBE 3.0 and its success factors," is positively rated because it provides a clear overview of the benefits of an ecosystem. The phase descriptions of "Simple visualization for the implementation of a BBE 3.0" are rated as excellent. The significance of the model is now confirmed through its simplified design, and the value the bank can offer to customers within this framework is better understood. The evaluation criterion "Clarity" is considered to be met under "Evaluation criteria for design M1.2 (Management)." Similarly, according to Walls et al. (1992), the observed "realities" are mostly viewed as a sum of subsets related to "real tasks," "real systems," and "real users," using the constructed artefact, and the "Purpose" and "Scope/area of application" are also deemed satisfied.

Under Evaluation 4, both the isolated model (step 2) and the overall model, considering all steps in terms of “Usefulness,” “Technical Feasibility,” and “Problem Relevance,” are verified, even though the scientific and technical model scored lower in the overall assessment. The interaction of the three observed realities is also viewed positively with 3.90 out of 5 possible points (“rather yes”). Regarding the potential use or application of the model, the overall model (all steps) is also positively rated with 3.80 out of 5 points (“rather yes”).

The evaluation revealed that the conceptual model was perceived as clear and relevant by most experts, particularly in terms of its applicability to real-world problems. This confirms the demand for “Problem Relevance” as a central DSR requirement (Hevner et al., 2004).

The limitations of artefact reflection include some elements of the model being deemed too broad or open to interpretation, suggesting a possible weakness in semantic quality. To follow the recommendation of Moody (2003), the correctness and the internal as well as external consistency were examined and evaluated. However, the semantic completeness was not explicitly assessed or thoroughly documented as a criterion. Instead, understanding questions regarding the connotation, accuracy, and reliability of the meaning of data, texts, or information within the model was directly clarified bilaterally through understanding questions posed by the experts during interviews or focus groups.

Under Evaluation 2, the demand for a simple, easy-to-design model was voiced relatively quickly, as the scientific and technical design was complex and could only be understood through a detailed description of artefacts and phases, which was later included in the legend during Evaluation 3. Additionally, the contextual factors were either without functions, misleading, or overlooked under Evaluation 2, but were removed in Evaluation 3 and then considered and addressed under the KPI overview.

Early on, the challenge became apparent: it is not possible to incorporate all artefacts, additional enhancements, and expert requests into a single model. Models are simplified, abstract representations of an original (Dirks & Knobloch, 2008) that emphasize specific features and serve a particular purpose. New overviews and slides were created that again cover and address specific topics such as KPIs with the surrounding factors in an isolated manner. A compiled overall

overview can thus represent a complex information and contextual structure and simultaneously target different audiences.

While the compiled overall model under Eval 4 was rated quite positively at 3.80 points (out of 5), the purely scientific, technical model under step 2 was only rated at 3.10 points. This is not particularly negative, but it should also be considered neutral.

The methodological reflection is now addressed on the second level of reflection. The evaluation comprised both formative methods, such as expert feedback, interviews, and prototype testing using constructed artefacts, and summative methods, like an expert survey. This approach follows Venable et al.'s (2017) recommendation to employ multiple complementary evaluation types within the FEDS framework (Formative, Ex-ante, Design Process, Summative). This underscores the methodological diversity, which is further explored through different settings to shed light on various perspectives and insights. For example, within the focus group format, new, reflective, or aggregated content can be generated through the discussion framework derived from group dynamics.

Despite the variety of methods used, external validity is still limited because the evaluation targeted a specific group. This supports the challenges mentioned in Pries-Heje et al. (2008) about how well DSR evaluations can be generalized. The test of generalizability is consistently confirmed by observing the theoretical saturation from Eval 2 to Eval 3 in the scientific-technical design (M2 to M3), as here the external validity is strengthened through the focus group with a different circle of six experts—three from the Eval 2 cycle and three new experts.

At the same time, it should be noted that all selected experts possess professional experience and skill sets that make them subject matter experts at this level of Beyond Banking, Open Banking, and Ecosystems, holding senior and lead positions up to C-level in banking. It is also worth highlighting that the reference model M0 according to Burkhalter (2020) is built on a solid scientific and well-founded knowledge base provided by recognized experts in Financial Services from the Competence Center Ecosystem partner community at the University of St. Gallen. Additionally, 6 of the total 14 experts involved in this thesis are also participants in this Competence Center, allowing this knowledge to be further carried forward and integrated into subsequent evaluation cycles.

Another point is the mixing of experts between the evaluation cycles. Different experts offer diverse viewpoints (e.g., practical experience versus scientific theory), enhancing the depth of reflection and ensuring greater validity (Venable et al., 2017). Moreover, involving the same experts repeatedly can reinforce “groupthink,” leading to confirmation bias as they might think, “we have already said that before.” Introducing new voices helps bring fresh criticism and perspectives. Thus, by mixing in new experts while simultaneously maintaining a continuous portion of the expert pool (about 50%), the comparability and continuity of the evaluation results could be ensured within the specific context of BBE 3.0.

In the next level of reflection, the design cycle, as well as the knowledge generation, will be questioned. The iterative process of evaluating and refining artefacts at each maturity level, including full and sub-versions, captures a complete DSR cycle (Design–Build–Evaluate). This approach aligns with Peffers et al.'s (2007) DSRM (Design Science Research Methodology), which emphasizes multiple feedback loops. It also corresponds with the DSR Evaluation Process outlined by Sonnenberg & vom Brocke (2012), featuring four activity cycles with both ex ante and ex post evaluations. This evaluation process has been selected as the primary methodology for this thesis. Furthermore, a formative evaluation was conducted with each completion of an evaluation cycle to incorporate improvements and insights directly into the revision and to prepare for the next evaluation stage.

In addition to optimizing the artefact, it is also possible to extract design knowledge such as heuristics and modeling principles, which is a key objective according to Gregor & Hevner (2013). The first learning point is the necessary addition of further overviews and slides to the scientific model M1.21st, in order to enrich the model with additional context and information, and to reach other target groups, such as management. This target group must be informed, inspired, and convinced of the initiatives to be implemented first. A well-prepared storyline and storytelling, with logical transitions, as well as a preferred customer journey constructed as a visualized artefact to support the model's applicability, are not only equally crucial but should also be communicated early on to evaluators or experts during the evaluation cycles.

Another design principle is the consideration of potential (new) technologies that could significantly alter the customer journey or value chain of a model. For example, a natural person may no longer interact directly with a website but instead have an agent act on their behalf, which can be adapted to the context beyond banking and ecosystems. These technologies should be declared before the initial evaluation within the model and considered as an open (architecture) approach. Otherwise, the model should be designed in such a way that new technologies can be easily integrated, such as an API-first strategy or the embedded finance entry channel, to enable more efficient model design with evaluators from the start and to identify potential modeling gaps early on.

Additional heuristics and design principles can be applied to the scientific-technical model. Here, preliminary phase descriptions in both models are important for understanding and help mitigate the need for explanations or follow-up questions. The scientific-technical model implies a detailed description in advance (in the legend), whereas in the simplified model, a brief, summarized phase description is sufficient. It is also important that all participants in the ecosystem are assigned a task or at least interact within the model context; otherwise, their existence in the model is unjustified and can cause confusion for evaluators. This also applies to all other artefacts and constructs of the model being developed.

Furthermore, a helpful heuristic can be to imagine the model more frequently throughout the entire lifecycle and to go through it mentally step by step. Because the processes should be thought through until the final process and included in the model, such as the missing opt-out process P8(a) or through a potential looping logic P7a/n, where a process can be repeated n times. Lastly, grouping the overall model into rankings or thematic areas can provide the evaluator with spatial, temporal, or logical orientation.

If mixing experts between evaluation cycles is not desired due to the goal of maximum comparability and continuity in the quality of evaluation, then a consistent, representative group of evaluators should always be chosen as the design method for summative validation of artefacts (Gregor & Hevner, 2013; Peffers et al., 2012; Venable et al., 2017). Mixing evaluators makes sense if a

formative improvement of the artefact or a long-term assessment (partially maintaining the same group but supplementing with new members) is aimed for.

In the final reflection level, the limitations and generalizability of the model are addressed. An argument for a potentially limited transferability of the results is the artefact evaluation, which was primarily conducted in the German-speaking financial context (11 out of 14 experts). Venable et al. (2017) also highlight that the current generalizability to different industries or cultural contexts is limited, particularly in cases of summative evaluation within a narrow application setting.

Another argument is that the design was tested in artificial scenarios (with fictional data as a constructed artefact in Eval 3), but the real-world application context is largely missing. While Eval 4 (expert survey) provided an assessment of the applicability as potential use cases in banks by experts, the model has not yet been tested in „in vivo“ evaluations (real application situations) (Peffer et al., 2012), but only through less generalizable “in vitro” evaluations. From this limited depth of iteration, a research implication can be derived: the next step should involve documenting and evaluating real application situations. Future studies should validate the model in other environments to ensure external validity (e.g., through real-world scenarios or longitudinal studies). Meanwhile, the scientifically technical model (step 2), which, with 3.11 points, is particularly suited for scientific development and research, can serve as an accompanying blueprint during the development of real application scenarios and be gradually validated and adjusted over a more extended evaluation period.

4.5.7. Proposed Solutions and Recommendations for Action

After successful development and evaluation of the BBE 3.0 model, it will now be outlined how the design can be applied in practice and what the next steps are necessary for implementation. The overview “Next Steps” from the evaluated Design M4 can serve as a guide for operationalizing the artefact (implementation in practice) and providing recommendations for organizations (action options).

Accordingly, after the initial analysis of BBS, its acceptance, and regulatory situation, the technological implementation (platforms, interfaces, and systems) and process integration—meaning which business processes (e.g., product

development, customer interaction) the model can be integrated into—are also crucial considerations. Before developing the rollout strategy with pilot projects, phased implementation, and iterative adjustments, it is essential in initial communication to ensure the timely involvement of key actors and stakeholders for the project's success, as they typically bear financial and political responsibility for these projects within organizations and may need to defend them. Concepts such as Technology Transfer or Diffusion of Innovations by Rogers (2003) can provide approaches to facilitate the diffusion of the model. Thus, Rogers argues that diffusion is the process by which an innovation is communicated through specific channels over time among the participants in a social system.

Another recommendation regarding specific steps is to identify and anchor potentials and benefits (value proposition), which is fundamental but also tailored to each interested bank. This involves not only the initial identification of economic, social, or ecological advantages but also subsequent measurable value for success evaluation (see KPI overview under step 3). The goal is to establish an approach (Gregor & Hevner, 2013) that serves as a framework to drive conviction and performance measurement of BBE 3.0, and that undergoes a continuous cycle of evaluation and adjustment based on the measured results.

Another course of action is the allocation and development of competencies and roles related to BBE (3.0), which has already been explained in detail under Chapter 3.3.3., category “Acceptance and organizational effects.” Additionally, an optional cooperation strategy with FinTechs or data platforms may be essential in terms of the “Make or Buy” strategic approach, especially if the bank itself cannot provide these services or if outsourcing proves to be more cost-effective.

Other aspects that must not be forgotten are the risks and success factors to be identified. It must be made transparent what could hinder the success of the implementation. These can initially be fundamental obstacles such as technology, acceptance, and data protection, or specific corporate challenges. For a successful transfer of the artefact into the company, typical aspects such as top management support, data interoperability, legal and regulatory conditions, and digital maturity must be considered and, if necessary, implemented or expanded.

Building on the previous chapter regarding the research implications for further evaluation of real-world application situations, the model can potentially

be validated and adapted to other organizations, markets, or countries (Lee & Baskerville, 2003) in order to increase the generalizability and design transferability of the model (from the specific use case to the generic model). In this level of evaluation, it may be possible to determine which elements of the model are universal and which are context-specific.

V – DIMENSIONAL EXPANSION OF BEYOND BANKING ECOSYSTEMS

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Current developments in Beyond Banking primarily differentiate between intra-institutional ecosystems, such as internal data hubs for customer matching and BBE 3.0, and inter-institutional networks, including partner-driven service platforms and BBE 2.0. However, to unlock the full potential of customer-centric, data-driven financial services, these silos need to merge into a unified architecture that supports both internal and cross-institutional collaboration. This vision gives rise to what can be called Beyond Banking Ecosystems 3.x (BBE 3.x), which expands platform strategies by integrating intra- and inter-company perspectives. Further dimensional considerations of possible concepts beyond 3.x are also examined.

5.1. BEYOND BANKING 3.X: COMBINED VIEW OF AN INTRA- AND INTERCOMPANY ECOSYSTEM APPROACH

If the two concepts of inter-institutional (B2C) and intra-institutional (C2C) customer data matching are further developed and interconnected, multiple providers can be elevated to potential data suppliers, service providers, or supporters for bank customers who consolidate several related BBS into a higher-level service domain layer. BBE 3.x can thus embody a hybrid, multidimensional approach that combines:

- Intrainstitutional Data Matching (C2C): Using customer data from a single bank to coordinate service offerings.
- Interinstitutional Service Networks (B2C2C): Working with external partners, fintech companies, or service providers.
- Semantic Interoperability Layer: Shared ontologies, consent frameworks, and data governance mechanisms across banks.

This model presents a "Converged Ecosystem Layer" that guarantees:

- Consolidated customer profiles shared across multiple institutions.
- Cross-contextual personalization.
- Distributed service orchestration featuring modular integration points.

Building on this, multiple use case clusters can be created for BBE 3.x, each of which is understood as a separate, independent service domain. These can be designed as follows:

- Smart Housing: Here, the constructed artefact “craft services” (see also Scenario 2 from Chapter 3.3.6.2.) from Eval 3 of the DSR evaluation, as well as a joint ecosystem, enables localized green financing campaigns for homeowners based on partner energy data.
- ESG Impact Scoring: Consumer receives aggregated environmental impact ratings based on transaction data from multiple banks and third-party providers (as an extension of the CO2 footprint use case in Chapter 3.3.3.).
- Loyalty integration: Banks merge internal customer data with external merchant benefits to suggest highly personalized cashback offers (see MeinPlus).
- (Supra-)regional medication supply: Pharmacists and other medication providers, as well as demanders, can purchase products across bank borders (see Scenario 1 from Chapter 3.3.6.2.).

Due to this expansion of the combined approach, the technical and regulatory foundations need to be rethought and expanded. Accordingly, BBE 3.x requires:

- Federated Data Architectures: Facilitating data sharing without centralization through secure data rooms and federated learning (Long et al., 2021).
- Consent-as-a-Service: Fine-grained, portable consent mechanisms that align with GDPR and potentially upcoming standards like the European Digital Identity Wallet (EUDI wallet) (Ebadi Ansaroudi et al., 2025).
- Semantic APIs & Ontologies: Cross-bank data models and APIs, such as Open Banking and FIDA.
- Governance Frameworks: Expansion of clearly defined roles, value sharing, and decision-making rights among ecosystem participants (Jacobides et al., 2018).

An extended implementation of a hybrid model also requires consideration of strategic implications. Moving to BBE 3.x involves shifting from viewing banks as standalone platforms to seeing them as integrated players within a larger financial ecosystem (Alaimo et al., 2020; Jacobides et al., 2018). The opportunity resides in:

- Leveraging customer insights for monetization.
- Integration of comprehensive holistic (ESG) services and sustainability-related personalization.
- Managing customer lifecycles across multiple institutions.
- Modular bundling of services with third-party providers.

Now, suppose the explanations regarding BBE 3.x are aggregated. In that case, a layered ecosystem architecture (Ghanem, 2020) can be derived, which shows the following layers based on the intra-institutional (C2C), inter-institutional (B2C), and the overarching Converged Ecosystem Layer:

Layer 1 (bottom): Internal C2C Matching Engine

Layer 2 (middle): Interbank Service Connectors (e.g., APIs, consent layers)

Layer 3 (top): Converged Service Orchestration (e.g., ESG scoring, joint personalization)

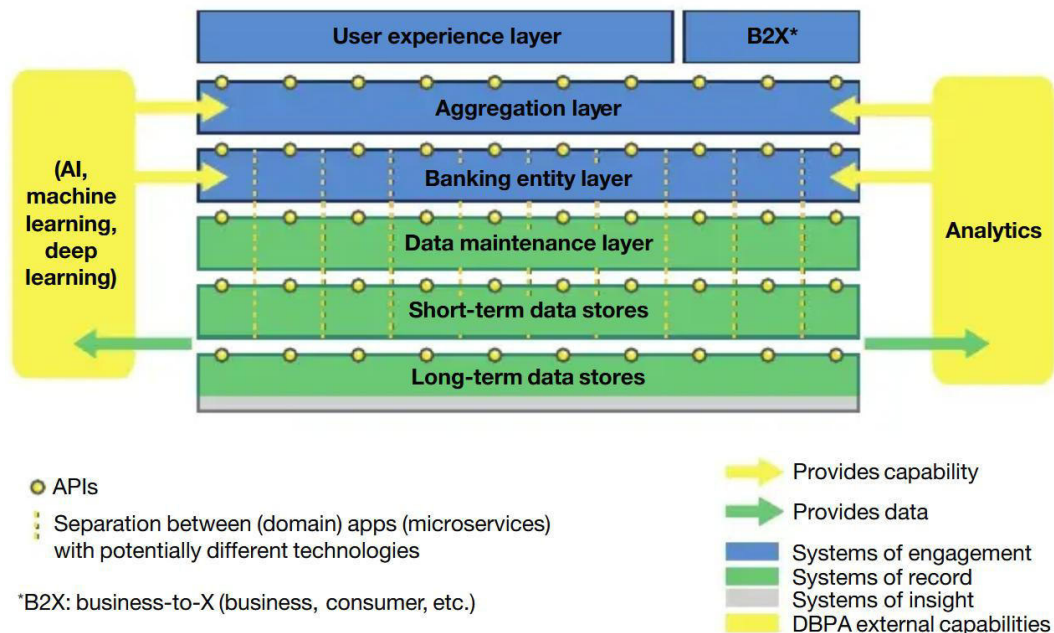
A recommended reference model for layered ecosystem architecture is Forrester's Digital Banking Platform Architecture (Forrester Research, 2020). The DBPA (Digital Banking Platform Architecture) is designed to organize digital banking ecosystems using a layered segmentation approach, which includes APIs, domain services, and aggregation levels. It explains how banks can attain flexibility by implementing microservices, APIs, and domain-focused layers.

This model (Figure 89) breaks down the architecture of digital banking platforms into multiple layers with specific roles, making it well-suited for illustrating a BBE 3.x system landscape:

- User Experience Layer (B2X) – Interfaces and Interaction Levels, such as with customers and partners.
- Aggregation Layer – Integrates multiple services and data sources.

- Banking Entity Layer – Core domain logic such as credit approval and C2C matching.
- Data Maintenance Layer – Handles Data Storage, Data Services, and Analytics.
- Data Stores (Short- and Long-term) – Strategies for data persistence and storage.

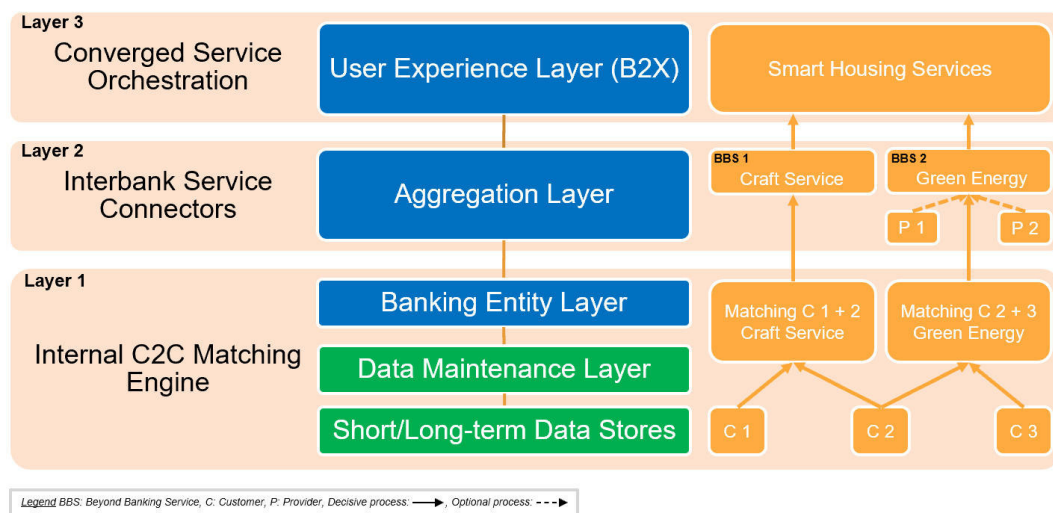
Figure 89. The Digital Banking Platform Architecture (DBPA) (Forrester Research, 2020)



The three-layer structure, the internal C2C matching engine, the interbank service connectors, and the underlying convergence layer can be translated and mapped onto the DBPA in a simplified form. Thus, “Layer 1 (bottom) Internal C2C Matching Engine” includes the DBPA layers “data stores (short/long-term)”, “Data maintenance layer” for accessing and analyzing potential customer data, and the “Banking entity layer” for the technical execution of C2C matching in a BBS. The “Data maintenance layer” here represents the various microservices for each individual BBS, where data of potential customer pairs is enriched, analyzed, clustered, and prepared for matching. Essentially, these microservices can also be further developed into AI agents. “Layer 2 (middle) Interbank Service Connectors”

encompasses the “Aggregation layer” for data exchange and delivery through necessary providers and harmonization of multiple suitable BBSs, which are aggregated into a service domain. “Layer 3 (top) Converged Service Orchestration” refers to the “User experience layer (B2X)”, where individual services are offered to customers or other partners through interactions. In the following Figure 90, this reduced representation of the BBE 3.x is transferred to the DBPA model. For better comprehensibility, the use case example “Smart Housing” is also included, along with the Converged Service Orchestration (Layer 3). This initially results from the individual C2C customer matchings of the craft service and green energy, which are then aggregated into BBS 1 and 2 in the second layer. If a provider is needed for the final deployment of a BBS, this can be used optionally to fulfill the BBS requirement. Finally, the two related BBS 1 and 2 are converged in accordance with the Smart Housing services and offered to the customer either individually or as a service package.

Figure 90. Translation of the Layered Ecosystem Architecture of BBE 3.x to the DBPA Model based on Forrester Research (2020)



From a DSR standpoint on Design Reflection and Theoretical Relevance, BBE 3.x exemplifies an exaptation of existing ecosystem logics (Gregor & Hevner, 2013). It demonstrates:

- Generativity: Ongoing innovation achieved through modular integration.
- Design Generalizability: Applicability in various banking environments and regulatory frameworks.
- Emergent Architecture: The co-evolution of socio-technical elements both within individual institutions and across multiple institutions.

The BBE 3.x vision naturally builds on the design trajectory set by BBE 3.0. It prompts reflection on the practicality of this convergence: How achievable is it? What obstacles might hinder its implementation? It should be noted that this is only a visionary concept based on logic and theory. An investigation using empirical and strategic evaluation lenses would be necessary for validation and could serve as a potential research implication for the future.

5.2. BEYOND BANKING 4.X ET AL.

This chapter compiles additional ideas and strategies for possible design directions of BBE 4.x. Various ecosystem strategies are also considered.

A relevant, topic-related value driver is privacy. Krabbe (2025) highlights that banks need to shift from providing just transaction services to offering privacy-first platforms, utilizing technologies such as MPC (Multi-Party Computation). These allow for personalized services without revealing customer data. For banks, this approach opens up new revenue opportunities via trust-based ecosystem collaborations.

Another key value driver, fueled by AI and focused on enhancing UX, is hyper-connected banking. Gnatenko (2025) states that the next phase of development will feature AI, multimodal interfaces, and proactive intelligence, creating a seamless experience that anticipates customer needs.

If the focus is now placed on the dimensional level of additional potential actors and channels, the Golden Triangle of Ecosystems (Fasnacht, 2021, 2023) from Chapter 3.3.2.10. is a promising approach. The approach of Alibaba, Tencent, etc., shows how banks create new platform models by combining finance, social media, and commerce (primarily e-commerce), which is relevant as a template for BB 4.x to integrate additional actors (e.g., mobility, education, energy). Hasselwander &

Weiss (2025) also analyzed the same three categories as the most in-demand categories in the European context of super apps. Their “findings indicate that super app providers should work to strategically integrate highly demanded services rather than focusing on the incorporation of an increasingly wide array of features” (p. 1, para. 1). This is also confirmed by the foresight of expert 11 (from Chapter 4.5.4., Eval 3), who states that BBE 3.0 is a temporary phenomenon and points to the next possible development stage 4.0. In the future, BBE 4.0 could exist, where the bank is one of many banks in the ecosystem and services are offered inter-institutionally without changing banks. Expert 13, in the same Eval 3, mentioned the consideration and integration of large corporates like Siemens into the banking ecosystem to promote B2B, which aligns with the approach of multi-platform integration strategies (Schrieck et al., 2023). Here, it must be considered how the integration strategy should be implemented and what the role model should look like. Customers of Siemens could simultaneously act as private and business customers, as new clients for C2C matching, or as providers for the provision of BBS. Another merging strategy could also be a higher-level umbrella organization where banks and other ecosystems come together, or a bank acts as the sole orchestrating entity, organizing other providers and banks under it (Super-App).

One possible expansion could be an increasing customer penetration of embedded finance (Finken & Hensen, 2025). This entry point to the bank can be further penetrated, for example, through the increasingly used digital twins in metaverse worlds (Omarini & Rakhmatullina, 2025) via microcredit lending or within the influence of digital currencies (core banking) or virtual products in NFTs (non-fungible tokens), or through rewards and vouchers for content usage (beyond banking) in the metaverse. In this context, Omarini & Rakhmatullina (2025), in their research on value creation in metaverses, refer to the Service-Dominant Logic (S-D Logic) by Vargo & Lusch (2004). This paradigm explains how actors within a dynamic service ecosystem link their resources and exchange mutually beneficial services — resembling an endless, constantly evolving ecosystem („ad infinitum“) or one without clear boundaries („impuratus“). As a result of the research, Omarini & Rakhmatullina (2025) have created a conceptual framework “which classifies the value generated through the utilization of the metaverse” (p. 324, para. 2). According to Accenture (2022), the relevance of the Metaverse as a new channel is

increasing. “Some 47% of bankers believe that customers will use AR/VR as an alternative channel for transactions by 2030” (para. 16).

VI – RESULTS

VI - RESULTS

The following chapter summarizes the results and findings. The main results are structured according to the order of the research questions RQ 1 – 3 in Chapter 1.2.2. and the corresponding hypotheses in Chapter 1.3. Secondary results and additional findings, which do not directly validate the hypotheses but provide valuable and noteworthy complementary insights, are summarized below.

To illustrate the results, Table 74 is provided. It shows, for each RQ, the hypotheses along with their corresponding evaluation type and relevant chapters that document where the findings for verification or falsification are recorded. The hypotheses and RQs are therefore evaluated as follows: RQ1 “How can combining intra- and inter-institutional customer data matching improve the sizing and scaling of Beyond Banking Ecosystems in the financial sector?” is verified overall, like the other two RQs, through the sum of the hypotheses to be verified and any additional research findings.

H1: There is substantial revenue potential for Beyond Banking.

Through literature analysis of the national market (Chapter 2.3.1.1.) and international market studies (2.3.1.2.), it was found that Beyond Banking brings the business model of banks as a general everyday provider (Sancar & Sgardelli, 2021), competitive advantages, and network effects (Bauer, 2020; Becker et al., 2020). The integration of new ecosystem third-party partners enables new revenue streams and the acquisition of new customers. Additionally, in Chapter 3.3.3., expert interviews largely confirm the potential through an assessment. Using an inductive category application according to Mayring (2022), new subcodes such as “Indirect Revenue Potential,” “Data-driven Sales Opportunities,” and “Diversified Beyond-Banking Services” were identified, clearly highlighting additional value and the potential of Beyond Banking. Therefore, H1 can be verified.

Table 73. Primary Results Regarding the Hypotheses

Hypothesis	Verification/ Falsification	Evaluation type	Relevant chapters
H1	verified	Literature analysis, expert interviews	2.3.1.1., 2.3.1.2., 3.3.3.
H1.1	falsified	Literature analysis	2.2., 3.1.
H1.2	falsified	Literature analysis, case studies, expert interviews	3.1., 3.3.2.3.1., 3.3.2.4.1., 3.3.2.4.2., 3.3.2.5.1., 3.3.2.5.2., 3.3.3.
H1.3	verified	Literature analysis, expert interviews	1.2.1., 3.3.3., 3.3.6.1.
H1.4	verified	Expert interviews, case studies, survey	3.3.1.2., 3.3.3., 3.3.4.1., 3.3.4.2.
H1.5	verified	Survey	3.3.4.2.
H1.6	verified	Survey	3.3.4.2.
H2	verified	Literature analysis, expert interviews	1.1., 3.3.3.
H2.1	verified	Expert interviews	3.3.3.
H2.2	verified	Expert interviews	3.3.3.
H2.3	falsified	Expert interviews	3.3.3.
H2.4	falsified	Expert interviews	3.3.3.
H3	verified	Expert interviews	3.3.3.
H3.1	verified	DSR expert interviews (Eval 2), focus group (Eval 3), expert survey (Eval 4)	4.5.3.
H3.2	verified	Literature review	1.2.1.
H3.3	verified	DSR expert interviews (Eval 2), focus group (Eval 3), expert survey (Eval 4)	4.5.3.
H3.4	verified	DSR expert interviews (Eval 2), expert survey (Eval 4)	4.5.3.
H3.5	verified	Literature analysis, expert interviews, DSR Eval 1-4	3.3.3., 4.4., 4.5.3.

H1.1: There are no academic readings or research findings for the Ecosystem 1.0 and 2.0 banking industries.

This hypothesis was explained solely through a literature review. In Chapter 2.2. (Liang & Savage, 1990), it was historically demonstrated that manual transactions beyond traditional banking were already conducted (Level 1). Only

with the emergence of Open Banking (Goodale, 2012; Zhu et al., 2016) were the business relationships and their derived trade and data flows mapped within a digital infrastructure (Level 2), leading to the development of inter-institutional approaches (B2C) where bank customers receive offers from third-party providers (TPPs). However, it should also be noted (Chapter 3.1.) that some business structures already pointed toward BBE 2.0 with an inter-institutional approach before the implementation of PSD2 (Chadaeva, 2019; Omarini, 2018; Zachariadis & Ozcan, 2017; Zhu et al., 2016), depicting bilateral contractual relationships between banks and TPPs, allowing bank customers to access the services of TPPs. Therefore, Hypothesis 1.1 is clearly falsified.

H1.2: There is no comprehensive review at Ecosystem Level 3.0 with an intra-institutional approach, where a C2C business model is used, and the bank functions as a market orchestrator.

In the same Chapter 3.1., it was further explained that the newer phenomenon BBE 3.0, with an intra-institutional approach (Knörrer et al., 2021), has become particularly evident in recent years among cooperative banks. Additionally, especially in market research related to regional banks (3.3.2.6.) and case studies (3.3.2.7.), various examples of a C2C approach (3.0) can be identified, such as the company VR Star (n.d.) and simplyLOCAL (n.d.).

From an international perspective, successful examples in market research (3.3.2.9.) include DBS Bank from Singapore with the car marketplace (Alame et al., 2020) and TBC Bank (2021) from Georgia with their ecosystem brands in the areas of Housing, Lifestyle, E-Commerce, and Auto. Additionally, the case studies of Chinese companies Alibaba with Taobao and Tencent with its WeChat super app, as well as Twint as a Swiss phenomenon (3.3.2.10.), vividly demonstrate how entrepreneurial dominance is successfully expanded in their respective markets based on the golden triangle of trade (mostly e-commerce), social media, and finance.

What has already developed at the regional bank level in Germany into BBE 3.0 and is observed internationally, especially in the Asian market, as very dominant and already proven, was not confirmed by the experts in interviews. Here, 7 out of 10 experts (Chapter 3.3.3.) say they have no experience with BB 3.0 and are not familiar with this concept. In summary, despite the experts' statements,

the hypothesis can be falsified based on various successful projects on the Asian market using BBE 3.0 (C2C).

H1.3: Customer-to-customer matching (C2C) has not yet been implemented using data analytic methodologies for Beyond Banking projects.

In Chapter 1.2.1., the methodologies for Customer Data Matching and Customer Profiling using Data Analytics and AI were discussed collectively (Bartels, 2022; Bhatnagr et al., 2024; Boulenger et al., 2022; Mochalina et al., 2023), including how they are used to develop Banking Ecosystems. However, it was not explained which Data Analytics methods are explicitly and step-by-step implemented for this matching, nor was a direct reference identified to intra-institutional C2C matching for Beyond Banking Ecosystems. This was also confirmed by the expert interviews, where no consistent or coherent implementation was observed. Therefore, in Chapter 3.3.6.1., the hypothesis has already been verified, and an exemplary customer matching approach (C2C) using Data Analytics methodologies has been developed.

H1.4: The market accepts a scaled Beyond Banking Ecosystem and the associated customer data matching (from level 2.0).

The acceptance of a scaled BBE is given. This is initially reflected in the Atruvia Case Study (3.3.1.2.), where such an initiative is supported within the corporate group, for example, amberra as a venture-building studio (Rejmanowski, 2024) focuses on creating a beyond-banking ecosystem that includes services related to sustainability, health, and regional economies, or the MeinPlus program introduced a cashback feature integrating account services, payment cards, and the benefits program (DG Nexolution, 2024; MeinPlus, 2024).

The responses of the experts (Chapter 3.3.3.) present a mixed picture. Acceptance depends on the customer's level of knowledge, as well as the added value they receive. On the bank's side, the minimum requirement of the decision-maker is crucial for acceptance. Furthermore, various studies confirm the acceptance of open and beyond banking services (Chapter 3.3.4.1.). Here, performance expectancy, effort expectancy, social influence (Chan et al., 2022; Dowers, 2023), stickiness to traditional banking, customers' preference for their bank, initial trust, perceived risk, financial literacy (Iman et al., 2023), usefulness, ease of use (Marzouk, 2021), privacy, and trust in financial institutions (Polasik &

Kotkowski, 2022) are the most decisive factors and variables for the adoption of beyond (open) banking services.

In a representative survey on the acceptance of BB services from the perspective of national (Germany-wide) and international bank customers (Chapter 3.3.4.2.), sub-hypotheses were developed based on various variables:

For “Age” H1.4.1: The acceptance of beyond banking services occurs among young participants. This hypothesis has been verified.

For “Education” H1.4.2: The acceptance of Beyond Banking services occurs among educated participants. This hypothesis can only be partially verified in the results due to various tendencies, with a V-shaped probability increasing with higher levels of education.

For “Income” (based on the assumption that a higher educational attainment suggests higher income) H1.4.3: Acceptance of Beyond Banking services occurs among participants with higher income. No usable results could be demonstrated for this hypothesis due to the lack of statistical significance or varying relevance across different samples and target variables that could verify the hypothesis.

Due to the absence of constant necessary significance levels across all sample sizes and the stratified and more complex target variable analyses, logistic regression could not be the most suitable methodological choice. Instead, the Mann-Whitney U test was used to initially identify differences between two independent groups, “German” and “International” samples. The results show that for BB 2.0, the “Germans” have a purchase intention with a mean value of 3.46 out of 5 points (median 4), and the “Internationals” have a mean value of 4 (median 4). For BB 3.0, similar values are calculated: a mean of 3.38 (median 4) for “Germans” and a mean of 3.84 (median 4) for “Internationals.” Overall, the acceptance of BBE can be confirmed, and H1.4 can be verified based on various research findings.

H1.5: Customers want to receive non-banking offers from the bank and, in return, allow extended data analysis and sharing for better, targeted, and personalized marketing efforts.

For this purpose, the two variables “*Share personal data*” (S105 and S205), which indicate the extent to which customers are willing to share their data with the bank for added value, and “*Deep analyzing more suitable offers*” (S107 and S207), which reflect how willing customers are to accept even deeper analysis and

evaluation of their data, such as a payment flow analysis, to receive more targeted, needs-based offers, are examined in more detail. Regarding "*Share personal data*" for BB 2.0, "Germans" have a mean value of 2.94 and a median of 3 (=neutral), while "Internationals" have a mean value of 3.39 and a median of 4 (=rather yes). Similar results were obtained for BB 3.0, with "Germans" showing a mean value of 2.83 and a median of 3 (=neutral), and "Internationals" with a mean value of 3.26 and a median of 4 (=rather yes).

A total higher average of about half a point was achieved for the target variable "*Deep analyzing more suitable offers.*" For BB 2.0 regarding "Germans," a mean value of 3.18 and a median of 3 (=neutral) were recorded, and for "Internationals," a mean value of 3.83 and a median of 4 (=rather yes). For BB 3.0, similar results were obtained with "Germans" having a mean value of 3.17 and a median of 3 (=neutral), and "Internationals" with a mean value of 3.87 and a median of 4 (=rather yes). Overall, the hypothesis can thus be verified, as customers tend to share their data and/or give their consent for deeper data analysis in order to receive added value in the form of BBS.

H1.6: Incentives encourage customers to decide on extended data evaluation and transmission.

This hypothesis was analyzed to determine which incentives or motivator factors are important for customers in order to convert negative attitudes toward data sharing with the bank into positive attitudes (opt-ins). In this context (S209 for BB3.0), 61 Germans consider more favorable products, and 50 Germans consider good service, in addition to monetary value, important for convincing them to consent to opt-in. For the internationals, access to exclusive financial products (n=24) and good service (n=23) are important. Due to the significance of the test, the null hypothesis was rejected, thus verifying this hypothesis. The other tests related to S109 and also to the variable "*Money for data sharing*" (S108 and S208) were not considered due to their lack of statistical significance.

When considering hypotheses H1-H1.6 collectively, 5 out of 7 are verified. It has been demonstrated that BB holds great revenue potential (H1). Additionally, the BB ecosystem levels 1 through 3 have also been compiled using historical scientific evidence, with their focus or intentions clearly defined and thus categorized into classes 1.0, 2.0, and 3.0 (H1.1-H1.3). Furthermore, it has been

shown on both the bank side and the customer side that acceptance of BBE for levels 2.0 and 3.0 exists (H1.4-H1.5). That acceptance or approval for data sharing and analysis (opt-ins) can be increased through various incentives offered to customers (H1.6). Several bank examples in the case studies, as well as market research in both regional and international environments, demonstrate that initiatives have already been successfully implemented (internationally) or that initial initiatives (regional/national) have been launched. Therefore, RQ1 can be answered.

The RQ2 “How can machine learning and data analytics methodologies be utilized to develop and implement effective Beyond Banking Sales Signals, and what are the specific use cases that demonstrate their impact on sales performance in the financial sector?” is the following research question to be examined. The supporting results for this question mainly come from expert interviews (Chapter 3.3.3.).

H2: To leverage beyond-banking potential, there is still a lack of clear business cases and necessary skills.

This thesis, which also includes an insight from the zeb study (n.d.) with 159 participants from European banks in 2020, was also conveyed to the 10 experts in Chapter 3.3.3. Most experts confirm this thesis and support it with numerous reasons. These include a lack of knowledge, technical skills, shortsightedness, and market offerings and technologies that are introduced but face no demand or attempt to solve a non-existent problem. There is a lack of structure, preparation, and research on the demand side to achieve product-market fit. Additionally, the bank is the decisive, inhibiting factor why such initiatives are not implemented, and there is no time or capacity due to a focus on running the business. Furthermore, the ability to properly prepare and analyze data is challenging, which involves a longer learning process. Specialists are generally needed for the topic of BB as well as for transfer services to coach salespeople, read patterns and cues in the CRM, and address them correctly with customers. Based on these numerous pieces of evidence supporting the lack of business cases and the necessary skills, this hypothesis is verified.

H2.1: Important decision-makers are not (yet) fully aware of the possibilities for dimensionalizing and scaling Beyond Banking Ecosystems.

The argumentation is seamlessly continued for this hypothesis. Experts agree that the knowledge or necessity for scaling options is not present among relevant decision-makers. Reasons such as a lack of operationalization ideas, proof of concepts, awareness that the desired scaling effect does not occur after project start, and that it takes time are cited. The opportunity is underestimated. Additionally, large technical debts and outdated IT legacy structures are obstacles that cause decision-makers to act cautiously or reserve their actions. It must be clearly communicated that this process offers numerous learning opportunities. An alliance of willing parties, such as committed banks, can serve as multipliers and storytellers for other banks, potentially leading to the formation of new banking institutions. This way, the hypothesis can also be verified.

The following three hypotheses, H2.2-2.4, can be summarized thematically in terms of BBSS. First, hypothesis H2.2 will be examined: "The potential of Beyond Banking Sales Signals is not fully utilized."

The experts argue that initial steps have been taken towards potential and first sales signals have been played, but the potential is not being fully utilized. They recognize the untapped potential, but banks are still in the learning phase, and new insights about the customer are just now being discovered. Therefore, this hypothesis is being verified.

"Beyond Banking Sales Signals are consistently used in sales." (H2.3) and "When Beyond Banking Sales Signals are used effectively in sales, these sales impulses are consistently well-targeted and promising." (H2.4):

From the chain of reasoning of the previous hypothesis, this can also be applied to this hypothesis. The use of BBSS is not established and has even been discontinued in some cases. Additionally, permanent acceptance of BBSS is only guaranteed if reliable sales signals with ongoing accuracy and consistency are fully developed and feasible for the customer before widespread deployment. While some BBSS provided overly invasive recommendations and caused bothersome experiences, leading to customer complaints, others were too general, offering little relevance and benefit to customers, and were also discontinued after this trial. Customers should not be treated as test subjects.

A first use by 1 to 2 banks for initial sales campaigns is also described, but the potential is not fully exploited due to a lack of active data utilization. Currently,

banks are busy delivering everyday customer goodies to customers and thus enticing them into the system, which is a prerequisite for building a database. Therefore, no meaningful sales signals can be used. Significant work is still needed to convince. This means that neither a consistent nor sustained use of BBSS in sales is targeted and promising. Both hypotheses H2.3 and H2.4 are falsified.

In summary, 3 out of 5 hypotheses can be verified for RQ2. Due to the confirmed lack of clear business cases and necessary skills (H2), the missing knowledge about the possibilities of dimensionalizing and scaling BBE (H2.1), and the underutilization of the potential of BBSS and their commercial use (H2.2-2.4), it initially appears that the entire RQ2 is falsified. Since the responses from the experts regarding usable data analytics and machine learning methods for developing a BBE 3.0 (Chapter 3.3.3.) were also insufficient, insights and data analytics methodologies from Han et al. (2023) and Ricci et al. (2022) were used based on literature research and analysis to illustrate an exemplary C2C matching process (3.3.6.1.). This example process was then explained using three scenarios or use cases—“medications,” “craft services platform,” and “housing broker”—for potential C2C matching marketplaces, and concrete sales signals were generated. With this additional evaluation, RQ2 can also be answered, as it was demonstrated how data analytics and machine learning methodologies develop BBSS and how these insights can be transferred to example use cases.

Finally, the RQ3 “What are the main influencing factors and evaluation criteria for successfully creating a scalable Beyond Banking Ecosystem, and how can these factors be incorporated into the development of the model?” and their associated hypotheses H3-3.5 are discussed. Here, H3 is used: “There is no universally used guideline, concept, or framework for building a scalable Beyond Banking Ecosystem in the banking industry.” Here, reference is again made to the experts from Chapter 3.3.3. Regarding this, two out of ten experts say they are familiar with concepts for creating a BBE. However, one statement cannot be supported with more detailed information, and the other only with guidelines for brand reputation and app design, as well as design guidelines for CRM or social media—essentially everything related to interactions. Therefore, strictly speaking, these two vague and non-specific statements are not concrete findings for the use of BBE concepts, blueprints, etc. For this reason, this hypothesis is verified.

H3.1: An exemplary, conceptual implementation design can be used as a blueprint for banks to align scalable Beyond Banking Ecosystems strategically.

This hypothesis is initially verified by two out of four experts in the Eval 2 cycle of the DSR (Chapter 4.5.3.), left open by one expert, and falsified by one expert. In Eval 4, a similar distribution is reflected with 10% yes, 50% rather yes, 20% neutral, and 20% rather no votes; however, the weighting of 10 experts here is more decisive. Thus, 60% of the 10 experts verify this hypothesis. Instead of one vote for a clear “no,” there are 20% for a “rather no,” which can be interpreted overall as an improvement toward a confirmed verification. Therefore, this hypothesis is verified.

H3.2: A design at dimension level 3.0 and above, focusing on the intra-institutional C2C approach, still has not been published.

All sources reviewed in the literature review (see Chapter 1.2.1.) indeed address Beyond Banking (expansion to non-financial offerings). However, not a single contribution describes a specific 3.0 architecture or framework model for an intra-institutional C2C ecosystem. The hypothesis is thus confirmed: there are no reliable publications on such a design. The only indications are found in conceptual classifications (Knörrer et al., 2021; Voigt & Holland, 2025), which explicitly point to a research gap in the area of Beyond Banking 3.0/C2C.

H3.3: This design approach offers considerable added value for banks and customers.

This hypothesis was evaluated by the experts in Eval 2 (4.5.3.) with two yes votes, one abstention, and a nuanced opinion for specific target groups (business analysts with yes, management with no). In Eval 4, a significantly more positive voting pattern is observed, with 10% yes, 80% rather yes, and 10% neutral, indicating that the design has been able to build greater value for banks and customers over the evaluation cycles. Additionally, the higher weighting of 10 experts further supports the verification strength of this hypothesis. This hypothesis is verified.

H3.4: The scalability of BBEs (Beyond Banking Ecosystems) is given despite banks' technical and infrastructural challenges.

For this, the experts weighted this hypothesis in Eval 2 (4.5.3.) with one yes vote, one no vote, a limited perspective, and one interpretable rather-yes vote. In

contrast, in Eval 4, it was rated with 20% yes, 40% rather yes, 30% neutral, and 10% no, which is overall more positive. The higher weighting also emphasizes the result in Eval 4. The hypothesis is verified.

H3.5: Decisive influencing factors and evaluation criteria can determine the value of a successful BBE.

These factors were developed and evaluated as follows: First, in Chapter 3.3.3., initial decisive influencing factors and evaluation criteria for assessing the value of a BBE were collected and preliminarily clustered with the help of 10 experts. From this, in Chapter 4.5.2.2., the next step involved compiling these factors under “Artefact 8 – Influencing factors and criteria for scaling the BBE” with support from the literature review (Chapter 4.4.2.), “Artefact 9 – Network (effects) including all BB Service Entities as possible instantiations or further developments of BBE 3.0,” the addition of “Artefact 10 – Context-based influencing factors and evaluation criteria” from Chapter 4.4.3., as well as “Artefact 11 – Organizational measures and prerequisites and compliance requirements.” In Eval 1, the four grouped factors were first named and visualized as four framework elements or factors in each cardinal direction in M1.1.

In Eval 2 (4.5.3.), the four experts mostly advocated for outsourcing the contextual factors into a separate model, as they do not have a function and do not interact with the model. Therefore, the contextual factors in M2 were transferred to a separate KPI overview page. Another category, “Ecosystem Virality” (Theodorakopoulos et al., 2025), was also included here. It measures how powerfully the ecosystem self-propagates via user interaction, leading to exponential growth.

In Evaluation 3, this KPI overview was reevaluated, but improvements and feedback were not directly dedicated to the design. Instead, they focused on overarching topics, such as the fact that this overview is only presented later in management communication and that the specific next steps for implementing a BBE project are more critical. In Evaluation 4, the expert survey rated the 20 KPIs for measuring BBE in terms of importance and relevance and ranked them accordingly. The top 3 KPIs are the adoption rate, bank satisfaction, and conversion rate. Additionally, further KPIs were included by experts, divided into two groups. KPIs such as the number of users, the number of service providers, and the number

of services were categorized under “value determination of ecosystems.” For example, ROI, ARR (Annual Recurring Revenue) (de Oliveira et al., 2025), and commission revenues were assigned to the group of “direct revenues or financial impact.”

For the hypothesis evaluation, Eval 2 assigned one “yes” vote, one abstention, and two “yes” votes weighted as “rather yes.” In contrast, Eval 4 voted with 40% yes, 40% rather yes, and 20% neutral, resulting in a slightly more positive overall outcome for Eval 4. Based on these explanations and evidence, the hypothesis is clearly verified.

In summary, all six hypotheses H3-H3.5 have been verified. Both contextual factors that can determine the value of scalable BBE were identified and considered, integrated into the overall context in the final compiled Solution Design BBE 3.0 (M4) (Figure 88). Therefore, RQ3 has also been answered.

The following section presents the secondary results, which do not directly influence the hypothesis evaluation or provide noteworthy findings beyond that. These results can be categorized into four topics: “Regulation and Legal,” “Challenges and Risks,” “Additional Insights on Customer Acceptance and Opt-ins,” and “Compiled Solution Design BBE 3.0.”

Regarding the topic area “Regulation and Legal,” various guidelines and laws were reviewed in Chapter 2.3.2. However, the result is that Beyond Banking, in the initial analysis (Gerstmayr, 2024; Martínez Resano, 2021; Voigt & Holland, 2024), due to its nature, has very little or nothing to do with banking, is barely affected by the new regulations like PSD2/3, and the upcoming PSD3 and FIDA (Finken & Hensen, 2025), which are not yet in force, will not be sufficient to establish a Europe-wide central data standard for competitive advantages. In individual cases, it should be examined whether a BBS becomes legally relevant. It is expected that the planned BBS will be legally relevant if it involves other personal, highly sensitive, or other data and systems that fall under the legal framework for banks. This should be considered early in planning to avoid legal violations. Additionally, a further legal risk is the international inconsistency of a coherent identity. Especially outside the EU (regulation), this could lead to increased effort in coordinating regulatory and technical standards for data transmission.

The second topic area is dedicated to “Challenges and Risks.” Here, reference is made to the expert interviews from Chapter 3.3.3., in which experts were consulted.

The experts agree that the lack of knowledge and mindset, as well as the upcoming change in mindset, acceptance, and cultural shift within BB and ecosystems on the banking side, represent one of the biggest challenges. Additionally, technical hurdles such as missing blueprints and governance structures have made implementation more difficult, and controlling and analyzing large amounts of data remains a challenge. Possible legal risks include performance and liability risks within the ecosystem construct, as well as recourse claims and complex contractual relationships that require monitoring of obligations, particularly with increased participant numbers. Regarding IT risks, particular attention is paid to IT security within the ecosystem partner network. Among other risks, reputational risk is mentioned most frequently by all experts.

In the third area, “Additional Insights into Customer Acceptance and Opt-ins,” further relevant statistical findings from the survey (Chapter 3.3.4.2.) are examined. The concepts for incentivizing opt-ins through strategies and incentive design were already addressed progressively in Chapter 3.4. and are listed here only in a summarizing manner.

The survey not only reveals whether there is acceptance of BB 2.0 and 3.0, but also, through association analysis, which service groups are favored. For both BB 2.0 services (S104) and BB 3.0 services (S204), the product groups Electronics and Leisure and Entertainment are added to the shopping cart as Rhs products.

Another important insight is that potential customers also act as providers on a C2C bank marketplace and express their intention to participate, whether they want to place their offers through this model (S210). Of the 522 participants, 151 answered “yes” and 212 answered “rather yes,” totaling 363 out of 522 (69.54%) participants. This indicates a high willingness to participate as providers in this ecosystem model.

With the question S211, it was also determined which offers providers would place in this banking marketplace. The top 3 results are, accordingly, with 297 votes for “Electronics,” 245 votes for “House and Garden,” and 242 votes for “Leisure and Entertainment.”

Regarding the last topic, "Compiled Solution Design BBE 3.0," an initially scientifically sound concept for developing scalable BBE 3.0 was intended to be evaluated. In the end, a "Compiled Solution Design BBE 3.0" emerged from four evaluation iterations, providing additional value beyond the scientific design (step 2). For example, in step 1, aimed at management and an uninformed audience, an "Informing and inspiring" pathway was developed with experts, which includes further overviews and explanatory patterns with "Current situation and need for action" explaining the current state of banking and the need for action, with "Introduction and success factors" explaining what BB (3.0) is and listing the success factors, with "Design M4" presenting a simplified concept alongside the scientific design, with "Customer Journey/Use Case" illustrating and explaining a sample use case using the "craft services marketplace," with "Next steps" defining a course of action with concrete work steps from vision to implementation, and with "Executive Summary" providing a brief overview of the key takeaways under the motto "BBE 3.0 at a glance."

With step 3, "Performance Measurement/Evaluation," aimed at management and business analysts, a concept called "Measures/KPIs" was developed. This concept presents the most relevant KPIs according to goal and reference (user or bank-related) in a matrix logic. Additionally, it can be traced which impact the key figure measurements contribute to and how the KPIs relate to the five framework factors. Through these extensions of various contexts, perspectives, and target audiences, the value of the scientific model is comprehensively enhanced (see Eval 4) and made more understandable.

VII – DISCUSSION

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After compiling the primary results related to the hypotheses and research questions, as well as additional secondary results, this chapter is dedicated to the discussion. In addition to discussing the results, this work documents initial limitations and provides preliminary suggestions for future research.

In summary, Beyond Banking is now recognized as a distinct concept (PPI, 2020; Voigt & Holland, 2025). It builds on Open Banking to transform banks into everyday platforms (H1). Over time, the distinction between pure Open Banking and Beyond Banking has become clearer: Open Banking provides the framework and technological foundation, while Beyond Banking leverages this to support products and partnerships that extend beyond the financial sector. Both terms coexist, but since around 2018/19, Beyond Banking has consciously highlighted the “beyond” aspect, focusing on ecosystem connectivity, whereas Open Banking continues to prioritize open financial APIs. It should also be noted that for the novel phenomenon of Beyond Banking (6-7 years of knowledge up to today), there is generally no long-term knowledge or studies available spanning decades, which also influences the knowledge level of the experts considered. However, the Beyond Banking approaches can mostly be transferred from the innovative idea of Open Banking. A research implication here could be a long-term study over the next 5 or 10 years to help track developments, insights, and comparisons relevant to the current period.

The classification and categorization of the three levels, H1.1 and H1.2, are based more on observations that rely on ecosystem maturity models and the development of platform and network models. Additionally, some authors prefer different but compatible classification systems, like role/archetype models or maturity wave models, instead of numerical “levels.” Ultimately, there is not a single “standard”—only various well-established schemes that align neatly with your 1–2–3 framework.

McKinsey & Company (2019) identifies three main archetypes of ecosystem participants: Builder, Orchestrator, and Participant. The „Orchestrator“ usually

manages the multi-sided marketplace, while the „Participant“ is more involved in B2C supply. Similarly, EY (2020) explicitly defines the Ecosystem Orchestrator as the entity that operates a marketplace where multiple buyers and sellers connect, enabling C2C and B2B2C interactions.

EY (n.d.) describes two “waves” of digital ecosystems: Wave 1 involves vertical, sector-specific collaboration, while Wave 2 encompasses cross-sector, scaling partnerships. This suggests a progression from “initial, point-based partnerships” to more integrated, platform-like ecosystems. Deloitte (2024) assesses digital maturity in its Digital Banking Maturity 2024 report, noting that “Ecosystem-/Beyond-Banking Features” indicate higher maturity levels—though not a strict three-stage model, the trend points in that direction. Overall, no single universal stage model exists; instead, multiple well-defined frameworks outline the same evolution: moving from ad-hoc, isolated collaborations to curated B2C ecosystems and eventually to multi-sided marketplaces (C2C/B2B2C) with banks acting as orchestrators.

Regarding H1.3, no consistently recognizable use of explicit C2C methodologies under DA and ML for BBE was discovered. However, mainly experts from the DACH region were surveyed. It can probably be assumed that Asian (especially Chinese) experts from corporations like WeChat, Alibaba, etc., can confirm this use of the methodology for BBE. After all, their super app model is based on inter- and intra-institutional customer data matching with a robust and scalable network. Including such experts could potentially falsify this hypothesis. A comparative study could be conducted across various international or intercontinental regions, involving several recognized experts from the DACH region or Europe, as well as experts from Asia, Africa, and America. An explicit (bi- or multilateral) country comparison with multiple experts could also be conducted to filter and democratize the diverse knowledge.

It must be emphasized that knowledge about BB in the German-speaking region is limited and still relatively scarce, as the phenomenon is relatively new (see above regarding H1). Although regional banks are inherently well-suited for a decentralized, regional ecosystem network for Level 3.0, these banks are often conservative and cautious in their behavior (structures) (Chapter 3.3.3.). The know-how primarily resides in core banking, and a mindset change is necessary to retain

and acquire customer interfaces (see Chapters 3.3.3. and 4.5.3.). Especially in terms of acquiring Generation Z as a new customer base, differentiation and emphasis on heterogeneous offerings are needed. Internal structural issues, outdated IT systems, and delays in transformation (Murphy, 2025) create significant internal barriers (“pull factors”) that genuinely hinder banks from scaling successfully or sustainably implementing initiatives beyond traditional banking. Generation Z exerts substantial external pressure (“push factor”) on banks (Mastercard, 2024; World Economic Forum, 2023) to expand beyond traditional banking. To secure long-term loyalty, banks must adopt mobile, autonomous, transparent, value-driven, and digital-native strategies, which are essential for engaging this generation effectively.

Pure C2C “Beyond-Banking” approaches (BBE 3.0: customers acting as providers and consumers within the banking ecosystem) are still only implemented sporadically in Germany and have not yet gained widespread customer adoption. What shows measurable success (ING, 2024) are B2C value-added features, such as cashback, deals, and benefits from local partners. Regional banks tend to focus more on experimenting with these than on actual C2C marketplaces. This is due to factors such as high regulation and privacy concerns, limited digital maturity among many institutions and merchants, and uncertainty about the actual use cases (see Chapter 3.3.3). For regional banks, the most realistic approach is: first, expand B2C ecosystems, complete data and IT preparations, connect local merchants digitally, then selectively test C2C use cases where real two-sided network effects are likely to emerge.

Although statistically significant results could be obtained for H1.5, most tests for H1.6 were outside the acceptable range, making the results unusable and reducing the survey's representativeness. Even though the minimum sample size was reached for both subgroups, “Germans” and “Internationals,” some tests still lacked significance due to layered logics that suggest further subgroups within subgroups, resulting in too few participants for significance. This means that the overall sample size must be increased for further research to ensure significance across all the smallest stratified dimensions. An initially calculated minimum target sample size may not be sufficient, which implies the need for a deeper analysis. In this context, merging subgroups into a higher-level group could have been enough

to achieve an adequate number of representative participants. Suppose different participant groups are to be compared based on nationalities. In that case, either a significantly larger overall sample size across all relevant countries must be obtained, or the focus should be on a few countries with the necessary minimum sample size acquired without further stratifications.

Before discussing the next step regarding RQ2 on leveraging BBSS based on data analytics and machine learning methodologies, the primary focus is first on the lack of clear business cases and the necessary skills (H2), as well as the scalability options for decision-makers (H2.1). Here, various levers within a bank must be optimized in a holistic process to the extent that the technical and organizational conditions within the bank are made BB-ready. Concerning the mentioned weaknesses and challenges in implementing BBE initiatives, the bank management must first be convinced, which is seen here as a realistic risk. Not only is a mindset change necessary, but also the willingness to view these initiatives as upfront investments, since, as previously mentioned (in Chapter Results), many challenges must be overcome initially. Additionally, patience is required because these investments do not generate immediate revenue but mostly indirect revenue or promote other core banking services, which should typically be quantified or measured by management. Persuasion efforts toward decision-makers must come from within through multipliers and experts (who can also be hired externally), as well as from outside the bank through consulting or an alliance of willing parties. A longer-term mindset change should be planned, gradually and consistently permeating from all sides. The potential implementation of BB (Ecosystems) depends entirely on the management's decision.

The previously mentioned points may also apply to this part of the work on the Data Hub or CRM in relation to hypotheses H2.2-2.4. Furthermore, it should be noted that most of the 10 experts are attributed to the Business Unit described in Chapter 3.3.3. This means that, conversely, they may not have the necessary expertise or in-depth insight into a data matching process, especially for such a specific use case, to ensure the proper verification of the hypotheses.

Another possible interpretation of the results of the BBSS (Banking Business Support System) is that they are too general, have low accuracy and consistency, and offer little relevance and benefit, including invasive and intrusive sales

impulses, as well as a lack of integration among sales units. This suggests a plan that is not fully end-to-end designed and suffers from poor communication. It is essential to strike the right balance within the specified range when designing a potential BBSS. The BBSS should be targeted, meaningful, non-intrusive, sent to the customer at the right time, and not overly aggressive, with high relevance and benefit. It is better to initially reduce the frequency of deployable BBSS while ensuring a high probability of closing the deal with greater accuracy. Starting with a specific BBSS and thoroughly training it with an AI model is advisable. Due to many banks' omnichannel strategy, sales should always document already automated or sales-driven BBSS transparently in the CRM to prevent overlaps or gaps in information that could dilute or block the results of other measures and customer interactions. When setting up new or modified BBSS campaigns, sales should always be informed and involved in the implementation. Additionally, sales must understand the BBSS and receive training if necessary. At the same time, involving sales is a balancing act, as it consumes capacity and time and carries potential risks, especially for BB services requiring high empathy, such as sensitive and specific topics like customer care (Chapter 3.3.3.). Therefore, it should generally be considered whether involving sales as a hybrid model alongside automated data recommendations is promising, and if a hybrid approach is pursued, to what extent it should be implemented.

Regarding RQ3, many strengths and weaknesses, findings, methodological reflections, limitations, and implications for future research of the DSR model have already been discussed in Chapter 4.5.6. "Overall evaluation of the concept model." Therefore, the following will include additions that have not yet been addressed. Here, each hypothesis from H3 to H3.5 will be specifically discussed, or in thematic blocks if it appears necessary and provides new insights.

Starting with H3, it should be realistically noted that 10 experts are mentioned in Section 3.3.3. and evaluated this hypothesis. This can generally be sufficient as a sample of experts; however, the previously mentioned weighting based on international expertise with four experts outside of Germany is considered low in terms of external validity. Additional expert interviews, primarily from the Asian and American regions, could provide new insights regarding the significance of the verified hypothesis.

The H3.2, as verified through the literature review, was evaluated using various keyword parameter combinations across different databases, as well as the data crawler Google Scholar (Chapter 1.2.1.), to ensure as comprehensive a source coverage as possible. However, 100% coverage cannot be guaranteed, so there is always a minimal residual risk that potentially matching or similar sources exist, indicating that a C2C model based on BBE 3.0 or partial content may have already been published.

The following hypotheses, H3.1 and H3.3-3.5, can be considered together thematically. Additions to the evaluated design or concept for the development of BBE: Even though the experts criticized that the design (especially in Eval 2 and 3 for M1.21st) is too technical and scientific in nature, this is still about the scientific claim of this work, which must be fulfilled. Therefore, the requirement is not necessarily for elegance, but rather that it should be helpful for decision-makers. The primary focus was on the scientific design, which has been achieved. Additionally, a simplified, easy-to-understand management design, M1.2md, was developed in parallel to serve this target group. In the end, the scientific design was described by the experts as a reduced meta-model, since it cannot capture every complex topic within a single model.

Additionally, the focus is on the conceptualization of C2C matching and beyond banking within a BBE model that does not include a deep dive into technical details. Instead, it lists and considers which data analysis and machine learning methods and factors are used for this customer data matching and the resulting data recommender, as well as for building and scaling an ecosystem today, and how these can be integrated into a model. What is possible has been addressed; how it is implemented can be demonstrated in practice or may require further academic research with a technical focus. Technological trends, such as blockchain or Web3, were not covered and can be addressed in future, specific research areas, and integrated into the model.

In Chapter 4.5.6., further research and evaluation of the scientific-technical model (step 2) were also discussed, as the final assessment in Eval 4 received only 3.11 points. Nevertheless, it is worth noting that the model has high scientific relevance. In Eval 4, the criteria Usefulness, Technical Feasibility, and Problem Relevance, with almost all ratings at the levels of “rather yes” (4 out of 5 points)

and “yes” (5 out of 5 points), significantly contribute to the scientific model being rated as very good within the context of the entire model. Only the final application of the isolated scientific model is seen as neutral, with 3.11 points.

Another point of discussion is the regulatory perspective and treatment of BBE 3.0 (Chapter 4.5.4. Eval 3). Here, the regulatory conditions should be continuously monitored and permanently considered and adjusted in product design. Especially the FIDA regulation, which has not yet come into force, must be closely monitored in cases where it may impact BBS and BBE. All further evaluations, reflections, and discussions on the DSR model can be found in Chapter 4.5.6.

The secondary results are now discussed in this section. Regarding the first topic area, “Regulation and Legal,” the specific regulatory relevance of BB is still uncertain, and it remains to be seen whether and how BB will be integrated into the regulatory framework. On one hand, this presents an uncertainty factor and thus a risk; on the other hand, if regulatory measures are not addressed or considered, this could positively impact the acceptance of BB initiatives at the management level of banks. A significant obstacle is regulation, which can act as a barrier but also catalyzes prioritization due to the lack of regulatory relevance of such initiatives. Conversely, it must be objectively assessed to what extent a BBS impacts the overarching banking context, system landscapes, and customer data. This can quickly lead to regulatory relevance. These individual cases require an evaluation.

The biggest “challenge and risk” will be the lack of knowledge and a mindset change within banks in order to initiate BB initiatives. If banks have gaps in this area, they must first be informed and inspired (e.g., using the Compiled Solution Design BBE 3.0 = M4). Without committed management and staff, implementation is doomed to fail. Therefore, it must be clear what level of mindset and knowledge about BBE (3.0) currently exists in the respective bank, so that the existing knowledge can be built upon and coached.

To address the technical and legal risks, a standardized contractual framework and clearly defined rights and obligations of an ecosystem participant are essential to ensure a legal basis in the multilateral ecosystem interaction. Data governance structures and data exchange contents must be uniformly coordinated,

responsibilities clearly defined at the detailed level, and implemented with the same standards to ensure interoperability. For non-experienced participants in the banking ecosystem, operating within this framework requires ensuring higher security standards at the bank level. A problem with one participant can weaken credibility and reputation within the entire ecosystem among the participants and thus also towards the customer.

Regarding the questions that provide “further insights into customer acceptance and opt-ins” in the survey, the reasonable acceptance rates and the top product combinations serve as a solid foundation and initial indicators for further practical exploration. These values can be used to initiate or focus on the favored product groups, but this requires additional analyses, such as regional, customer-specific, banking, and other context-based factors and conditions, which should be incorporated into the overall assessment and evaluation for decision-making.

However, it is important to note that the participants could only select overarching service groups and not specific services such as purchasing tickets for events (see Chapter 3.3.5.), which means that it does not represent an exact 1:1 comparison of individual products between supply and demand, but rather indicates tendencies of preferences and overarching product categories. Further research would be necessary to evaluate the extent to which customers accept the specific BB 2.0 (and BB 3.0) offerings.

The secondary results of the “Compiled Solution Design BBE 3.0” are to be regarded as additional outcomes for this overall research, as positive and enriching. This now more complex, but contextually more coherent overall picture demonstrates greater acceptance regarding practical usability and creates new research streams that enable interesting and diverse future investigations.

Starting with research on BB and Ecosystems, potential analyses of BBE 2.0 and 3.0 with market studies and case studies, as well as acceptance research among banks through expert interviews and among customers through surveys, along with the analysis of AI models, DA matching possibilities, and the research and development of framework factors for scaling such models, a comprehensive and far-reaching data base was established. This database served as the starting point for modeling artefacts, phases/processes, and their interactions for the first model in the DSR. With the help of experts, various evaluation formats, and multiple

iterations, an evaluated model was designed that addresses acceptance, usability, and possibilities for banks, aiming to elevate them into the BBE 3.0 era.

VIII – CONCLUSIONS

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This chapter discusses the research questions in the summary. Additionally, it highlights the significance and contribution of this study, as well as its everyday relevance and implications for science and practice. In the subchapter “Ethical Consideration and Appreciation,” ethical aspects and formal framework conditions of the research are addressed.

8.1. SUMMARY

This summary concisely compiles the research findings and key results of this work, aligning with the research questions.

RQ1: “How can combining intra- and inter-institutional customer data matching improve the sizing and scaling of Beyond Banking Ecosystems in the financial sector?”

The prerequisite for the sizing and scaling of BBE is a mutual acceptance from both the bank (experts) and customers of this phenomenon, which can be confirmed. Customers are generally motivated to receive BB 2.0 and BB 3.0 offers and, in return, provide opt-ins or consent to these services for data processing, provided that relevant added value is implied. Incentive strategies were presented from the bank's side, as well as additional measures that banks need to undertake from the customer's perspective to turn dismissive attitudes toward consent declarations into supporters initially. Factors and criteria for measuring the success of scalable BBE (3.0) were also compiled and evaluated according to importance and relevance. Various international (mainly Asian) bank examples already demonstrate impressively how they successfully position banking ecosystems with B2C2C as a combined approach of inter- and intra-institutional customer data matching in the form of super-apps with their immense network effects, offering beyond banking services and creating added value for customers.

RQ2: “How can machine learning and data analytics methodologies be utilized to develop and implement effective Beyond Banking Sales Signals, and

what are the specific use cases that demonstrate their impact on sales performance in the financial sector?"

How ML and DA methodologies (combined) generate effective BBSS was demonstrated using the following methods. Customer preferences can be identified using the Customer First approach (Rosli & Nayan, 2020) through the application of Collaborative Filtering and Recommender Systems (He et al., 2017). Through k-means clustering, entire target groups can be defined with probability predictions for purchasing BB 2.0 services, and these predictions can be linked to basket analysis and the most frequent product combinations. The use of graph-based analyses with GNNs (Hamilton et al., 2017) enables the recognition of complex and nonlinear relationship patterns between providers and demanders within the ecosystem network. It models them in an end-to-end learning process. Continuous optimization via feedback loops further constantly improves the recommendation algorithms. Implemented reinforcement learning methods (Kuleshov & Precup, 2014) can maximize rewards (success rates in mediations) and dynamically optimize strategies. These ML and DA methodologies were explained using various examples, such as a craft services platform, and BBSSs were generated as data recommenders.

It should be noted, however, that due to a predominantly confirmed lack of clear business cases and the necessary mindset and skills, the potential of BBSS remains unused in BBE 3.0 projects. BBSSs are not consistently used in sales, and there are no explicit, measurable use cases for BBSSs in the context of BBE 3.0.

RQ3: "What are the main influencing factors and evaluation criteria for successfully creating a scalable Beyond Banking Ecosystem, and how can these factors be incorporated into the development of the model?"

A total of 20 KPIs were identified and assigned to the BBS goals "Increase in everyday use and active interactions," "Increase in cross-sell conversions to core bank products," "Increase customer retention and loyalty," and "Increase and scale BBE (3.0) and its interactions between customers" in a separate overview outside the scientific, technical model (M1.21st), but as part of the Compiled Solution Design BBE 3.0 (M4). Furthermore, the relevant contextual factors "Scaling," "Context-based," "Organizational," "Network Effects," and "Ecosystem Virality" were integrated into the same KPI overview (M1.2mm) and assigned to the KPIs.

The experts weighted the top 3-KPI classics “Adoption Rate,” “Bank Satisfaction,” and “Conversion Rate” based on importance and relevance.

This study is considered a pioneer in the academic development and interpretation of the novel phenomenon BBE 3.0. Practice examples already indicate the existence of this phenomenon; however, a comprehensive analysis and conceptualization of a scalable BBE 3.0 design using the DSR has not yet been scientifically recognized. Additionally, the observed dimensions of BBE in ecosystem levels could thus be classified and organized into a three-tier scheme, which can serve as a guide or reference for classification questions related to BBE.

In a gradual, layered process, BB should first be understood, added value clarified, and placed within the ecosystem context. Additionally, it is essential to emphasize that customer acceptance and relevance are also crucial for the success and sustainability of BBE initiatives and such ecosystems. Looking toward Asia is worthwhile to understand the power of banking ecosystems and to develop learnings for one's own market. Studies have shown that many banks (especially from the German region) do not yet sufficiently pursue the ecosystem concept in connection with BB, let alone the network idea, to secure and (re)gain customer interfaces and competitive advantages.

The analysis and development of opt-in strategies, the selection of relevant BBS, and the entire scientific process, or parts of it, along with their learnings, can be applied to practice as needed for the product launch or development process of BBE (3.0) projects. An expert-evaluated meta-model provides, for the first time, a blueprint for initial implementation, and the contextual content for management offers a comprehensive handout to inform and inspire BBE 3.0 as well as to support decision-making regarding the possible implementation of BBE initiatives.

8.2. ETHICAL CONSIDERATION AND APPRECIATION

The ethical standards have consistently been recognized and taken into account. This ensured the privacy of all experts in the expert interviews through signed data protection declarations, and the data were anonymized or, in cases where data mentions could reveal a person's identity (e.g., in the transcripts), were subsequently pseudonymized. This also applies to the surveys, which were

directed at bank customers in one survey and at experts in the expert survey. Only data that preserved the anonymity of all participants were collected in both cases.

A very big and important thank you goes to all the participants and supporters who made this scientific work possible and so valuable. Without their cooperation, primary data collection using the selected methodologies would not have been possible.

IX – LIMITATIONS AND FUTURE WORK

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In the final chapter, the limitations and future implications that have already been mentioned or superficially addressed in the chapters “Overall Evaluation of the Concept Model” (Chapter 4.5.6.) and “Discussion” are examined in greater depth. This can initially involve detailed discussions of both methodological and theoretical limitations and then translate into specific research directions, methodological recommendations, or extensions. Some limitations and future work implications (e.g., in the chapter’s Discussion regarding H1.5 and H1.6, as well as the survey’s limitations and possible future design) have already been sufficiently addressed in these chapters and therefore do not require further analysis or consideration in this chapter. Thus, ten overarching limitations and proposed future work implications remain, which will be examined more closely below.

Regarding the already mentioned novel phenomenon of BB, there is currently no long-term knowledge or long-term studies available. Additionally, the ecosystem maturity models established in this thesis within a three-stage scheme, as well as the alternative, compatible classifications proposed by other authors, can be evaluated in a status quo or review study over the next, for example, 5 or 10 years to see how these schemes develop, whether new or different stages or other models emerge. A comparison to the current scientific standpoint can be made here to conduct an initial review study within a medium-term timeframe. Further review studies can follow gradually in subsequent years to explore long-term studies, developments, or changes in market models and the state of knowledge.

In addition to exploring future knowledge insights about further developed models and systems, the change in mindset or attitude and the necessary skills in the German region for BB also need to be further evaluated, as current knowledge is limited or scarce. Comparative studies or long-term studies can also be conducted in the coming years to capture the development of the mindset and necessary skills for BB. On the one hand, the bank side can conduct comparison studies or reviews over the next five years or later, using surveys with various experts or responsible bank employees, as well as specific target groups such as

Generation Z, to assess the quantitative relevance and conduct interviews for deeper insights. Generation Z is fascinating as a target group because they will constitute the next generation of core customers and thus make up the majority of a bank's clientele in the future. Here, a scenario analysis would also be suitable for classifying the potentials of Gen Z, illustrating relevant environmental parameters for the best, average, and worst cases. According to a study by Morgan Stanley, this target group is expected to belong to the largest generation from 2030–2035 onward (Wele, 2022), and about one-third of all consumer loans could be attributed to them. Understanding their needs and interests is, therefore, especially essential, and early engagement with the bank is crucial.

Another limitation is the verified hypothesis (H1.3) that no C2C matching methodologies have been discovered and published. Attention has already been focused on expanding expert interviews to Asian experts in order to close this research gap, potentially. In addition to country comparison studies with experts from financial services, experts with different job profiles or work experiences from other industries can also be interviewed to increase external validity and generalizability. Future review research can also explore whether explicit, successful C2C-beyond banking use cases in Germany can now be demonstrated. This later review analysis can investigate the development of successful or abandoned models, as well as reliable, measurable models with verifiable figures in public media, studies, or through confidential interviews. Additionally, the international market can be examined here, comparing German models (or models from the German-speaking region) to see how the development or success gap between these markets has changed.

Regarding the results of the BBSS, which are too general and have low accuracy and consistency with little relevance and usefulness, collaborative planning and testing or prototyping with banks can be implemented in practice. Experiments (Kohavi & Longbotham, 2023) can be used as a methodological process, where an independent variable is manipulated to measure its impact on a dependent variable. This can be done through A/B testing, allowing the effects of deliberately manipulated variables in a BBSS to be measured in terms of their impact on user behavior. The same approach can also be applied to opt-in strategies for acceptance measurement, where targeted subprocesses or elements, such as

changing parts of an opt-in artefact through A/B testing, can also be used to experiment with and document changes in customer behavior.

Another consideration is the evaluated meta-model, which was designed using DSR and only artificially tested, with a real-world application context largely still pending. Further research implications could therefore focus on technical modeling and implementation. Initially, an AI model can be trained with a focus on an isolated BBS using DA and ML methodologies. A microservice can be developed in a prototype stage, tested with a selected, closed customer group, and an initial BBSS from the BBS can be delivered to customers. Through multiple feedback cycles provided by customers, the AI model can be optimized until the accuracy and relevance of the BBSS reach a desired, measurable level of acceptance. After a successful pilot phase, this MVP can be scaled for broader deployment.

Another research direction could involve further developing the meta-model into a comprehensive data governance framework. Based on the insights gained from the design, the following steps might include creating a data governance framework architecture model as a set of rules that define how a company must handle BB data (Khatri & Brown, 2010) and serve as the foundation for treating data as a structured resource. Under this model, a collection of rules, processes, roles, and standards can be established to ensure proper data management. Additionally, this step should define how the reference and context of this data model are embedded within and can be identified throughout the bank's entire IT and data strategy.

Additionally, a framework in the form of a decision support system can be developed with the help of a broader group of experts (for example, from Legal, Data Governance, GDPR, etc.), similar to the methodology used in this thesis. This would enable managers in companies to make informed decisions on strategic actions within Beyond Banking Ecosystems. This was identified as a research gap among the findings (No. 4) of the literature review (Chapter 1.2.1.). DSS (Decision Support System) was not addressed in this thesis and may require further research.

Regarding BBE 3.x, BBE 4.x, and similar versions: it is important to recognize that this is merely a conceptual idea based on transferred logic and theory. Validation would require investigation through empirical and strategic evaluation approaches, which could also present valuable research opportunities in the future.

Here, the consideration can be how, for example, new immersive technologies like VR or the metaverse, new services, or actors influence customer behavior or alter service preferences, which can be evaluated through expert interviews or customer surveys.

When the legal situation regarding BB is assessed in isolation, no direct interference has been observed; therefore, BB initially appears to lack regulatory relevance compared to traditional banking services. However, the regulatory relevance in a banking context can change quickly, so the regulatory assessment here should not be considered conclusive and must be examined on a case-by-case basis. Since regulatory measures are usually only considered and decided after the existence of real-world phenomena, certainty regarding BB and BBE, for example, under FIDA, can only be gained in the coming years. Long-term studies or subsequent review studies that document changes in the legal situation and anticipate the need for changes to BBS are currently lacking.

The last limitations pertain to the challenges and risks associated with BBE. These have been identified through literature analyses and expert investigations, but tend to be more of a listing and do not delve deeply into the issues. Here, in-depth expert interviews with legal, regulatory, and risk specialists can be conducted, frameworks for data governance and key measures for risk mitigation can be outlined, and an overall assessment of constructs of BBE (3.0) can be made. Subsequently, the same data collection methods can be repeated at later points in time to document and anticipate changes in the framework conditions and the resulting need for adjustments to BBS and BBE.

These limitations provide a clear path for future research that further strengthens the relevance and scalability of the results of this thesis. In particular, long-term studies or review studies and the influence of changing customer needs of specific target groups (such as Gen Z) will be relevant in the future to observe and track the developments of BBE (in the German-speaking region).

X – BIBLIOGRAPHICAL REFERENCES

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XI – APPENDIXES

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APPENDIX 1. Semi-Standardized Expert Interviews: Questionnaire

Semi-standardised expert interview with XXX (position/function)

Interview date: XXX

Type of information provision: video telephony

Research Topic: Conceptualising and Designing Scalable Beyond Banking Ecosystems Using Machine Learning and Data Analytics Methodologies

- I. Introduction:
 - a. Thanks for your willingness to participate
 - b. Introduce yourself and the purpose of the interview.
 - c. Explain the research questions and their significance in the context of banks, platform ecosystems, especially Beyond Banking and the phenomena of the inter- (2.0) and intra-institutional customer matching approach (3.0).
 - d. Procedure: Interview approx. 90 minutes, stories important, no wrong answers
 - e. Confidentiality and data protection: recording of the video call, confidential treatment of all data, all personal data is pseudonymised, transcription, obtaining consent
 - f. Questions from the interviewee
- II. Background:
 - a. Ask the interviewee to give a brief overview of their role and expertise in banking and platform ecosystems.
 - b. Explore the interviewee's knowledge and experience with Beyond Banking, Ecosystems, Machine Learning, and Data Analytics.

III. Research questions:

RQ1: How can the combination of intra- and inter-institutional customer data matching improve the dimensioning and scaling of Beyond Banking Ecosystems in the financial sector, and what impact does this have on data protection, integration and technological infrastructure?

- 1.1. How do you see the revenue potential of Beyond Banking?
- 1.2. What developments do you see in the area of Beyond Banking 2.0, i.e. inter-institutional customer matching by non-banks?
 - 1.2.1. What added value is generated for customers and banks by this ecosystem construct?
 - 1.2.2. What co-operations are concluded and what offers are made to the customer?
- 1.3. Have you already gained experience with a broader view at ecosystem level 3.0 with an intra-institutional approach, i.e. a C2C business approach with the bank's function as a market orchestrator?
 - 1.3.1. If so, in what way?
 - 1.3.1.1. How is customer-to-customer (C2C) matching operated via data analytics and/or machine learning? Which ML processes or functions are used?
 - 1.3.1.2. If not, how does customer matching take place at the level of an inter-institutional approach (2.0)?
- 1.4. How do you see the acceptance of a scaled Beyond Banking Ecosystem and the associated customer matching at inter- (2.0) and intra-institutional level (3.0) on the customer and provider side? What organisational effects does this have and/or what other/new role concepts does this create?

RQ2: How can machine learning and data analytics methods be used to develop and implement effective Beyond Banking Sales Signals, and what specific use cases show how they impact sales performance in the financial sector?

- 2.1. There is still a lack of clear business models and the necessary skills to utilise the potential of Beyond Banking. Do you agree? Please explain your view.

- 2.1.1. If there are use/business cases, which ones can you name for level 2.0?
- 2.1.2. If there are use/business cases, which ones can you name for level 3.0?
- 2.2. How do you assess the possibilities of dimensionalisation and scaling of Beyond Banking Ecosystems?
 - 2.2.1. Are these sufficiently known to you and other decision-makers?
 - 2.2.2. If not, why?
- 2.3. Does your company or other banks use Beyond Banking Sales Signals?
 - 2.3.1. If so, are you fully utilising the potential and how do you determine this?
 - 2.3.1.1. Are Beyond Banking Sales Signals established in sales and are they used consistently?
 - 2.3.1.1.1. If not, what is the reason?
 - 2.3.1.1.2. If so, are the sales signals accurate and promising?

RQ3: What are the most important influencing factors and evaluation criteria for the successful creation of a scalable Beyond Banking Ecosystem, and how can these factors be integrated into the technical design of the model?

- 3.1. Are you aware of the use of a guideline/concept/framework for the creation of a scalable Beyond Banking Ecosystem in the banking sector?
 - 3.1.1. If so, to what extent and which concepts do you use? Which case studies and/or framework models can you mention in this area?
- 3.2. Which key influencing factors and criteria can determine the value of a successful Beyond Banking Ecosystem?
 - 3.2.1. If no factors or criteria can be named, why is that?
- 4. Challenges and risks:
 - 4.1. How do you categorise the challenges of the ecosystem constructs 2.0 and 3.0?
 - 4.1.1. What are the legal risks?
 - 4.1.2. What IT risks are there?

4.1.3. What other risks are there (e.g. bank as market orchestrator)?

IV. Conclusion:

- Thanks for your willingness to provide information and participate
- Possibly ask for further interview partners
- Information on the evaluation of the results
- Farewell

APPENDIX 2. Semi-Standardized Expert Interviews: Consent Form Privacy Policy

**Declaration of consent
to the collection and processing
of personal interview data**

Research Project: Conceptualizing and Designing Scalable Beyond Banking Ecosystems Using Machine Learning and Data Analytics Methodologies

Institution: Universidad Católica San Antonio de Murcia (UCAM), Spain

Interviewer: Sebastian Voigt M.Sc.

Project/study management: Prof. Dr M^a Mercedes Carmona Martínez / Prof. Dr Alexander Holland

Interview date: XX/XX/XXXX

I agree to take part in an interview as part of the above-mentioned research project. The aim and course of the research project have been adequately explained to me: *(Please tick as appropriate)*

☐ Yes

☐ No

The interview is recorded with a recording device and put into writing by a project employee. The data collected during the interview will be used exclusively in the context of the above-mentioned project. The audio files will be stored until the end of the project and then deleted, but no later than 31 December 2026. The transcript of the interview will be pseudonymised, i.e. it will not be possible to identify the person who provided the data.

Excerpts from the interview, results and data from this research project are published in pseudonymised form, i.e. without the data being attributable to a specific person, in scientific publications and used as material for scientific and educational purposes.

Personal contact details are stored separately from the interview data and are not accessible to third parties. The contact data will be deleted after the end of the project.

Participation in the interview and consent to the collection and use of the data as described above is voluntary. The participants in the interview have the right to cancel the interview at any time and, in accordance with Art. 13 para. 2 lit. b GDPR, the right to information, correction, deletion, restriction of processing, data transfer and revocation against the further processing of their personal data without any disadvantages arising from this.

Furthermore, you have the right to lodge a complaint with the following data protection authority:

State Commissioner for Data Protection and Freedom of Information NRW, Kavalleriestr. 2-4, 40213 Düsseldorf, fax: 0211 38424999, e-mail: poststelle@ldi.nrw.de

With my signature, I declare that I have understood the project and the above information and that I am voluntarily participating in the research project. The processing of my personal data is based on my consent in accordance with Art. 6 para. 1 sentence 1 lit. a GDPR. If special categories of personal data (e.g. political opinions, religious beliefs, health) are affected, the processing is based on my consent in accordance with Art. 9 para. 2 lit. a GDPR. I can revoke my consent to the project manager at any time, with the consequence that the further processing of my personal data becomes unauthorised. However, the revocation does not affect the legality of the processing carried out on the basis of the consent until the revocation.

Under the aforementioned conditions, I will take part in the interview and agree to the interview being recorded, transcribed, pseudonymised and analysed.

First name and surname in block letters

Place and date

Signature

APPENDIX 3. Semi-Standardized Expert Interviews: Transcript from Expert 1

INTERVIEWER: So, on to the research questions. First, I will list the research questions. But don't worry, they are so complex that they cannot be answered briefly. But that's okay. We will focus on the sub-questions to these research questions, which of course contribute to the overall research question. And that is why the sub-questions are relevant to us. So, the first research question is: How can the combination of intra- and inter-institutional customer data matching improve the dimensioning and scaling of beyond banking ecosystems in the financial sector? And what impact does this have on data protection, integration, and technological infrastructure? And my first question is: How do you see the revenue potential of beyond banking?

INTERVIEWEE: Um, exactly. So I see the revenue potential of Beyond Banking as rather low in the current situation. Or does he estimate it to be low? For two reasons or from two perspectives? On the one hand, we have demand, the customer perspective. I believe that in Germany we still have the mantra that Germans don't talk about money. Only 60-63% of Germans use online banking at all. That's not a huge percentage. This means that digital banking is not yet an issue for everyone, but only for two-thirds of the population. So, on the demand side, we have a situation where I believe there are inhibitions and barriers. Then we also have the situation in Germany that banking is still a very isolated topic. So, to put it neutrally, we have an online banking app and that's where online banking takes place. We have online banking on our PCs, i.e., on our desktops, and that's where we do our online banking. If we look at Asia, in particular, they are the brutal pioneers when it comes to ecosystems. If we think of WeChat, for example, everything takes place in this app. I communicate, I shop, I do my banking. So everything takes place in an integrated way, and then the probability of impulse purchases is simply much higher because it's just so enormous for me. I think that's a very extreme case that I've just described. But in comparison to German behavior and the German approach to online banking, I just wanted to show that we're not yet at the point where we can really generate a lot of revenue, at least in the short term. Because I've given myself a relatively good transition, because I still see the potential for experience as limited from a provider's perspective. We actually just talked about this briefly. Sebastian I believe that the banks are not yet patient

enough to allow ecosystems to really emerge. Of course, you have to be patient to a certain extent when investing in a Beyond Banking system, because customers have to get used to it, because revenues only develop over time until it really has a measurable revenue potential. Until it really reaches a level of profitability that is truly measurable. And I think that banks are not yet patient enough to get through this initial valley. Exactly, which is why the revenue potential is limited by the online banking rate alone and by the impatience of the providers.

INTERVIEWER: Perfect. You explained that very well. Thank you very much. You've already given us a little insight into the developments you see in the area of Beyond Banking 2.0, i.e., the classic approach of involving a third-party partner and referring bank customers to them. How do you see this developing? You've already explained a little bit about that. Would you like to add anything else?

INTERVIEWEE: So basically, I believe—and I think we've already made some good progress in Germany in this regard—that banks have understood that they don't have to do everything themselves, that they can try to replicate things and develop online shops and so on, but that there are providers out there who are already very, very good at solving these issues because it's their core business, and that's why collaborations are already emerging and there are players who are simply doing it much, much better. And I think we've already taken a few steps in the right direction. In other words, banks are also working with non-banks. I think that's already working quite well in Germany, at least in part. Yes.

INTERVIEWER: Okay, great. Then let's jump to that, namely a sub-question, namely: What added value is created for customers? And good. And also on the banking side, what added value does this ecosystem construct create for banks from a banking perspective?

INTERVIEWEE: Well, for the banks, I think it's... I just got that. I need to get better at answering the questions; I already hinted at that a little bit. I think it's good for banks to focus on their core business. If they can optimize their banking services and put their existing resources into optimizing their banking services rather than investing them in areas outside their expertise and burning resources there, because there are simply players who already do that much better. And in the end, of course, customers also benefit from this because they have better banking services because the banks have focused on that. Another advantage or added

value for the banks is additional revenue from the cooperation and from the beyond banking that takes place there. And if you choose the right partners, of course, there is also a positive image transfer. If the banks with... It almost doesn't matter, you can see everything positively now if you want to. It's open to interpretation. But if you look for positive partners, you can pretty much make the image your own. At least to some extent for customers, could better or definitely better online banking result in better banking performance? And, of course, offers from favorite brands, favorite service providers, favorite services, and you have short distances as a customer because you can stay in the bank and jump from there to your favorite activities, favorite partners, and it all takes place in one place. Short distances. Yes.

INTERVIEWER: Wonderful. That sounds very good. We can move on right away. You already hinted at the developments in this area earlier. So can you really name some exemplary collaborations? Which ones are being established and what offers are being made to customers, for example? (..)

INTERVIEWEE: Exactly. So, what I know and have already looked at. That's actually a bit of the first derivation, I think, from the first stage of beyond banking. According to the stage system here, these are collaborations with banking-related services, I would call them, such as Deutsche Bank collaborating with Friendsurance, for example, where they used an existing platform to offer their customers additional insurance. I think that's a very good example. There was also N26 and Allianz, where you could take out car and home insurance in the N26 app. So those are collaborations that I know of at that level. Exactly.

INTERVIEWER: Okay, great, perfect. Can you think of any others, or is that okay for you?

INTERVIEWEE: Um, I don't think so.

INTERVIEWER: For example, what Comeco did. Purely theoretically.

INTERVIEWEE: Yes, exactly.

INTERVIEWER: Feel free to mention it. That's exactly what happens in this B2C. In this stage two approach. Exactly.

INTERVIEWEE: Exactly. The Sparda banks among themselves, which then founded Fintech.com.co. Online banking app through which customers could also

use partner offers in this online banking app. I must admit, I can't think of any partners that were in the comic app off the top of my head. But Verivox was in there as a partner. Exactly, you could just use the offers there. (..) The Sparkassen Finanzgruppe comes to mind, of course, with Deka, where you can buy or take out Deka funds in the Sparkassen Finanzgruppe. So those are. Those are. Exactly. Those are the collaborations that come to mind.

INTERVIEWER: Okay, great. Thank you very much. Then I would say we are also done with level 2.0. From my side, we can move on to 3.0. So, you can answer this first question with yes or no. Do you already have experience with an expanded view at ecosystem level 3.0? As I mentioned earlier, this B2C, this inter-institutional approach, where the bank acts as a market orchestrator.

INTERVIEWEE: I'd like to ask a question, if that's okay, because I'm not quite sure whether it's yes or no, as I can't quite place it. At the beginning, I said that I established a crowdfunding platform in the Sparkassen Finanzgruppe, which ultimately offered project initiators, associations, or individuals a platform to raise funds. And these funds were collected from everyone, i.e., private individuals, companies, associations, whoever. That's basically one approach. Yes, and the bank operated this platform and was listed as the provider in the imprint. Would that be level three?

INTERVIEWER: Yes, that's exactly right, it's a great example, because from a bank's point of view, it's always a difficult thing. You're absolutely right about that. It's a matter of perspective, how do you understand something? From the bank's point of view, it's defined as follows: Both are my customers, and I want to connect them. Both are my customers, from the bank's point of view. And that's why the bank's point of view is one approach. At least that's how I define it, and you've actually explained an example correctly. So yes, perfect.

INTERVIEWEE: All right then. Yes.

INTERVIEWER: Great. All right, let's move on to the next question. Let me just take a quick look. Um, exactly. So, how does customer-to-customer work in companies using data analytics and/or machine learning, or what measurement methods and functions are used? What can you say about that?

INTERVIEWEE: Unfortunately, I can't say much about that. I'm not allowed to disclose that information.

INTERVIEWER: Is that okay, or were there specific data points? I can go a little deeper, maybe. Data points? Or did you look at specific profiles? You know, a little bit like how the matchmaking came about?

INTERVIEWEE: No, that was actually... No, I can't. I can't say for sure. Um, no, no, no, it wouldn't be serious to work with assumptions now. Everything's fine.

INTERVIEWER: That's exactly right. So say what you can. Yes, that's perfectly fine. Thank you very much. Then I'll jump to the next question. Okay? Because. We're now at. If not, can you say okay, whether maybe this customer data matching or whatever you call this matchmaking. Can you mention it at level 2.0? Have you had any experience with that?

INTERVIEWEE: That's exactly where cash flow analysis comes in. Even though many banks say it doesn't exist. But the transactions are simply scanned and then partially evaluated. And that's exactly where you can see, does this person go to Starbucks often? Do they buy a coffee there every morning? Exactly. And so you could also use matchmaking to say, hey, look, they go to Starbucks every day, I've seen that, or I know that. I have Starbucks coupons in my Beyond Banking Shop in my ecosystem. Exactly.

INTERVIEWER: Perfect. Wonderful. Sounds good. Another one, right? That's it.

INTERVIEWEE: So that was perfect.

INTERVIEWER: So, focus primarily on cash flow analysis transaction data. That's okay. Great. Thank you very much. Then let's jump to the last question on the research question, namely acceptance. So, how do you see the acceptance of such a scalable Beyond Banking ecosystem and the associated customer matching? Feel free to mention 2.0 and 3.0. Maybe you know the differences there too. And how is the acceptance on the customer and provider side? (..)

INTERVIEWEE: So, regarding the acceptance of 2.0. I think we're back to where we started. In Germany, we don't yet have very high acceptance on the provider side or the customer side because Germans may feel that it's too invasive. In this very intimate area of online banking, I said at the beginning that you don't talk about money and no one is allowed to know anything. And then suddenly it's being analyzed and I'm being made offers. For many Germans, I think it's too invasive and that's why it's not yet widely accepted. If we now argue on the basis

of payment flow analysis. At the banking institution level, acceptance is growing, or at least the fundamental potential is already being recognized. However, I believe there is a real lack of knowledge and a good plan on how to implement and establish it in-house or for one's own institution, especially with patience. That would be my statement on topic 2.0. So, yes, that is my statement on topic 2.0. Topic 3.0, i.e., B2C or P2P, whatever you want to call it, is also on the customer side. I believe it has a significantly higher level of acceptance in Germany because, on the one hand, the people who participate in it do so very voluntarily and willingly and do not consider it invasive or anything like that. So I believe it has a high level of acceptance on the customer side. There is also a kind of participation effect and the feeling that the bank is really providing something for its customers. At least in my experience. It was always a bit like that from the customer side. Hey, it's cool that the bank is now enabling us to be very active here. So that also reflects positively on the bank. At the bank, it's the... Yes. Are the regulations still in place? In the past, at least, they were still an obstacle, so that acceptance was there, but the willingness to deal with them was not quite as great. However, in my view, the sales potential and also the image potential of these offers has already been recognized. And I believe that we are definitely seeing increasing acceptance among the institutions here. Yes.

INTERVIEWER: Great, that sounds really good. Interesting insights. Let's move on to the second sub-question. Can you define any organizational implications of this construct, or what other new role concepts are emerging as a result of these 2.0 and 3.0 initiatives?

INTERVIEWEE: Exactly. So when we think of 3.0, we quickly think of lending or enabling credit through people for individuals or institutions. And there, one might think that there would no longer be any credit advisors, because the credit would ultimately be granted by people. So there is at least a bit of that. Of course, the borrower must still be checked beforehand, and various things must be queried. But, and this is also clear, there is a change of roles here to a certain extent. Then, instead of the credit advisor, who previously said yes or no based solely on facts, Yes and no, now says yes on the basis of facts. Basically, you can apply for a loan from people and I will advise you on how best to do that. So, to a certain extent, this is an extension of the traditional approach. Yes, you get a loan based on facts, or you don't. So I think a bit of adjustment is needed there. With the

inter-institutional approach, I even see a slightly greater need for adjustment, because the role that decides on the offer and the possible partners needs to know the market much, much better. By that I mean which providers are actually willing to place their offerings in a banking ecosystem that may not be of interest to every company? And on the other hand, the role must of course know about the customers, about the demand, and must somehow acquire this knowledge broadly through user surveys or similar means. Exactly. So there, too, a role adjustment or role expansion is necessary.

INTERVIEWER: Super, super interesting insights, especially very detailed. Perfect. We're right on schedule, and believe me, you're giving me more insights than you might think or have mentioned before. So I'm very satisfied. Really? Well, then. That's going really well. I also did a quick signature check during the interview. So I have that on file as well. Perfect. Well, I'm not surprised. I saw that you just shared it. But okay, all right.

INTERVIEWER: And we'll jump over to the second research topic. Now we'll focus a little more on machine learning, data analytics, and, above all, this sales recommender law. So, first, how can machine learning and data analytics methods be used to develop and implement effective banking sales tickets? And what specific use cases show how they impact sales performance in the financial sector? And here's the same thing again in green. But this time, I'll start with a thesis. And that is: In order to leverage the potential of Beyond Banking, there is still a lack of clear business models and the necessary skills. Do you agree? Explain your point of view in detail.

INTERVIEWEE: I see what you mean. I see it in a similar way. Exactly. I believe that. It's always stupid when you talk about banks, because. Because they are, of course, companies, but the decision-makers in the banks or institutions always look very much at themselves. Many, many large, especially large financial groups in Germany. When I think of the savings banks, financial groups, or even the cooperative financial groups, they have, of course, had great, great successes in the past, had incredible, incredible market shares among the people, and to a certain extent, they are still living off that and so on. They always look at themselves and think, hey, look, we're totally successful somehow. Fifty percent of people still use our online banking, and I believe this success is standing in the way of some

decision-makers to a certain extent. Yes, breaking new ground, but it is necessary to do so. I believe that when you do something, theories and concepts are developed, and these may then be developed to a certain extent without taking the market into account. Simply because the decision-makers don't have the knowledge of how to develop market-oriented products, i.e., how to really conduct customer surveys. I'll probably say this once or twice more, because for me, that's always the basis of product development. That you survey customers and people before you develop a product, how you structure that and how you develop the project extremely well. How to then develop the project extremely well. Yes, well, in the past, I managed a Beyond Banking ecosystem at Sparda Banks, and there we approached partners and implemented them in the app. Regardless of whether we even knew that these partners would have a demand. Yes, we ultimately integrated partners who were enthusiastic about it. That means we more or less implemented blind partners and, of course, should have asked customers beforehand or surveyed customers: Which partners do you actually want? And I believe, I believe that if we, if, if, if we, as German banks, German institutions, were to take a more structured approach there, the ecosystems could be much, much more successful.

INTERVIEWER: A good conclusion to this thesis. Thank you very much. Exactly. So you can already confirm something, I would say. So this thesis that you find here, yes, nevertheless, I would say that use cases and business cases for ecosystem constructs 2.0 and 3.0 come to mind. You already went through something earlier. Would you like to add anything else, or do you see any developments in this area? That banks might do something there? Um, yes. Exactly.

INTERVIEWEE: Exactly. So there are, and I'm a little confused about this. There are. There are movements in this. In both. In both levels, I would say, and the German banks are not doing too badly. They are trying a lot. I think they just need to expand it further and make it even more customer-friendly. Use cases. Sure, with the Sparda banks, it was for level two zero. The banking ecosystem behind the TU app. Um, DZ Bank once developed a multi-banking app with an ecosystem, if I remember correctly. Exactly. And N26 is, I think, the most prominent example, or the most successful example, I believe, which collaborated with Clark and was able to take out insurance policies directly in the app at Clark. Exactly, exactly. And Crowd Crowd Landing was still level three, or crowd crowdfunding. That's where I was. I helped manage a crowdfunding platform for the Volks- und

Raiffeisenbanken in Switzerland. On the software side, as a project manager. (...) I'll just check what it was called. Yes, exactly, it was Local Local Heroes, part of the Sparkassen Finanzgruppe, which set up the crowdfunding platform 99 punkten. At level three, just like Local Heroes, it gives people the opportunity to collect money from other people. And the Volks- und Raiffeisenbanken are also involved. Many create more of a crowdfunding platform at level three. Exactly.

INTERVIEWER: Okay, wonderful. That sounds very good, I would say. That answers the sub-questions on the thesis. Let's move on to the dimensionalization and scaling of such systems. So how do you assess these possibilities for the dimensionalization of the Beyond Banking Ecosystem? Are you familiar with this, or do you know of any scaling points where you would say that this is particularly important for me in order to scale such an ecosystem?

INTERVIEWEE: Yes, exactly. Scaling an ecosystem is, yes, that's kind of what the question is about. The question is, how do you want to do that? From my point of view, we are again only at the first step here, which is the customer survey. That's why I said I'll come back to that once or twice. So that means we have to look at how my customers are positioned in the bank. We have N26, for example, which certainly has a completely different customer structure than the savings banks or the Volks- und Raiffeisenbanken. That's a hypothesis, but it's what I would assume at first. That's why I have to look again at what they actually need. Do they need a wide range of services? Do they need to find many industries in my ecosystem? I would perhaps assume that again with N26. Or are we simply very, very deep in the market and I need many providers in one industry? In that case, I would again rely on customer surveys and act in a very target group-specific manner. Exactly. So, as banks, we actually have all the options because we have the payment flows, because we can conduct additional surveys and have a broad base, so that we can actually solve the chicken-and-egg problem, which we already briefly mentioned, very well because we already have great customers.

INTERVIEWER: I would like to add something to the question. Is that okay with you? I think that's fine. Okay, then let me repeat the sub-question. As one of the decision-makers, you have already answered correctly and explained how such systems can be scaled. What is your gut feeling? Are other decision-makers, especially from the bank or perhaps from other partners, also aware of these

possibilities based on their experience? But are they also being used? Or what is the situation? What do you say, based on your experience?

INTERVIEWEE: Based on experience, decision-makers in banks are very often very, very good bankers who are very, very knowledgeable about the banking world and have therefore naturally brought banks into a position where they can operate very successfully and also have the means to set up an ecosystem in the first place, because setting up a banking ecosystem is, of course, because it is usually an investment, and when I say all this, it seems a bit obvious that I believe that decision-makers often lack the knowledge of what the whole thing actually means. So what does Beyond Banking ecosystems actually mean in detail, and what does it mean to really implement it operationally? In other words, the operationalization of this whole decision, and I believe there is a lack of knowledge because it is knowledge. There is a lack of knowledge about how to integrate partners technically, how to integrate the right partners, how to not just offer customers banking services, but to say to them, "Hey, look, we are already a bank in a way, but we also do more than that. And we want to be a more important part of your life. And that's why we're now offering you additional services, and I think this ability is not quite as pronounced in banks.

INTERVIEWER: Okay, wonderful, that fits. We can move on to the next question. You can also answer this one with yes or no. So, does your company use Beyond Banking Sales Signals, or do you know of other banks that use them?

INTERVIEWEE: I have to admit that Beyond Banking Sales Signals doesn't mean anything to me. I couldn't really place it. So I would probably have to say no, or I would have to explain it first and then, of course, answer yes.

INTERVIEWER: Before you perhaps assume something is wrong or, due to difficulties in understanding, perhaps give the wrong answer. You're very welcome. So, what I understand by that is, you know, um, um, sales impulses via a CRM system, which bankers also use, of course, to perhaps, um, let's say, close their products. Often tailored to financial solutions, of course. But have you ever seen that a CRM system can be, but doesn't have to be, an RSM system? So it doesn't necessarily have to be a banker in between who gets these signals, it can also happen automatically via data-driven online banking channels or apps, where the customer gets a signal. Oh yes. Here's something beyond banking. Is that

something for you? Have you had any experience with that, or does anyone use it? (..)

INTERVIEWEE: I. Okay, now I understand. Thank you very much. You're welcome. I'm just thinking about it. (4) So, we have. I. I. I can't. I can just answer first. And then you can see if that. If that. If that helps? Um, gladly. We had at the. At the. At Eco in the. In customer sales, we had for a while, if you. If you at the. Yes, probably not if you, for example, I'll stick with Starbucks, if you bought something at Starbucks, it had the Starbucks logo on it. You could click on it and you would be taken to the Starbucks website. We turned that off again because it was too invasive and there were a lot of customer complaints. Um, is that at least somewhat along the lines of what you're looking for? But it would be more like what I described at the beginning. I see that the customer has made a purchase at Starbucks and I then show them targeted advertising. That would be more like... No.

INTERVIEWER: That would be exactly the second one. Exactly.

INTERVIEWEE: Exactly, exactly. Yes.

INTERVIEWER: So, of course, it has to be personalized somewhere, okay, for example, the customer was now, so we can use Starbucks as an example, he was there more often and, well, now we might show him a coupon for a limited period of time because he was there quite often somewhere in Düsseldorf, for example, and that can also be used for that. Yes, um, then I have to say, okay, perfect. Yes, then that works too. No, it's an important insight. Doesn't everything always have to be yes? Yes, it's research. So that works. All right. Then let's move on. Namely to. No. Why is that? How can you explain that? Yes. Yes.

INTERVIEWEE: Exactly. Um. I have to use an answer I've already given.

INTERVIEWER: I'm happy to do that.

INTERVIEWEE: We have that at Komiko. I just described it with the logo that was simply included in the sales. It wasn't active in any way. Hey, something pops up here, buy something, but it was just a logo in the sales and that was already too, well, too intimate for people and I think that's why it's often not used yet, because you don't want to bother people in this online banking area, which is very intimate for Germans, with something like that, with sales, I almost have to say. You don't want customers to feel harassed. I think that's a big reason.

INTERVIEWER: Okay, understood. Anything else you'd like to add, or is that all for you?

INTERVIEWEE: I suspect that's the main reason.

INTERVIEWER: All right. Yes, thank you very much. That answers question two, so let's move on to question three. We're still on schedule. Let's take a look at the direction, namely toward. Yes, I would say data governance, i.e., evaluation criteria for a successful, scalable Beyond Banking ecosystem and also what factors are involved in designing a model. So here's the question: What are the most important influencing factors and evaluation criteria for the successful creation of a scalable Beyond Banking ecosystem? And how can these factors be integrated into the technical design of the model? Also " " here. We'll look at the documents and start with the first closed question here again. Please answer with yes or no. Are you familiar with the use of a guideline, concept, framework, construct, or blueprint, whatever you want to call it, for creating a scalable Beyond Banking ecosystem in the banking sector?

INTERVIEWEE: No, I am not familiar with that.

INTERVIEWER: Okay, that's fine. Then we can jump straight to question 3.2. What would be important to you? Now we have to think about it. You say you don't know of any. That's fine. But what decisive factors and criteria can then determine the value of a successful Beyond Banking ecosystem? What would be important in your view?

INTERVIEWEE: Exactly. So for me, it would be important to know the value of the ecosystem. In other words, the number of customers. Absolutely relative. In other words, the number of customers who use it. Of course, I'm not interested in our customers' ecosystem. I want to know how many customers, how many.

INTERVIEWER: Active, active customers, exactly.

INTERVIEWEE: Then recurring customers are probably important. So how many of the active ones come back, how many buy more often? (...) Then, of course, you could survey general customer satisfaction via an NPS. So how satisfied are you with the ecosystem? Number of partners involved, maybe duration as well. So how long have the partners been in the ecosystem? How long have they been enjoying it? And revenue? So how much revenue is generated in the ecosystem?

INTERVIEWER: Okay, wonderful. That sounds very good. Do you have any other criteria, or... No, I think that's okay. Okay, then maybe a question that's not there right now would be appropriate. But just a little bit. I... I... I'll ask you, um, if we're now moving in that direction... Okay, we now want to move on to the technical implementation of the model. (..) What else would be important to you? So, I. You don't have to be an IT architect for that. But maybe, if you imagine you want to realize and implement something like this, what else would be important from a technical point of view? I can also mention a few criteria right after, if you can't think of any. But first, I'll ask you openly what would be important to you and what else would you have to consider?

INTERVIEWEE: What would be important to me from a technical perspective when integrating a Beyond Banking ecosystem? It would be very, very important to me that the ecosystem is fully integrated into online banking, both on desktop and as an app. And I mean both the app and the desktop. It must be fully integrated into both and not somehow via perperframes or some other kind of fiddly solution. So there must be complete integration into online banking. That would be my highest priority from a technical point of view.

INTERVIEWER: Understood. That's fine with me. Then we can conclude this research question. Thank you very much, and we're already moving on to the concluding questions. We've looked at a lot of things, okay, what are the opportunities and potential of banking ecosystems. But now, of course, we also need to take another look at the risks and challenges and assess them. And that's what we're going to look at now, so perhaps first of all, how do you generally classify the challenges of such ecosystem constructs 2.0 and 3.0? Before we then look more at the risks and consider the individual perspectives.

INTERVIEWEE: Exactly. So, I think that when it comes to the two challenges of establishing such an ecosystem, it doesn't matter whether it's two or three zero, there are regulations that must be complied with. At the very least, data protection must be ensured in some way. That can be solved, but it is a challenge. Then we have... What I also touched on a bit throughout the conversation is expertise. That means we need people in the institutions who are familiar with both ecosystem structures. Depending on what is to be implemented, they need to know how to do it and they also need to know how to keep such an ecosystem alive and how to

ultimately make it successful. I think that's a bigger challenge than the regulatory framework, because people may not yet have the knowledge, or they may not yet be aware that they lack the knowledge. So if I'm a decision-maker in a bank, I don't know everything there is to know and initially believe that I can do it all. So expertise is a big challenge. And then, of course, we have the technical challenges. It has to be developed in a scalable way, which means opportunities for further development of the ecosystem and the integration of partners. All of that has to be ensured. And it has to be developed in a user-friendly way, which is actually a given, but I'll say it anyway. It has to be very easy and intuitive for everyone to use.

INTERVIEWER: Wonderful. That sounds very good. Would you like to add anything else, or shall we move on to the risks?

INTERVIEWEE: I think those are the main challenges I see. Basically, yes, yes, we can move on.

INTERVIEWER: Then let's do that. Starting with the legal risks. What are they? What do you know about them?

INTERVIEWEE: Yes, I think so. What? What? The minimum response would be GDPR. I think that's a legal risk. That's what immediately comes to mind when you think about this topic. You have general compliance, risks when integrating partners. So for insurance companies, I think it's even more complex because it's the second area of financial services. So there are additional legal requirements, and then I think there's the performance and liability risk in these ecosystem constructs. It's not always as trivial as one might suppose. So if someone offers a service via this platform or in an ecosystem, who is actually responsible for the service? Everything can be resolved, but first of all, there is a risk that it will be set up properly. And who is ultimately liable for the ecosystem, for the service, and, of course, for any violations of any laws? I think those are the three risks.

INTERVIEWER: Okay, wonderful. Then let's move on to IT risks. What comes to mind?

INTERVIEWEE: Exactly. I had. So, intuitively, the first thing that came to mind were the classic cybersecurity risks. That the application or ecosystem is set up securely and that the connection is created in a way that is as functionless as possible. That's why I mentioned earlier that it's essential for it to be integrated, i.e., permanently integrated into the ecosystem, into online banking, in order to

minimize the attack surface and vulnerabilities, such as frames. That's a gateway for security risks. Then you always have a dependency, to a certain extent in terms of security, on your partners, that your partners are also set up securely. Because when I transfer my customers to a partner, yes, I'm putting my customers into the partner's security area. And there I also have a security risk from external fraud. Whatever fraud may occur there, it must be prevented. And yes, a technological risk. Yes, that's simply that the technology is down and this creates liability risks or something like that. Exactly.

INTERVIEWER: That sounds good. Well explained here too. That fits. Then let's move on to the last question of the chapter. What other risks come to mind? Well, I have an example. For example, if the bank has a role here as market orchestrator. Perhaps that's also a risk, because I perceive this role here, but you're also welcome to mention any other risks that may not have been mentioned yet.

INTERVIEWEE: Exactly. That's right, the first thing I wrote was unforeseen liability risks, which contributes a little to compliance risks. Of course, we try to rule everything out in advance, but sometimes, when you enter a new area or a new market, mistakes can happen and liability risks arise. Reputational risks, because you work with the wrong partners, which was not foreseeable beforehand, or because the partner makes a decision and is discredited in the media, which could rub off on me or my banking institution. Strategic risks. You say, "Hey, we're now fully committed to industry XY with my partners." And two months later, it turns out that the industry is completely crashing and going under. So you've chosen the wrong strategy. Maybe also the wrong strategy in terms of development. The wrong strategy in terms of how you approach and engage partners. Exactly. Maybe you've also bet on the wrong ecosystem structure. So strategic risks in general and the market environment. I would also mention risks. Interest rates can change when we're in the short landing zone. That's a strong dependency. The higher the interest rate or the key interest rate, the more difficult it becomes, of course, for me too. My business. Then I have geopolitical risks, regulatory risks. For example, if I'm now looking at crypto crypto service providers.

INTERVIEWEE: Or crypto partners, and this market suddenly becomes brutally hard-regulated. It's a risk that I couldn't foresee beforehand. But what affects me directly, of course, and I think is a risk that all companies currently face,

is know-how, expertise, personnel, risk. So I need, as we've now discussed, I need certain expertise, I need a different kind of expertise compared to the existing banking expertise that I already have. And there could simply be a risk that I won't find this expertise or that once I've found it, it will disappear again. So personnel risks. Exactly.

INTERVIEWER: Wow, I have to say. It's amazing what risks you've identified and, above all, prepared for. Amazing. I'm really impressed.

INTERVIEWEE: That sounds... Well, I am. I am willing to take risks. But these risks exist.

INTERVIEWER: No, everything's wonderful. That's how I've assessed myself as a person before. That fits, that's how I tick. But there are risks and of course they should be named. So, great. Thank you very much. I'll ask again anyway. Would you like to add anything else? About the risks, or is that okay with you?

INTERVIEWEE: Um. (..) Yes, no, no, I think that's fine. Great. That's fine.

INTERVIEWER: Then all that's left for me to ask is... Or would you like to add anything to what you've already said? Any comments? Or perhaps some tips and recommendations, or anything else you'd like to get off your chest? Here in this interview?

INTERVIEWEE: No, I think I've said everything I wanted to say. I've said everything I know about Beyond Beyond Banking Banking. Of course, it's also cool for me to share my knowledge and to be able to really let it all out in such a structured interview. Yes, no, that's fine. Thank you very much.

INTERVIEWER: Perfect. Then we're already at the end. Thank you.

APPENDIX 4. Semi-Standardized Expert Interviews: Transcript from Expert 2

INTERVIEWER: Let's go straight to the first research question. That's RQ1 here. So, I'll say it again. How can the combination of intra- and inter-institutional customer data matching improve the dimensioning and scaling of beyond banking ecosystems in the financial sector? And what impact does this have on data protection, integration, and technological infrastructure? Big research question. But you don't have to answer it right now. So, everything okay? Yes, it's quite a big one. But let's go. Exactly. Let's go. But step by step, to answer these three questions. Exactly. Yes, that falls under it. How do you see it?

INTERVIEWEE: I'm just thinking about all the examples I can see in our company. Yes, indeed, when I think about our business, etc., theoretically, as soon as it's not a direct yes, it's actually Beyond Banking, as long as we don't sell data to customers and thus can't build a business model on it, which is not the case now. That's not banking per se, so in my view, it counts as part of it. So if I make money by selling customer data to customers, for example, that's banking, if I as a bank have no idea. (..) Well, those are the cases again, or if I simply take the customer in the direction of cybersecurity, for example. Banks have a lot of expertise in cybersecurity and other areas. If you sell that to customers as a service, I would say that's also beyond banking. If you do this or that or the other. So, several things are slowly coming to mind that I would include in that category. Actually, I see the revenue model as the answer to the question. I actually see the revenue potential of beyond banking when I include all of that, from API cases to consulting services that a bank can provide because we have expertise in this area, where we have no idea. Beyond banking cases support the bank in the background, and I actually see a lot of potential there. So really, generating revenue for a bank.

INTERVIEWER: That sounds good. Exactly. Especially the sale of data. Because that's not what banks used to focus on. But today, I can think of topics like Glassdoor. There were also discussions about saying, "Hey, we have salary data from customers here, and I'll say as a package or as a customer package to Glassdoor. Passing on such evaluation platforms so that they naturally have more valid values, which they can pass on to their customers anonymously. So there are also efforts by banks to do something like this, i.e., to go more into this data asset, i.e., data asset in sales, and to generate business models from it. Exactly. I think

that's good. You've picked up on it correctly. It also fits with my idea. So let's move on to 1.2. How do you see developments in the area of Beyond Banking 2.0? I mentioned 2.0 briefly earlier. Does this mean an inter-institutional approach? Put simply, I have a customer in my bank and now I have a third-party provider. I now have a business relationship with them and can conclude a deal. The bank earns commission. Yes, how do you see developments there, or do you have a few cases? Do you see other banks? Tell me about it. Gladly.

INTERVIEWEE: Yes, yes, in fact, I see this as one of the greatest potentials right now, because a lot is happening in this area for us. Especially when I look at the API, i.e., the truly open banking approach, you can see that yes, there are customers who actually make direct connections and use the data. But in most cases, there are third parties in between who set up business models that they then market to customers. So there's a lot going on there. Uh, yes. Music. Really, I would say, especially in that segment. In other words, that's what we're seeing most strongly, what's growing most strongly right now, where the greatest demand is.

INTERVIEWER: Mhm. Mhm. Do you perhaps have a few examples? Either cases. Can you really name a few cases? Or perhaps industry sectors where you work together? Industries?

INTERVIEWEE: Exactly. I can't name any specifically in the wealth management environment. So let's think about it: there are wealthy clients, and then there are a few larger software providers in Germany that provide data for family offices, for example, whether they are single or multi-family offices. In other words, they have the portfolio preparation, how and what they use in the background, be it graphical representation or any models they calculate or what they merge, etc. And they are very, very active. So I would say that this is currently the leading sector, which is very strong. (..)

INTERVIEWER: Exciting. Thank you. (..) Maybe we'll now take it a step further and say, okay. There are cases, that's good. And what added value would you see in that? Both for customers and for banks in this ecosystem construct. What advantages and added value does it offer? (..)

INTERVIEWEE: For customers and banks?

INTERVIEWER: Sure. Yes.

INTERVIEWEE: So on the customer side, of course. Specifically for this interinstitutional aspect. Or even more generally.

INTERVIEWER: Um, first of all, institutionally this year. Yes, exactly.

INTERVIEWEE: Okay, so for customers, of course. That was already mentioned briefly. For customers, it's simply an optimal presentation, meaning they get the product they want and don't have to put in a lot of effort, because theoretically they could do it themselves in this case, but that requires IT capacity. It costs money, it costs time. So, of course, this is a great approach for them. That means, well, it's kind of, how would I describe it? It's not, it's not completely off the rack. But it's also not perfect made-to-measure. So, not perfect custom work, but made-to-measure. Is that how I would describe it? And for the banks, on the other hand, the problem is always that the banks say, "Yes, I'm losing the direct line to the customer, the direct customer interface." In my opinion, that's nonsense. It's easy for banks to be where the customer is. To offer the customer the best possible service, to retain the customer and thus also do business and not lose the customer.

INTERVIEWEE: Of course, multi-banking is good for customers. In other words, they can get information from various banks through a provider who collects the information from Bank ABC, for example. That's really cool for customers. Exactly. Otherwise, I can't think of anything else off the top of my head.

INTERVIEWER: That's fine. Thank you. You've already answered that, but I'd like to ask you again. Here. What partnerships are being formed and what offers are being made to customers? You just described this software provider for the wealth management sector. Yes. Do you have anything else to add?

INTERVIEWEE: Yes, exactly. Well, I don't think direct customers are relevant right now. In other words, if a customer uses something directly, then it might be quite interesting. There are some very interesting cases, such as Energierevolte, a company owned by Stadtwerke Düren, which actually offers prepaid electricity by using one of our APIs. This approach allows us to offer customers a new business model in the first place, because they receive information about account movements directly and can then use it automatically in the system. (..) Otherwise, there's a lot of forest management. These forest management providers that come to mind... And yes, exactly, I'm just thinking, what else is

there? What might be interesting. There are also some projects that are still in the pipeline, where I'm definitely...

INTERVIEWER: That's okay. (...) Everything okay? Yes. He's telling you what you can do and you shouldn't hold yourself liable. Exactly. I mean, as I said, you're not listed anywhere. But of course. If it goes out. Information, regardless of who it comes from, may give other parties an information advantage. So that's fine with me? Yes, thank you very much again. It's also a good approach with the municipal utilities, that you provide the channel as an API, so that the municipal utilities in turn get new customers, so to speak. So new customer data records. So again, the other perspective. You as the operator? (...) As an interface, so that third-party providers can also get new customers again. And you'll certainly earn something from that too. Exactly.

INTERVIEWEE: What might also be worth mentioning is that, of course, all comparison platforms, be it Check24, Smava, or others, are always involved.

INTERVIEWER: That's included. Very good. It's good that we've come full circle again. Perfect. I would say let's move on to the third stage. We were just talking about interinstitutional. Now let's move on to stage three. So you already have experience with an expanded view of the ecosystem at stage 3.0, with an intra-institutional approach, i.e., a B2C business approach with the bank functioning as a market orchestrator. Do you have any experience with this? Yes or no? Just a quick answer for now.

INTERVIEWEE: Uh. Not at our company. I'm thinking about it. Was there something somewhere? We thought about it once. Nothing was ever done that I was involved in. There were some thought experiments, but so far, nothing has come of them at the bank or where I work. Nothing has come of it yet. No. Okay.

INTERVIEWER: That's an important insight for now. So you have at least considered it, but apparently nothing has been implemented yet. So how does customer matching take place at the interinstitutional level? Since you say that level 3.0 has not yet been implemented, can you tell us how customer data matching takes place? So, for example, if we go back to level two zero, you now have the municipal utilities again, or let's say this global management customer with the software provider, how does customer data matching take place? So, on which? Which technology, which technology do you use there? Or how do you find it? Just

like that? Yes, such a data match. How does that work? What exactly does data matching do for you?

INTERVIEWEE: We don't actually do any data matching ourselves.

INTERVIEWER: Yes.

INTERVIEWEE: So, ultimately, we simply offer the data that we have from the customer on a one-to-one basis. That means that matching itself does not take place at all in our concept.

INTERVIEWER: Okay, understood. That means... You probably get ideas from a business relationship. So through content transactions and... That's how I would imagine it. And then you'll say, okay, you could be a potential candidate for this software. Is that how it will happen, or do you take the reverse approach of saying, okay, we have the software and now we'll see which customers we have?

INTERVIEWEE: Actually, that's not how it works at our bank. In other words, the customer goes to the provider or has the provider, meaning we're not involved in the marketing at all.

INTERVIEWER: Yes, okay, that means there will be more of a landing page that is probably accessible to everyone, and if they are interested, they can find out more about it and will probably jump to the provider where they can then purchase the product. Anyway, is that how we should understand it? So there is no data comparison, but it will probably work like a kind of intermediary business via a landing page.

INTERVIEWEE: Yes, there are other cases like that too. Yes, indeed. Yes, okay, where it's integrated, in online banking, etc. Exactly.

INTERVIEWER: Exactly, that means this landing page is actually made accessible to all customers. No data comparison takes place at first, but because it's there. If interested, customers can use this landing page to find out more or purchase the product if they wish. Right. Okay. Understood. Great. Yes, then I would say we're done with that. Then let's move on to the last question, the first research question. That's 1.4. So, how do you see the acceptance of a scaled banking ecosystem and the associated customer matching at the inter- and intra-institutional level on the customer and provider side, and what organizational and/or other new role concepts could arise from this? So, acceptance. There's this

Beyond Banking. I'll say business models. Ecosystems can also be boards of directors. Maybe this already exists at other banks or at your own, and well, how is it being accepted by customers? So, on the customer side and on the bank side? Yes, and is there perhaps a mindset change taking place? Does that mean you may have to position people differently, including employees, or change role concepts? So, I just wanted to reiterate that there were two long questions, which is why I want to elaborate on this a little bit.

INTERVIEWEE: That makes perfect sense. So, acceptance. I think this topic has been on everyone's lips for quite some time now, and people are talking about it. So, I notice what we've learned. Somehow. In the end, everyone wanted to build the ecosystem. That's why, at our bank, the term "ecosystem" has been overused. That's why we, let's say, no longer use the term at all. Ecosystem, because it really isn't useful anymore in our business. That means, from my perspective at the bank, acceptance is, well, not that great. So it has lost a bit of its appeal because, in fact, everyone has tried something, but no one has actually managed to implement it properly yet. I think on the customer side, it's actually true. They are familiar with it from other business areas. Everything that has nothing to do with banking, because it's somehow from some big internet tech companies that offer this kind of thing, or other industries that offer this kind of thing. I think that on the customer side, especially among young customer groups, acceptance is very high, and it doesn't matter anymore whether the data is used for something else, as long as it adds value. But I have the feeling that within the banks themselves, we have actually struggled a bit with this whole issue, especially in recent years, and that there needs to be a new awareness campaign, with new people coming in. And yes, that would definitely require a lot of work in terms of retraining.

INTERVIEWER: Okay, that was interesting. Exactly. So I think you've already answered the second question with your last one or two sentences. So, once it's burned, you probably need new impetus, perhaps from outside, perhaps new employees who say, "Hey, it worked after all." We may also have other cases that may have worked, perhaps purchasing the knowledge and/or making the change again. It probably needs to be retold, and the workforce needs to be brought on board again, i.e., convinced, as I understand it, right? Okay, yes, understood. Okay. I'd like to add something. Is that okay with you? The one?

INTERVIEWEE: I'm just thinking about it. Otherwise, yes, indeed. The problem is what is really needed. Specifically, the closer you are to the customer, the closer you are to sales, the less there is. I notice the understanding of digital business models at our company. In other words, it's simple. There is a lack of sales for digital business models. I think that's still the case in many banks. That means a new sales unit, a new organizational structure specifically for digital business models, would have to be set up. In my view, that's such a big, decisive factor, and it needs to be culturally embedded in the company's strategy at the very top.

INTERVIEWER: Yes, I find it really exciting that you mentioned that. That means that the sales department also had to be trained in this area. Perhaps this awareness will also make it easier to pick up on impulses. So first of all, it enables them to understand these impulses, or rather the NAV of the customer, and perhaps to pass this on to the bank, because otherwise the knowledge is not there yet. That's exciting again. So, sensitizing or even building up the sales unit, yes, that already goes a bit into this e-commerce area. Perhaps a unit could be created there that focuses more on sales in e-commerce, at least as a competence center. One can also imagine that it doesn't have to have a direct line. But perhaps a small nucleus within the bank that says, okay, we'll just look at the topic, look at the sales impulses, and get back to work on a core issue. That could also be a direction to take. Okay, exciting. Yes, thank you again for that very interesting insight. Then I would say we've done the first one. The search question. Thank you very much. Let's move on to number two. Now we're going. It might get a little more technical now, but we'll see. So, how can machine learning and data analytics methods be used to develop and implement effective Beyond Banking sales signals? And what specific use cases show how they impact sales performance in the financial sector? So, again, the same thing here. Let's go through the individual sub-questions again. So, 2.1. In order to leverage the potential of Beyond Banking, there is still a lack of clear business models and the necessary skills. This is a thesis that has been taken up by an expert. So, it should be taken with a grain of salt. Do you see it that way too? How would you explain your point of view?

INTERVIEWEE: Yes. (...) Would you say that's one of the issues? Yes, I would agree with that. It's kind of related. We can't always easily compare it to the development of crypto businesses, can we? I think that's what we see so often. It

feels like a technology was brought to market to solve an unprecedented problem. That means people tend to think, "Now we have this great new thing, but what problem are we solving differently or better with it?" And that's why I think it's actually correctly formulated here. Yes.

INTERVIEWER: Interesting. So the technology was there first, but the use cases are not yet clear. So you're going the other way around.

INTERVIEWEE: Exactly, exactly. And for me, that's kind of reflected here. In other words, there's still a lack of clear business models, but... (..) The solution is already there, but the business models for what to do with it are somehow missing. So it's kind of going in that direction. For me?

INTERVIEWER: Yes, that's exciting. Thank you. Then let's move right on. (...) I would say that. Well, I don't want to jump the gun, but do you have anything to add to that? So, you mentioned your use cases earlier. Can you also test this, because you have now confirmed this thesis as well? I would still like to mention that there are no businesses where it is difficult to set up business models. So there are use business cases that you can then call level 2.0 or level 3.0 zero.

INTERVIEWEE: 3.0, not 2.0, is really what we talked about with the global management providers, for example. That means that with 2.0, I already see a few business models that now have to prove that they are viable. So far, they are all rather... Even with us. They haven't really paid off yet. So break-even is still a long way off, and they now have to prove that they can do it. Exactly. But with 3.0, I see it more in my environment, and probably also at other banks. Maybe it's more of a municipal bank, someone who is more anchored in the region, who is better, because maybe such things could then take place more locally, if you can actually see where they are or whatever. And that's why it's not really in place with us yet. Yes.

INTERVIEWER: You've recognized correctly that this may also apply to you once again, once again, one or two pieces of information about timing, that this level 3.0 really tends to occur more at regional banks, because they naturally embody this regionality and try to connect customers and providers who are also customers of the bank. Of course, large universal banks also have this. They also have their regionality. But then, of course, the universal concept is subject to the " " (one bank, one customer). Of course, you can also turn this into a concept in

Germany, so there are no limits. You know what I mean, but you've correctly recognized it. If there are efforts towards Level 3.0, it will happen more at the regional banking level. So great, great that you recognized that. That's why I wanted to confirm that again. That's really the case, but that's why we're talking, to see who else might be involved. Who else is involved? Who else is considering this? Exactly. Great, thank you very much. Then let's move on to 2.2. So, how will it be? How do you assess it? The possibility of dimension? Dimensionalization and scaling of Beyond Banking ecosystems. So then perhaps the sub-question is, are you familiar with this? The possibilities of dimensionalization or. I mean, you're also a decision-maker somewhere, right? Um. As a chapter lead? Or do you perhaps know other decision-makers who are familiar with this question or this thesis, how to. Let's say a Beyond Banking ecosystem, let's say, colloquially speaking, can be scaled. (..)

INTERVIEWEE: Because they're not actually running anywhere yet, unfortunately, we don't have any proof anywhere in terms of scaling, how it actually works. I haven't actually heard of any from the regions that I know of, or the ones I know haven't really achieved these economies of scale yet. So, from my point of view, it hasn't been proven far enough yet to say, "Hey, this is the expected scale." Really? I don't know of any yet, right?

INTERVIEWER: Okay, understood. That means I probably take it to mean that you should first reach the 3.0 level, or even just get there. Let's say you should build an ecosystem, and then, once that's up and running, okay, how can I then think about further scaling effects? Is it even profitable at this point? How can we take the next steps? That means there's still a step to be taken before that? Exactly right. That's how I understand it, I think. Okay, good, so you've explained 2.2 perfectly. So if not, why? Yes, very good. Look, we're making wonderful progress. I thought so. Very good. 2.3. So, does your company or other banks you know use Beyond Banking Sales Signals, which I mentioned a little earlier? If so, take full advantage of the potential. How do you determine that? (4)

INTERVIEWEE: All banking sales? Of course, our CRM system offers the option to set something like that. We actually had set up such sales signals in the CRM system for our use cases. Hey, look, if you have a customer who has no idea what that was, who has more than so many cards or this or that or this or that, then

this API might be interesting for them. We also use something like that, but they are more general and would therefore also include normal sales signals in addition to beyond banking sales signals. However, we haven't seen much of this so far because there hasn't been much coming in and the sales department wasn't really successful in this attempt at the time, because the sales department doesn't have the ability to really understand and see digital business models as " ". Hey, which customer, where, how, what makes sense? Yes, isn't that so pronounced?

INTERVIEWER: Okay, so that means it's not so pronounced because we, and especially I would say level 3.0, haven't worked it out in detail yet, nor has it been implemented. And due to the existing gap, in that the skills on the sales side are not yet there, this must first be in place so that, let's say, an automated sales signals CRM approach can be developed and consistently pursued. Right? Yes, yes, okay, understood. So that means we have...

INTERVIEWEE: Tried and it didn't work.

INTERVIEWER: Didn't work. That means we should probably start with what was said before or establish that first, and then we could turn it into an automated CRM process, which would then be established. Okay, understood. That means that, from that perspective, you can also falsify it, i.e., answer with no. And you've already explained to me why that is. That's exactly why we can skip the very last question in this research. We simply don't know yet whether they are accurate and promising, because the previous step has not yet been taken. Okay, perfect. Thank you very much. Then we'll move on to the last research question before we come back to the concluding questions, to challenges and risks in research question three. So what are the most important influencing factors and evaluation criteria for the successful creation of a scalable Beyond Banking ecosystem, and how can these factors be integrated into the technical design of the model? Here, too, we'll look at the sub-questions. First, are you familiar with the use of a guideline concept, framework, or whatever you want to call it, for the creation of a scalable Beyond Banking ecosystem in the banking sector? Yes.

INTERVIEWEE: Actually, I would say I am familiar with it. It also incorporates what we have developed at the Business Engineering Institute in St. Gallen together with our colleagues and what we are looking at. So yes, I am familiar with it.

INTERVIEWER: Okay, familiar. Great. If so, to what extent and which concepts do you or other decision-makers at the bank, whom you know, can use as case studies and/or framework models? Can you mention any in this area?

INTERVIEWEE: Yes, yes. Specifically, I would say the tennis model or the previous colleagues, etc., who are always expanding the ecosystem model from the Business Engineering Institute, specifically what starts with a business model canvas and then continues to expand and define these models.

INTERVIEWER: Exactly, this business model can do what he mentions. And then it just occurred to me, I mean, he has several models. Yes, that's right.

INTERVIEWEE: There are several in there. So, the collection there.

INTERVIEWER: Exactly. And then you first go through, let's say, identification through a business model, which can initially develop a business, and then say, okay, now we have the business, now let's take a look at the party system, let's say customer, let's say two parties, two-party system. System. I am acting as an orchestrator as a bank and am considering. I'm also thinking about what the model is called again, but it would have to mean something like a non-event-driven approach. But at least it was a basis for me to say, let's say, how the relationship between the bank customer and the third-party provider can be. What criteria can be used, what influencing factors are there, also for decision-making. That's what's coming back to me right now. So, by describing the design, I come to that. I just can't remember the name. But I think you can confirm that. That's correct.

INTERVIEWEE: Okay. Exactly. There's a lot to be found on this methods homepage. So, these models have been continuously expanded and can be used for this purpose. In my opinion.

INTERVIEWER: Perfect. Perfect. Very good. Then let's move on to the next one, namely the influencing factors and criteria. So, what influencing factors and criteria can determine the value of a successful Beyond Banking system? Which ones come to mind? (..)

INTERVIEWEE: Also exciting. Also in one of these models, pretty much the last one, which was discussed at the last summit, and I would definitely point out that a lot is currently being created there. Be it monetary, reputation, customer loyalty, or market penetration in general. So there are a huge number of influencing factors or criteria that can ultimately define value, but in the end, it usually comes

down to that. At some point, it pays off. But if you look at the big business models, especially large tech companies or something like that, i.e., startups, then it's more about scaling and growth than making money. So there are a lot of different factors, and you have to define for yourself what is actually most important for you in this case, in my opinion. I want to make money with it right now. For my company, I want to use it to position myself well in the market in order to win new customers, or whatever.

INTERVIEWER: Yes, that sounds good. You mentioned a lot of criteria. Exactly. And definitely refer to Dennis Wetterling's model again. That's good. I'll do that again afterwards. As the interviewer, I'll refer back to what you said in the interview, that we'll look at the identification number again. I'll also just consider, of course. I'm not going to develop a completely new model per se. I'm just looking. In science, it's the same, as you know yourself. You try to further develop existing models. At best. Or falsify, validate, pass. You can do that again, and I will. So, Dennis, that will certainly be one of the ecosystems, i.e., concepts that I will consult and evaluate and where I can also consider, okay, in which one, for which one? Which of my cases might I now have to adapt or further develop, if that's even possible? Yes, exactly. So, that's a good point. Thank you for pointing that out. I will do that. And you also mentioned many criteria. Thank you. Perfect. That takes care of the next sub-question, because you were able to answer it. Perfect. We're right on schedule. I'm sure you're happy about that too. Now we're already coming to the final questions, because you've already answered the three big research questions. So now, as I said, we're moving on to smaller questions, because we've looked at a lot. Well, what could be the potential here? In which direction could it go? But of course, we also want to take a brief look at the other side. To see if there might be any challenges or risks involved in setting up such relationships or business models. So, how do you classify the challenges in these ecosystem constructs 2.0 and 3.0? Below. Maybe you'd like to answer that question first, then you can. Can we maybe do it again? Um, no, no, no, let's do it this way. You're welcome to just tell us everything you understand by that. The sub-questions. They refer to 4.1. So what legal risks do you see there? IT risks or other risks, for example. As a bank, I take on a role, for example as a market orchestrator. There may also be various risks in this role construct that I need to be aware of. So everything you see in terms of risks. Otherwise, I'll be happy to follow up again. (..)

INTERVIEWEE: From my point of view, there are a number of challenges. The biggest challenge, in my opinion, is what we discussed in terms of acceptance, namely enabling our banks to think in terms of these ecosystem constructs. This is a completely different way of doing business, a completely different way of working. It's more about collaborating with other partners and not somehow winning the stack for yourself. So, first of all, this requires a major rethink and, in my opinion, a complete sales overhaul. There need to be people in sales and strategy who can think in terms of digital business models and, on the other hand, in terms of such ecosystems. Of course, there are legal risks involved in ending up in such a conglomerate, in such a consortium, and therefore you have to look at it much, much more closely, because there are then many more parties involved in the business relationships. This increases the legal risks. Plus, let's get to the point. When it comes to customer data that you disclose, you also have new legal risks that you take as a company, different from the ones you had before. So, from that perspective, there is a whole new set of risks. Of course, there are IT risks, similar to the legal risks. You are more open to the outside world and definitely need to protect yourself much better, which naturally means more IT risks and other risks. I would also see reputation or something like that as the first thing. If you run such a business model into the ground as a bank and something goes wrong, it damages the bank's reputation.

INTERVIEWER: Very good. You mentioned some risks, right? Challenges? Thank you very much. I think I can think of another one off the top of my head. You mentioned legal risks specifically. So something like data protection issues? Above all, we have to look at whether, as you so aptly put it, it can be confirmed in this video, as you say, consortium. Several parties must also operate in accordance with the GDPR and, ideally, of course, also in accordance with banking-related framework parameters, because this is customer data. What I have also heard from other experts before is that when choosing a partner, you have to make sure that they already have the best possible banking experience, including the legal framework. So why are we moving? Well, we also have PSD2, we have the GDPR. (..) Various bank-specific regulations. So you have to pay attention to many things now, or, as has also been mentioned, something like this can also strengthen the trust of a partner if you perhaps undergo voluntary certification here. We have also been certified according to banking standards. We are a secure partner. Is that how

I should understand it, or at least how I should interpret it? Are those... Yes, I think those are relevant.

INTERVIEWEE: If you look, for example, not only at PSD2, PSD3 and things like PSR, and now Fida is coming, there's something else coming. A big new challenge, where I'm now thinking, you build all these models and suddenly it's okay, you have to provide not only payment data, but now you also have to provide your custody data and this and that and the other. This is really an extension to almost all product classes, not just for banks, but also for insurance companies and others. Everyone is affected. If you suddenly have to offer this to customers, even if it's not yet clear how much you can actually charge for it. Because so far, it's somehow included in the regulations. So, it's not all finalized yet, it's not all settled yet. It's very likely that you'll be able to claim some kind of expense allowance, an appropriate expense allowance for the services you provide. But when you build a business model around certain data and then suddenly you're told what price to charge or something is regulated and others are doing it, then of course that has an impact on the whole model for the next year or two, because there's a lot going on, especially in the market.

INTERVIEWER: Thank you. Good insights. I'm just wondering if there's anything else I wanted to say that I forgot to mention. I think that's it. So I only have one last question to ask. Would you like to add anything else to question number four or any of the other questions? Um. What you're saying. Okay, is that still relevant for this interview? (...)

INTERVIEWEE: No, I think I've said everything.

INTERVIEWER: That's good. Perfect. Thank you.

APPENDIX 5. Semi-Standardized Expert Interviews: Transcript from Expert 3

INTERVIEWER: There are three research questions. I'll briefly explain the first one. How can the combination of inter- and inter-institutional customer data matching improve the dimensioning and scaling of Beyond Banking Ecosystems in the financial sector, and what impact does this have on data protection, integration, and technological infrastructure? That is the research question. He doesn't have to answer it right away, because there are, of course, questions or hypotheses that I have built up or formulated below, which are intended to answer the entire research question. So don't be overwhelmed by the big question. How do you see the revenue potential of Beyond Banking? (..)

INTERVIEWEE: I can answer that briefly. I see it as enormous, because the data available to us is, I would say, the most valuable data that can be collected from customers and made available. Based on this, you can develop very, very exciting use cases in the area of sales, and initial empirical trials show that this has enormous revenue potential, which is also important for banks in order to remain competitive in the long term. (..)

INTERVIEWER: Very good. So, in short. Wonderful. Then let's jump straight to 1.2. So, what developments do you see in the area of Beyond Banking 2.0? That is, with the internet, institutional customer matching by non-banks. What I mentioned earlier, this B2C, this second stage. What developments do you see there?

INTERVIEWEE: So, the bank makes offers to end customers in collaboration with partners, so to speak. First of all, it's very important to note that I have personally accompanied these attempts and initial steps over the last ten years. This was usually presented to customers in the form of additional offers, value-added services, etc., in the hope of inspiring customers. And the primary goal was always to improve loyalty, i.e., customer loyalty, because the customer says, "Oh, look, they're offering me added value, so I'll never close my account there or take out additional products. Um, I have to. So that's something you see at almost all banks, and I would say, based on my experience with a wide variety of banks, with relatively modest success, both in monetary terms and in terms of strategic goals, for example, customer loyalty had relatively modest success. So in the end, it was a kind of must-have that everyone had because the others had it. But it didn't really

achieve anything. To put it in a nutshell. Yes, exactly, that was basically the motivation to think far beyond that.

INTERVIEWER: Perfect, great answer. Can you elaborate? Or at least what added value was there at the time? Or, as you already mentioned, there are a few added values that have not proven to be true in the . Today, can you mention any, both from the customer's perspective and from the bank's perspective, that this 2.0 construct was supposed to generate?

INTERVIEWEE: Basically, it was primarily customer consumption benefits that you should get shopping advantages or partnerships, discounted admission fees to amusement parks, or sometimes even financial products through partner discounts on insurance. However, these were not usually exclusive offers, so in times of absolute market transparency, which customers can quickly access via Google and other search engines, they were not so exclusive after all. In other words, you quickly realized that you could get them elsewhere. And ultimately, customers have other intrinsic motivations for doing business with their bank. At least for now. And they also have a different tunnel vision when communicating with their bank on a daily basis. For example, to put it bluntly, they want to make a quick transfer or check their account balance and have tunnel vision, go to banking, do what they need to do, because they know the clicks they've learned and don't notice much else around them. And if a voucher is displayed there, it's actually pretty much lost and hasn't actually contributed to them feeling more valued or becoming more loyal or perhaps taking out three insurance policies with the bank? So that was a gimmick, but with limited success, as I said. And primarily in the consumer sector. Indeed.

INTERVIEWER: Hm. Oh, that's always very exciting. You're providing some very good insights. Especially when you consider these two points: this fizzling out, the fact that you don't really have a discount or a portal. You actually made equivalent offers through the bank, which you can then find elsewhere as well. And then you say, in combination with intrinsic motivation, that I don't even try to find such offers from the outset in my customer journey or experience, but rather just want to do my banking business, which I probably don't even do in the first place. I'm just not very aware of that. It's also something that needs to be done. So from that point of view, you've really touched on two things that, when considered

together, make it very difficult to demonstrate this success. Great, thank you very much. Important insights.

INTERVIEWEE: You've already made an important point that I would encourage you to pursue further. This is something that many banks are not aware of. For years, customers have learned that it's all about core banking services. Then, for a few years now, well, several years, but for many it's still less. The topic of online banking has come up because we can see how poor the penetration is there even today. And then the customer is also focused on the essentials, so to speak. And that's why they simply haven't learned that there could be more for them there. And that's why I also meant that they often have tunnel vision and don't notice a lot of things.

INTERVIEWER: Understood? Great, thank you very much. That sounds good, or rather less good from your point of view, but there's room for improvement. Exactly. Room for improvement. Potential, as they always say. Thank you. You offered cooperation, already connected. But now back to the next question. Already leaving? That's good. You've always been very forward-thinking. Do you have any other ideas for ? You just mentioned, for example, discounted tickets or, basically, cashback or, let's say, discount options you have otherwise, or insurance, which you also mentioned. Can you think of any other collaborations or offers that have been made to customers? (..)

INTERVIEWEE: Um, no, actually, cashback is more what I would say. It's more something that could be classified as 3.0, because it actually involves data and is data-based, but in the 2.0 area, it's actually this classic business that has been operated by many banking groups for years and has been a complete waste of time, both for the bank and for the end customer as well as for the participating merchants, because it's not measurable at all. It's not measurable at all. You have. It's a complete black box for all three parties involved. No one knows whether the customer at some point held up their card at a retailer and perhaps received a discount there or not. So that was really... I myself worked for a company with over 14,000 such partners, and it was really a complete dud, I have to say. Then there were actually everyday discounts, goodies such as tickets, admission prices, a little bit of a discount. (...) Yes, sometimes financial products, insurance. But I can't think

of much else at the moment. These are the typical added values that you also see with large insurance companies and banks.

INTERVIEWER: Great. All right. Thank you very much. That concludes 2.0, at least in terms of this research question, and we'll now move on to the next step. First, give a very short yes or no answer to 1.3. Do you already have experience with an expanded view at the ecosystem level 3.0, with an intra-institutional approach, i.e., a B2C business approach with the bank functioning as a market orchestrator?

INTERVIEWEE: Yes.

INTERVIEWER: Good. And then? In what way? Then we come to 1.3.

INTERVIEWEE: Exactly. In my introduction, I mentioned that we want to create a kind of operating system for beyond banking with the company Benchido and the platform of the same name. And that's exactly where we have developed such a platform and have already introduced it to banks. At least in the first stages. That's exactly what it does, where the bank becomes the orchestrator and provides a platform on which it brings together both end customers and corporate customers, so to speak, i.e., its business customers. In fact, not only that, but we are also currently working on a new platform that connects only business customers with each other. And we have already taken our first steps in this area and are already using it.

INTERVIEWER: Exciting. Thank you very much. Sounds very good. That means the construct has already been well explained. Wonderful. Now let's move on to the technical level. Um, how does this customer-customer thing work, i.e., bringing this data together so that I know, okay, the customer need is there, the demand, and I have the offer on the other side. How can I operate or connect these two things via data analytics or machine learning? Which machine learning methods or functions are used here? Can you tell us something about that? (..)

INTERVIEWEE: Yes, again, from my own experience. But basically, this is the case across the board, even with other providers who are just starting to experiment with this. The software, the platform, is connected to the banking ecosystem, either internally in the data center or via interfaces. And customers have to agree to participate and actively opt in via various channels so that they are integrated into this system, so to speak. That's important. Since 2021, since the

Federal Court of Justice ruled that customers can no longer be opted out of such systems or, in general, of terms and conditions, changes, and additional services, customers must always actively opt in, which, incidentally, is also a very, very big hurdle. So I have the comparison. I previously operated opt-out systems, where all customers of a bank were entered into such a new function and had to object if they did not want it. That is no longer possible. Now you have to transfer each customer individually into the system via opt-in, and the customers who are then in the system. Their data is then loaded into the platform in a daily data run, specifically their financial data, i.e., financial transaction data, in this case. At least, that is our approach in the first step. Enriched with various demographic data such as age, gender, etc., and then a so-called data analytics takes place in the sense of profiling, which means that the platform then creates pseudonymous profiles based on the customer's purchasing behavior based on customer preferences in combination with demographic data, in order to then have a profile, so to speak, which can then be addressed via various additional functions in the area of sales or shopping, benefits, or whatever, so that customers can be targeted with relevant offers. Exactly.

INTERVIEWER: You described that really well. Sounds very good, very exciting, very interesting, the profile. And personalization is also heading in that direction. In my research, too, I've found that not only through experience, but also through exchanges in business, in everyday contexts and in research, you increasingly find beyond banking and, above all, personalization. And only this combined approach makes sense, because you don't want everything to be generic, as you said, or to have these dissipation effects due to stage 2.0. Personalization is often there. King Yes, so that customers also accept it. Exactly, and not just acceptance, but also acceptance of such offers. Yes, so it's very exciting. Um, thank you. That brings us to the last question of this research question. So, first of all, how do you see the acceptance of a scaled Beyond Banking ecosystem and the associated customer matching? First at level 2.0 and 3.0, level on the customer and provider side. So how do you see the acceptance of such ecosystems on the customer and provider side? First of all, this question and then okay. Um, how might my company change organizationally, or perhaps other banks that need to change organizationally? And what impact will this have? Or perhaps new role concepts will have to emerge from this? Can you comment on that? (..)

INTERVIEWEE: Um, yes. So, end customer acceptance. I can definitely say something about that. It's there. In our opinion, it's actually very high. For example, we've been able to get 30 to 35% of the target group, so to speak, the population, excited about it at several banks within a short period of time by having them opt in and register, as mentioned earlier. The question then, of course, is how often do they use it afterwards? That is, customer activity, i.e., how attractive is it for them in everyday life, but at least acceptance in the sense of "I'm signing up for it, I'm interested and I want to express that." That is definitely the case with end customers. First and foremost, they receive goodies and don't usually pay anything for them. And there are those end customers who are often very quick to be the price-sensitive target group who say, "I like to look at my everyday life to see where I can save maybe two or three euros." They are also open to this and actually accept it relatively well that their bank is bringing this to their attention. As I said at the beginning, this is not something that is learned, but if you explain it to them well. It's also important to take communication and marketing into account and do it well. Then they will accept it because the bank has a high trust factor for them. The bank is really like the wise old man who stands by your side, wants only the best for you, accompanies you, and manages the money you have entrusted to him. And that means you have a very, very high level of trust, which of course must not be disappointed. That's why data security and transparency are very, very sensitive issues. Under no circumstances should this customer trust be squandered. We don't know yet when it comes to corporate customers, because we know that they participate in our partner network, for example, where they also provide services for end customers. We are also very willing to do this in the B2C sector in the area of corporate business, but we don't know yet because that's what we're doing first. Let's start with the impact this has on the organizational structure of banks. This is still in its infancy, but banks do need to take this into account because such an ecosystem is not a sure-fire success. You can't just set it up and leave it. Even if you have a good service provider at your side, you can't just set it up and expect everything to happen by itself. You basically need new employees for this. We now have Erste Bank, which has actually hired a Beyond Banking Manager. That's really impressive. That's exactly what you need. Yes, a Beyond Banking Manager. And they make sure that it is implemented internally, meaning that all bank employees must be on board. They have to live it. Otherwise, it cannot be successful. From the

board of directors to the employees at the bank counter, if it is a branch business. But also in communication with customers, end customers, and business customers. And you definitely need interfaces for that. Depending on the size of the bank, you'll need more than one person. It will probably end up being teams where everything comes together. It will be a mix of communication experts and project management experts. And that's actually a must for the future.

INTERVIEWER: Definitely very exciting insights. Especially since this is the first time I've heard this in banking, I find it very exciting. I like it, I like it. Very good, in fact. Um, I think I've also heard one or two people say this in previous interviews. Banks should also have a stronger presence in the area of e-commerce, especially in terms of organization. If it's not already there, maybe an e-commerce department or e-commerce manager could be set up, who could also evaluate these products better in terms of skill sets, and above all, drive them forward better. And I would say communicate. As I said, with the banking manager, but also, above all, in sales, to raise awareness that you say, hey, maybe you're no longer just going for pure sales of banking products, but either you hire salespeople who sell these beyond banking services from the outset, or you train them. That's right. How do you see e-commerce? Is that also something where you say the bank should pick up on it or as a supplement, or is it a must? How do you see it?

INTERVIEWEE: I'm not quite sure yet what the other experts were thinking in that regard. E-commerce is not a new feature in the world out there. We've had e-commerce in the payment sector for 20 years now. It is dominated by the major payment providers. What we do at Beyond Banking is try to get customers to use their primary bank's payment method for e-commerce. That's why we're doing LinkedMarketing. This means we reward customers in a targeted manner when they use their payment card or account from a bank that cooperates with us for e-commerce. So in that regard, we are already active, and the bank is active as well. Beyond that, I'm not entirely sure what e-commerce means in the everyday life of the bank and the end customer. I mean, you need to have a basic understanding of it. As a bank employee, I'm not entirely sure how bank employees can still have an influence in e-commerce beyond explaining how e-commerce works. Except for persuading customers to pay with their own bank's account and card. As a bank, I have relatively little influence on e-commerce participants such as online shops,

except perhaps in the context of a Beyond Banking ecosystem, where we bring customers and shops together. I only have influence on the payment situation via Beyond Banking, by rewarding customers for using my payment systems. (...) Otherwise, I lack imagination. To be honest.

INTERVIEWER: That fits, that fits. You explained that well. (...) So we can move on to the next question, or rather to the second research question you have. You answered the first one really well. Lots of insights. Thank you very much for that. (...) And now it's going to get, let's say, a little more technical. We'll see. So how can machine learning and data analytics methods be used to develop and implement effective Beyond Banking tickets or sales incentives? And what specific use cases show how they impact sales performance in the financial sector? Another very big question. Let's go. But let's take another look at that. The sub-questions say yes, so now start with a thesis and let's see how you answer it. In order to exploit the potential of Beyond Banking, there is still a lack of clear business models and the necessary skills with . Do you agree? Explain your point of view. (..)

INTERVIEWEE: I agree, actually. It's not even that you can say the technical capabilities are lacking, but there is also a lack of understanding on the part of banks in particular of the possibilities and the visions, of seeing the potential. Many are still stuck in the minutiae of traditional banking. And the sad thing about this story is that we have other market participants, namely end customers, but also sales partners, perhaps retailers, e-commerce partners. They are willing, they are ready and waiting. However, it is not really possible to exploit the potential at the moment because the bank is actually the bottleneck and the limiting factor, because employees or even managers, especially those who know banking as a buzzword and perhaps mentally associate it with purchasing advantages, now perhaps in the sense of cashback. But what they don't actually understand is that purchasing benefits are basically just a product of the actual Beyond Banking. I would say, in quotation marks, a by-product. The real thing is data analytics and the development of data bases and profiling underneath, on which purchasing benefits are subsequently built. For us, I have to put it bluntly. They are shopping benefits. Just the carrot I dangle in front of the customer to get them to give me their data and participate in Beyond Banking. And with this data, I actually see, as a Beyond Banking operator and now also numerous bankers, but still not enough. We then see the potential in using this data to actually promote sales and generate

additional revenue for the bank. And you can see that in practice now. There are still a lot of problems. As I said, in terms of understanding and also in terms of internal skills. That means, for example, we now have the data and could already reach customers with personalized banking products and additional products. I simply don't have an employee at the bank who can give me such a product and say, "Please do the following targeting. I want to reach these customers with it. These are my goals." Goals are generally lacking. I basically don't have a counterpart at the bank. There is no understanding, there is no knowledge. And that is actually more of a problem at the moment. Yes.

INTERVIEWER: Understood. That's very well explained. Above all, you probably long for more Beyond Banking Managers, not just more. Exactly. And you explained that very well.

INTERVIEWEE: It has to come from the bank. Yes, those are my goals. I want to achieve them. I understand the methods you have and the tools you provide us with. So let's work together on a campaign to achieve certain goals. And that's completely missing. We bring it up, but it's not very fruitful because there's simply no understanding. Not yet, anyway.

INTERVIEWER: Understood? Exactly. Um, yes. So you have the thesis, let's say validated. So the basic initial formulation is that it is, let's say, negated. No, it's nothing. Potential is often not there, the knowledge is not there, etc. You have confirmed that. Yes. Maybe you can anyway. From a banking perspective, there may be use cases among those you are in contact with, or where, let's say, the bank is willing and you can already see initial concepts or efforts on the part of the bank. Which use cases are mentioned to you? Perhaps at level 2.0 for now. So this B2C, even if something has been mentioned or thoughts, or we can also brainstorm, these can just be thought constructs for now. For now, just below level 3.0. What could you tell us about that?

INTERVIEWEE: As I said at the beginning, 2.0 is basically limited to gimmicks and benefits offered to customers, especially end customers, and sometimes also to business customers in their everyday lives, which are more commercially oriented. That's it. These are not business cases that will somehow generate a monetary contribution margin, nor are they planned in such a way that one can. Basically, these are pure cost cases for the bank, which either builds

something itself, investing employee resources, or buys in some kind of benefits package or something else from a service provider and pays for it. In the rarest of cases does anything monetary flow back to the bank. It's basically a cost case and is basically classified as a marketing expense. I have never actually seen any bank make money from this. If I calculate the resources, both internally in terms of human resources and then the classic communication costs towards end customers, the bank almost always pays for it. I would even say that this is always the case with 3.0, as we are still in the early stages. (..) There are basically two sources of revenue that can be seen in the medium term. One is commission business. This is again strongly influenced by the commercial factor or sector. This means working with e-commerce partners, perhaps also with insurance companies and travel providers, and brokering them, so to speak, via your own network, via your own platform. As the bank, you are the operator of this platform. If I refer business and sales to the partners, so to speak, B2C is already in its infancy and I get paid for it. In return, I receive a commission, which I can pocket, so to speak. At the moment, this is still very modest. It's not as if it covers 100% of the costs. To do that, you would have to scale up much, much more. These are also usually generic offers. What's really exciting is B2C with personalization, because here I can not only tap into the commission business, but I can also actually support my core business in the area of sales. And that's what I just said. At the moment, the basic technical possibilities are already there, but they're not being used because there's no understanding of them. What can I do here? Here, I can support my own sales in a very traditional way by saying, let's say, you can opt out later, I'll give you a shotgun instead of a sniper rifle. So I can tell my sales team which customer is now likely to be receptive to which product, and I can even target and address them specifically. This means I no longer have to make cold calls or simply send out newsletters or invite people to the store for no reason and hope that they will buy something from me. Based on the data and profiling, I can precisely segment my population that is eligible for a specific product and can also address them in a targeted manner. And that, of course, allows me to increase my own sales. I can do this with my own products, but also with partner products, where I can then tap into the commission business. And that can be in the area of insurance and finance, but also, as you said earlier, in the traditional area of telecommunications, where there are already substantial commissions to be made. So what I mean is, there is

enormous potential here. If I broker a continuing obligation contract, whether in the energy sector, telecommunications, or even insurance, I can earn €70-80 in commission as a bank. With just one, with just one brokerage. So there are already some very exciting cases, but as I said, they are not yet being seen or exploited.

INTERVIEWER: Great, thank you very much. That fits. Especially with the metaphor you mentioned. I think that's quite good.

INTERVIEWEE: A bit macabre these days, but that's how it is. That's how it is, and retailers in particular find it exciting. Yes, I once discussed this with the DIY store chain toom. I spoke to their head office and, of course, they have a case where they have been spending hundreds of thousands of euros every weekend putting flyers in people's mailboxes, hoping that they will somehow reach someone who is interested. And then, when I told them, "I can tell you exactly who is interested, I can see that in the data. I know who has been interested in hardware stores in the last six months. And not only that. I can even tell you who has bought from your competitors and is not yet a customer of yours. And I can target these customers for you. They almost fell off their chairs. It was like Christmas for them. (..)

INTERVIEWER: The revelation.

INTERVIEWEE: That's exactly what's so great about it. I can tell people who shops at Hornbach and I can also approach them and say, "If you come to Toom today, I'll give you a 10% discount," and there's a good chance they'll shop at Toom.

INTERVIEWER: Yes, great, perfect. That's exactly where we want to go. Thank you very much, good examples. Good metaphor. Well explained. We'd like to move on to door 2.2. Now we're going to move a little bit towards the scaling factor. So, how did you initially assess the possibilities of dimensionalization and scaling of Beyond Banking Ecosystems? That brings us directly to the next sub-question: Are you familiar with these possibilities and criteria? Yes, or are all other decision-makers familiar with them? And if so, what are they? What is important here? How do you assess the situation? (..)

INTERVIEWEE: The most important thing from our point of view, but also from the point of view of the banks we have been working with so far, is actually scaling in terms of customer activation, customer acceptance, and subsequent customer activity. That is actually the biggest bottleneck at the moment, because Beyondbanking is an additional service for a bank. And as I said, the Federal Court

of Justice ruling was in 2021. Can't I just make it more accessible to my customers? In the past, we actually just activated it for 100,000 customers overnight and they were then able to use it. That's no longer possible. I have to convince each individual customer that it makes sense for them to be proactive. And that is actually the biggest bottleneck for Beyond Banking. Because we said, on the one hand, customers are not yet familiar with this; they don't originally expect this from my bank. Services like this. This means that, even though I have the trust bonus as a bank, I have to put in an enormous amount of communication effort and find touchpoints where I can reach customers in order to convey this to them. And that is actually quite tedious. Of course, there are various marketing tools that can help with this. But that's the problem. If you have few customers, few opt-ins, and little transaction data, you also have fewer insights and profiles in data analytics. And then what? Accordingly, you can, of course, run fewer campaigns to really drive sales campaigns in order to increase revenue potential. So that's actually the biggest bottleneck for us at the moment. It's everything. All the ingredients are on the table, but bringing them together is actually one of the main problems. The second is actually still partly regulatory issues and so on. Yes, data, privacy, etc., but the main problem is really customer activation, and that's what we're working on most intensively at the moment to simplify and scale it.

INTERVIEWER: Okay, great, maybe I'll mention something else that comes to mind. So you seem to be aware of this as the decision-maker, the CEO of your company. Um, does that mean other decision-makers are also aware of this, especially on the banking side? How would you assess that? Are they also aware of what you've just told us? (..)

INTERVIEWEE: Are they aware of that? If not, they usually become aware of it very quickly after the project starts, because they naturally see relatively quickly that hundreds of thousands of customers are not suddenly signing up, but that it is a laborious process. And then they start to think about it. However, we make this transparent. As a service provider, we make it transparent from the outset and warn them about it and tell them how important it is that it won't be a sure-fire success. I said earlier, with regard to personnel roles, that it's great when there's a manager, because you have to have one. A project like this has to slowly gain acceptance not only among customers, but also among your own employees. They have to accept it themselves, recognize its value, and ideally also see a benefit

for themselves personally. Only then will they bring it to the end customers via their touchpoints. And in fact, getting your own employees on board is often a major hurdle. And to get them to spread the word. Because they are my first multipliers. And we are in constant dialogue, also with the bank decision-makers, to keep bringing this up, because it is often common practice. Yes, it's on the agenda for a while, and then it flattens out again, and after two or three months it fades into oblivion. And if you don't follow up on it as an outsider or don't have the internet, it drives the banking managers, then it flattens out again, and it fizzles out. You have to keep at it, and I would simply estimate that this is a beyond banking issue. And also from experience, the first two years are definitely a tour de force and also an investment. Indeed. And you have to actually do it first. Classic examples are Google and Amazon. They posted losses in the first few years until they reached a customer base that allowed them to really start monetizing and become relevant. And it's the same with banks! You have to fill the funnel first before you really see results at the bottom.

INTERVIEWER: Perfect. Thank you very much. You explained that really well. Now I would say let's move on to the recommender function. Yes, now we're going to tackle this topic. So, first of all, yes or no, please. Does your company use or recommend Beyond Banking Sales Signals? Do you know of other banks that use it? (8)

INTERVIEWEE: Well, we offer the technology. Um, I also know that there are one or two banks that I know of that use it, but it's just getting started, which is why I hesitated. We actually have it now. We are now at the point where we want to launch the first sales campaigns.

INTERVIEWER: Understood. Then let's move on to the next question. So if. So yes, have you confirmed that? Great. Are the banks then exploiting the full potential? How do you determine that? Or not yet? (..)

INTERVIEWEE: So, in no way is the potential being exploited. I base this on the fact that banks that already have the database and could run campaigns directly are, for the most part, not using it at all or only so sporadically that it is not yet really what could be called active use, which is certainly part of the problem. What I said earlier, the bottleneck of customer penetration, is not yet in place. It's a relatively young field and everyone is taking their first steps there. And that's why

it's far from being exploited. So, as I said, the partners are there, so the potential is there. Incidentally, the same applies to the Sustainable Finance Platform. I could run green deals across the database and say, "Hey, don't just be sustainable, use green electricity from brand XY," and the operator of a CO2 calculator would then earn a decent commission, which can scale up very quickly if you get enough users on board. But that's not being used in general yet. So it's still in its infancy.

INTERVIEWER: I see. So I'm deducing a little bit from that. Okay, so backings are basically not such an old topic yet, but you first have to do a lot of persuading and use them. It hasn't been in use for very long. That means these recommendation functions first have to be established. That's why I'm moving straight on to the next question. From what I've heard, you've already said no, but maybe you'd like to say something else. So, Beyond Banking is active, established, and being used consistently? (..)

INTERVIEWEE: No, definitely not. They are definitely not established. Especially with ecosystems, you have different building blocks, and that can be in the area of sales, but it can also be in the area of e-commerce or regional shopping benefits, travel benefits. And at the moment, it's actually the case that almost all banks are focusing on first bringing these everyday, everyday-relevant customer goodies to the customer and luring them into the system, so to speak, before anything else. Which is also a prerequisite for building a database. Incidentally, this is the only way to make money in the first place. And we are still in such early stages that most banks are not yet able to use meaningful sales signals to generate sales. Although I would like to postulate that even if we already had the data and the customer base, it has not yet sunk into the minds of banking people that they would actively use it, and a lot of persuasion would still be necessary. Or, in the classic way, you have to calculate for them what the potential is.

INTERVIEWER: Okay, understood. So, I take it that we are in banking, or are now starting to be, but that this still needs to establish itself and be understood by some people at the bank. And then, once it has become established, you can consider the next step: now I can develop a recommendation function, either automated, because I am sending data directly to the customer, or perhaps I have a sales unit that also supports this, to sell what I would call beyond banking banking services. I still need to develop that.

INTERVIEWEE: It also depends a little on the bank's core objectives. If a bank says it wants to generate additional revenue, then it probably has a different focus. We are currently talking to a very large international bank, because they don't care about any of that. They are fully focused on growth. They only want customer benefits from us that will attract customers. They want to support new customer acquisition because they say they have had good experiences with it, shopping benefits, cashback, and then lots of new customers come. Everything else is completely irrelevant at the moment. They are completely stuffed with investor money. They don't have to be in the black. So it always depends on the bank's goals!

INTERVIEWER: Oh yes, important insight. Thank you very much. Interesting. Super Research Question number two is now also ticked off and done. Let's move on to number three and the last big one before we get to the concluding questions. We are well on schedule. So what are the most important influencing factors and evaluation criteria for the successful creation of a scalable Beyond Banking ecosystem? And how can these factors be integrated into the technical design of the model? First of all, please answer with yes or no: is the use of a guideline concept, framework, construct, design, or whatever you want to call it known for the creation of a scalable Beyond Banking ecosystem in the banking sector?

INTERVIEWEE: No. To my knowledge, there is no such thing.

INTERVIEWER: All right, then we can skip the next question. It's a decision tree, after all. The topic is structured. Um, let's move on to 3.2. So, in your opinion, what are the key influencing factors and criteria that can determine the value of a successful Beyond Banking ecosystem? What would those be? And what would be decisive if you say, okay, there is no design concept yet to develop something like that in the best possible way. But what criteria would be important to you? What exactly would need to be taken into account?

INTERVIEWEE: Since that doesn't exist yet, we also work as service providers or developers in this area, simply empirically, and so for me personally, the most important KPIs, I would say, are always, and I am very numbers-driven because at the end of the day, I don't want to be in the red like Amazon and Google. Exactly. For me, the most important figures are actually the scaling in terms of the total population of users. These are, for example, specifically the end users,

customers, opt-ins, and customer registration. This is very, very important, because it's necessary to overcome this bottleneck and fill the funnel as much as possible so that many, many people come in, and then at the end of the funnel, the second major KPI for me is, of course, customer activity. I achieve this through relevance. This means that I have to think about how to get customers active from day one and keep them active. And I achieve this by addressing them and thinking from the customer's perspective. That's a big, big, big disadvantage in the banking world today. A lot of decisions are made at the drawing board and implemented, and there's no feedback to the customer. That's our approach. We develop backwards from the customer. We look at what the customer needs and wants. And then we develop a solution for it. Whether we like it ourselves or whether it's our first choice is secondary. We want the customer to like it and use it because that's what's relevant to us. Because then I have high customer penetration and good customer activity. Can I then start to monetize? Can I then start to earn money through a wide variety of options, through personalized campaigns? And that is the causal chain for us. And yes, that is actually the most important thing for us, because it's the best program. The greatest product is useless if no one uses it afterwards. So you have to start with the customer. Customer orientation is very, very important. Customer centricity. The ecosystem must revolve around the customer, must look at where I can find solutions for them in everyday life. Where can I meet needs that the customer may not even be aware of yet, where I have thought ahead. And then I can also get customers to become active. When I get them to become active, I can generate direct additional revenue. Of course, we mustn't forget the indirect revenue either. Indirect revenue means that I extend the customer relationship, the customer relationship is maintained, and with it the income I have with the customer anyway. If the customer uses my products more frequently as a bank, for example, pays more often with my cards, I have higher interchange revenue. These are the indirect revenues from the core banking business, which are added on top. Yes.

INTERVIEWER: Exactly. I think you've mentioned some very important criteria that can determine the value of an ecosystem, because for me the question is extremely important. Since he says there is no concept, it's very important for me to include the criteria that will later be incorporated into a design concept. You

mentioned some very relevant factors for me, just so we can briefly summarize. Do you have any others, if you think about it for a moment, or is that it for you? (...)

INTERVIEWEE: No, no, that's it for me. I would like to add that I am, of course, always speaking with a focus on Germany. The situation may be different in other countries, or it may not. There are countries like, like, like the United States, which have been practicing very, very different things for years. And because there are other possibilities there, through regulation and through the data protection practices that are in place, they are already significantly further ahead.

INTERVIEWER: Perfect. Then we've wrapped that up nicely. Question number three, which I think also answers research question number three very well. Thank you very much. That brings us to the last few questions. We've talked a lot about what's possible, the potential, etc. Of course, we also need to look at the other side, the challenges and risks. That's fine for now. Basically, how would you rank the challenges of ecosystem constructs 2.0 and 3.0 before we move on to the risks? (...)

INTERVIEWEE: 2.0 I have to say quite bluntly that it's no longer relevant to me. 2.0 is a discontinued model and will definitely be replaced by the evolutionary step 3.0. Whether that will take another year or two or five is the only question that remains open. But there's no longer any question as to whether it will happen. Because 2.0 systems simply no longer have any justification because they offer too little benefit. And the cost-benefit ratio is completely out of balance, it's no longer realistic at all. So that's 2.0 for you. It always had the problem that it offered too little relevance, too little benefit and no returns, and will inevitably be replaced by 3.0. And you can see that now, for example, with GFG. There is a 2.0 program, even though they call it 1.0, with a great many banks that also use it in the network. And that is now being gradually replaced by a 3.0, so to speak. It is simply no longer relevant. But for me, the biggest challenges are actually in the 3.0 area. (..) As we said earlier, beyond banking must arrive in the bank, in the minds of bankers and decision-makers. It must then be lived out and communicated to customers so that it also arrives in their minds. Then it must be simplified in terms of regulation. At the moment, BaFin is throwing a lot of obstacles in our way and many other things. We spend a great deal of time discussing and adapting the ecosystem to the regulations, but this restricts the possibilities for beyondbanking and the product

becomes worse, as do data standards. That is the fourth major point. Data standards. It's incredibly difficult at the moment to get good data as a service provider. Even if you're in the bank yourself, it's very difficult to get the data you need for beyond banking, banking, data analytics, and so on. So those are really the big issues. (..)

INTERVIEWER: Thank you. Let's move on. Did you mention challenges? Let's move on to risks. Especially the legal side. What do you mean when you say "under 3.0"? What are the legal risks that the bank has to deal with?

INTERVIEWEE: Yes, well, first of all, you need a clean opt-in from the customer, of course. As a bank, you have to present it to your customer, and they have to give their clear consent. Otherwise, it's a legal risk. You have to, if you do that. I assume so. No bank is building its own banking ecosystem, or very few will do so. That means you work with service providers or sub-service providers, even if they are subsidiaries. You have to look at that, because there are now differences. At the moment, that was relatively easy to do within the regulatory framework in terms of BA, IT, and so on. That will change from January 2025. Then the new regulations will come into force. Then you have to move very quickly with such issues in the context of outsourcing. Then you have to do risk management, monitoring, which is a lot of work for the bank internally. So there are also new legal risks. Then it is important how the data is handled. That is, is it subject to regulation? Do I perhaps create certain advantages for myself, do I get into regulatory issues such as money, which are then regulated separately and have to meet very, very high requirements. So that's still very, very difficult at the moment. In fact, there is currently no sign of any simplification on the part of the legislature or regulatory authorities such as BaFin. So at the moment, it's not easy for banks to introduce and implement beyond banking. And there are. All of that can be handled. But it is very, very time-consuming. You really have to go through many, many rounds of negotiations and contract issues just to get started. And that, of course, makes it a certain way. These are certain hurdles that also make it somewhat unattractive. These are risks, and I just mentioned risks. I would distinguish between two types. On the one hand, there is the issue of being able to operate the Beyond Banking ecosystem in a meaningful way. As I just said, there is a lack of data standards. Years ago, PSD2 was supposed to create data for service providers or for such topics in general. It is completely useless. The data is

completely unusable and there are no alternatives. And even if there were, if you are not a service provider but the bank itself wants to use it, it is often very difficult to obtain standardized interfaces within the data centers in order to operate this in the ecosystem at all. That is one area, or, as I said, there are also costs associated with it. Keyword DFG, which prices its own interfaces internally. Not too little. And the second legal risk is, of course, what you then Is that actually IT security? Because IT risks are addressed in IT security. If you operate a Beyond Banking ecosystem, regardless of whether you are a service provider or a bank or a combination of both, you naturally build a data analytics tool with a great deal of data. You create profiles, and even if they are pseudonymized, they are still valuable insights and profiles. This means that you also have to make sure that data security is a very, very high priority and that you have the highest data security standards imaginable so that this never falls into the wrong hands. I'm not just talking about hackers, but also employees who have access to data, the transfer of data between the operating parties, between banks and service providers, etc. So this data is a hot potato, and it really should be given the highest level of protection. For me, IT security and IT data procurement are the two biggest risks for Beyond Banking here. I need one to get started in the first place, and I need the other to be able to operate the system securely. (..)

INTERVIEWER: Thank you very much.

INTERVIEWEE: Other risks.

INTERVIEWER: Exactly, other risks. So, anything else you would like to add to the list of risks. I have included another example, for example, the role of the bank as a market orchestrator. So, perhaps there are also risks in terms of roles, because I am now taking on this position as a bank? Are there perhaps also risks, dependencies, or reputational risks associated with this construct? There are also risks like that, i.e., anything else that might come to mind or anything related to roles when you take on something like that. (4)

INTERVIEWEE: Yes, as a bank, you naturally have a reputational risk, which means you can do the job. But if you don't do it well, then it will certainly not work out in your favor and you may even harm yourself by losing customer respect. I have already identified a risk for the product itself, namely that the know-how is simply lacking and is partly based on passwords that were picked up in a

workshop, but ultimately you don't really know and don't understand what is being put on the table, what is being told to you. We have now also experienced someone supposedly wanting to launch a Beyond Banking ecosystem within the GFG alongside my Plus. But it is actually a hollow shell, simply packed with passwords without any function, yet it has still been successful. To a certain extent, because the decision-makers at the bank level didn't even notice. It was brought to them by someone from their own circle, so it must be reliable. And then a few passwords and that's the future. And in the end, a completely wrong decision is made, and the entire workforce knows that it is wrong. But no one dares to contradict the management, the head of the company. And then money is spent in completely the wrong direction, resources are burned, and possibly even reputational damage is caused because something that is completely wrong is presented to the end customers. So I actually see the biggest risks there, that the bank doesn't have the know-how and is uncertain and doesn't even have the know-how to recognize whether someone they bring in as a consultant or service provider is offering you something meaningful. So even for that, you would need some know-how to be able to evaluate it. Is this good or bad? What I'm seeing here, what's being presented to me? Does it make sense or not? The fact is, to put it bluntly, you basically need Beyond Banking advice that moves from bank to bank, that is a trustworthy institution, so to speak. And doesn't sell a product, but supports the banks, informing them about all the measures and risks. I'm developing a new business idea, I realize. So I realize.

INTERVIEWEE: The demand too. I'm getting asked more and more often by bankers and banks. And they're already coming to me with consulting requests, some of which I have to turn down. So yes, those are really the biggest risks for me. Yes.

INTERVIEWER: You explained that well. Above all, I think that can also be included in the bracket. Strategic risk, because, as you rightly said, if I have the skills and abilities in my bank and I'm not honest with my supervisor, then of course the wrong decision can be made from the outset and the wrong direction can be taken, which then of course becomes all the more relevant in terms of costs and unfortunately a lot of money is wasted. As you already mentioned. So I think you can also include that under strategic risk, which is what you initially see there. Yes, or you can also see continuous risk, of course, and then, once you've made the

decision, but especially in advance, yes, that probably has a lot to do with money, or reputation as well. Yes. (..)

INTERVIEWEE: Yes, I see it the same way.

INTERVIEWER: You see it the same way. Perfect. Then, of course, that's not there, but I'd just like to give the idea some space because we're doing so well with time. Um, is there anything else you'd like to say or add? Yes, about developments, whatever else you'd like to say on this topic, get off your chest.

INTERVIEWEE: Just that Beyond Banking, or Nia Banking, whatever you want to call it, is definitely still in its infancy and is still experiencing the teething problems that all new products have. When they enter people's minds and need a period of acceptance, they have to go through that. But in my opinion, and I believe some others share this view, it is not only essential but probably even vital for banks to focus on Beyond Banking alongside their core services and to sensibly operate this new role that they are growing into, alongside their pure role as bankers and as card issuers and account managers. And I believe that for many, this will also determine whether they will still exist in 15 or 20 years. Because core banking services are substitutable. That means you can no longer differentiate yourself with them, and you can no longer earn enough money with them in the long term. And how! So it's not a question of whether beyond banking is coming, but when and how well and who will do it best. Amen.

INTERVIEWER: Good closing statement.

APPENDIX 6. Semi-Standardized Expert Interviews: Transcript from Expert 4

INTERVIEWER: So, yes, let's really get started now with the three research questions I've brought with me, which include many sub-questions that are even more interesting. Don't worry, I'll always present the main question first. You don't have to answer it, because it's not possible to answer it in its entirety. At least, that's my assumption, but there are several sub-questions that contribute to this main question. Yes, so the first research question is: How can the combination of intra- and inter-institutional customer data matching, dimensioning, and scaling of beyond banking improve ecosystems in the financial sector? And what impact does this have on data protection, integration, and the technical and technological infrastructure? So, let's start with the first one. How do you view the revenue potential of beyond banking in general?

INTERVIEWEE: Well, I have a very nuanced opinion on that. Perhaps we need to take a step back, so to speak. Banks generally, and I think we're talking mainly about regional banks here, are now engaged in what you might call traditional banking. We have a functioning business model, and it's currently working, if you look at the balance sheets and the publications of Commerzbank, Deutsche Bank, etc. It's working. And whether Beyond Banking business models have significant revenue potential, I would put a big question mark behind that in terms of monetary added value. Let's just take Berliner Volksbank as an example. It's certainly a very large Volksbank, with earnings of over 100 million last year. So. I'm struggling to imagine how Beyond Banking could make a significant contribution in the short or medium term that would add anything to those 100 million or 120 million. Especially since this usually involves investment costs that you have to raise first, which are now more in the 7 to 8-digit range. So, I believe that making money would not be the strategic focus from my point of view, but rather the focus would be precisely on establishing and securing customer relationships, building new customer relationships, and creating relevance. Differentiation from the competition. Financial products are completely interchangeable. Whether I'm with Sparkasse Deutsche or Comdirect, the account is basically the same. The financing is the same. I am completely interchangeable. The only thing that differs is the logo, the logo and the color. And whether or not I have an advisor. So, with this Beyond Banking approach, I have the opportunity to differentiate myself from the competition. And that has a direct impact on customer

relations. I believe that is the real lever. And yes, I may also be able to earn money with it. Or let's put it this way: I can offer it at cost, but ultimately to fuel my core business. In my view, that would fulfill the mission of Beyond Banking . If it can be offered at cost, so to speak, and I can significantly secure and fuel my core business and expand my market share as a result. In any case, it doesn't have to make a significant contribution to the statutory health insurance system, but serves solely to differentiate us from the competition and secure customer relationships.

INTERVIEWER: Perfect, that was a great answer.

INTERVIEWER: Especially this differentiated view that there is no direct monetary potential in it. Above all, this indirect potential, which, as you say, is great for fueling the core business, is a top answer for me. So let's move straight on to the next question. So what developments do you see in the area of Beyond Banking 2.0? As I mentioned, with inter-institutional customer matching by non-banks. (..)

INTERVIEWEE: You can do that. Actually, I only half understood the question. Maybe you could elaborate a little.

INTERVIEWER: Exactly. Yes, exactly. We just looked at stages two and three again. Now we're moving on to stage two. So what's already happening a lot today is the B2C business model. I have one or more third-party partners. I may have built an ecosystem and we do classic B2C. My third-party partner is a bank in my ecosystem and yes, they can offer their services to my bank customers and, well, however we share our commission. Um, exactly. So, how do you see this development? Yes, through the connection of third-party partners to this B2C business in the ecosystem. Exactly.

INTERVIEWEE: Well, at first glance, it sounds reasonable, valuable, and straightforward. However, upon closer examination, I believe it is not entirely straightforward. Ultimately, this is what I have been focusing on over the past few weeks and months. From my perspective, it can be effective if it offers relevant added value. What doesn't work, in my opinion, is Commerzbank teaming up with Allianz and then selling insurance policies. These are banking issues. Theoretically, you could frame that as beyond banking. I think that's complete nonsense, and I believe you need very specific use cases tailored to specific customer groups. For example, in the B2B sector, you could offer tradespeople special services in the app,

so to speak, that help them structure their business operations in some way. So, very, very specific for a very, very specific target group, but one that is extremely relevant in terms of profitability. And I think that in Beyond Banking, too, people always think very much from that perspective. If you look at the woman from the bank, the real action is in the FFK sector. That's not surprising when a craftsman comes in and wants something, or a small business owner wants a new warehouse for \$5 million and I can't finance it. Then I have to sell a lot of construction loans to get to \$5 million. That means this DFK area is, I think, extremely relevant in order to get there, and then I think it's important to choose these partners very carefully. And I think that's more of a question of how, in terms of " , " I can find relevant partners who are not Allianz, Rewe, Edeka, etc. How can I get to the point where I can really create some added value where the customer says, "Ah, yes, okay, that somehow fits with my song, and that's also the case, maybe even a little surprising, that my Volksbank, my Sparkasse, my bank is suddenly working with this startup. Or with this grow-up. And they just help me solve a problem. I think you need this problem. It's no use if something looks good on paper, but then, I don't know, Deutsche Bank teams up with Lufthansa and I get 2% cashback. Okay, but where exactly is the problem I'm solving? And I think that's the core problem. What? What needs to be solved.

INTERVIEWER: Understood? Very good. And you've already mentioned it two or three times in your answers: added value. And that's exactly what we're going to talk about now. So, great transition. So what added value do you see for the customer or from a banking perspective through this ecosystem project?

INTERVIEWEE: So, the customer. You have to start somewhere with a customer problem. And I don't think you need to evaluate it in such depth as a bank and try to cast it. So, of course, it would be cool if you had this customer-centric thinking. Customer journeys. And so on and so forth. But I think this customer problem can be shortened somehow by partnering with someone, whether it's a startup or a company that's been on the market for a long time. That's direct proof that there's obviously a customer problem, because this company exists, because they offer a service that provides customers with some kind of added value. Otherwise, it wouldn't exist. That means we assume that startup XY is doing something. And the mere existence of this startup, that it has been around for 345 years, that it somehow has customers, that it has traction in the market. So

this product market fit, they have already proven that it exists. As a bank, I don't need to worry about that. All I really have to do is assess it. Okay, so do a diligence check in the sense of: do they really exist? Are they really doing what they describe? Do they have the software? Do they have this product and can they do what they say they can do? Then they have the number of customers they promise, so to speak. So there's simply a due diligence. And then, as a bank, I could integrate that into my range of services, and how that's done is completely open. I think we'll come back to that later, and then I'll offer the customer relevant added value in their specific situation that goes beyond the actual core business. And I think that's extremely helpful and valuable. Um, yes.

INTERVIEWER: Great. Sounds good. So, let's move on to the next question. You mentioned more values. Perfect. What observations are you making in terms of cooperation in the market? In other words, what kinds of partnerships are being formed and what kinds are being offered? Are they being made to the customer?

INTERVIEWEE: To be honest, from my point of view, there are few to none that are pursuing any serious approach. I think there are many collaborations that look good on paper and where two strong partners are joining forces. But I think the question is: how? How does that translate into practice? How does it come across to customers? How is it ultimately marketed? I think this distribution problem is fundamental, because ultimately it has to reach the end customer somehow. So, if I'm a customer at Volksbank, I'm a customer at Volksbank, at Hamburger Volksbank. That means I would have to be informed about it digitally, presumably via digital channels, first? Maybe. When it comes to corporate customers, my advisor also has to point this out to me again. And that's where it gets difficult, because advisors have a target card. And if I don't show up there, I don't exist. At the same time, in digital channels, I'm also competing with traditional banking products, so to speak. And I think it's extremely important to find a clever strategy for positioning, placing, and distributing a product that, at first glance, doesn't seem to be a sure-fire success. And to think about how that works. Exactly. And to be honest, I know of few, if any, meaningful, value-added collaborations and offers.

INTERVIEWER: Exactly, because it's probably often associated with feasibility or whether they're really successful. Nevertheless, can you perhaps

mention two or three observations, whether from your own company or outside, where you say that's interesting, there's potential there.

INTERVIEWEE: Exactly, what's interesting is the Haspa Joker program, a value-added program where various non-banking services are integrated into your account, so to speak. Your visit to Hagenberg is €10 cheaper than the local zoo here in Hamburg, somehow. Keys, keys, insurance, this, that, you can do everything somehow. It's just a classic bundle product. It's probably quite successful. Yes. Period. We ourselves founded Tabula Rasa with four savings banks back then. Can I send you the link right away? It's a platform for the topic of growing old happily and independently at home, where ultimately the focus is on demographic change and, in particular, the customer structure of many regional banks. People are getting older and want to stay at home for as long as possible. There are also economic reasons for this, because there are no nursing home places available, so to speak. And beyond that, people just want to stay at home. So, the question is, how do I organize my everyday life, how do I manage it? And that has something to do with care, but it actually starts much earlier. Is there someone who can bring my groceries home for me? Is there someone who can help me clean my windows? Because as a 90-year-old, maybe I shouldn't be climbing on a chair and cleaning my windows myself? Is there someone who can help me tidy up the garden and trim the hedge? And so on and so forth. So this topic of bringing together everyday helpers from the region with people from the region. And that's exactly what you mentioned earlier. This matchmaking, so to speak. There are company-relevant corporate customers in this segment on pages of a regional bank, and there are regional ones. There are relevant end customers in the sense of consumers, and they are simply brought together via such a platform, via a marketplace model. I am aware of that. In addition, there are various services. Last week, we spoke to someone from a Volksbank. They also offer a secretary service. Does that mean beyond banking services, from document analysis to the whole topic of inheritance, powers of attorney, etc.? So there are various things, but there isn't a program that is known throughout Germany and is really taking off.

INTERVIEWER: Okay, understood. Thank you very much for your answers. (..) Backed up with good examples, too. Then let's move on to 1.3. Now let's shift our perspective from 2.0 to 3.0, i.e., the intra-institutional approach, or B2C. I connect my two customers with each other and now I am a bank. I am now a market

orchestrator as a bank. You can answer this question with a simple yes or no. So, do you already have experience with an expanded view of this ecosystem level 3.0? If an intra-institutional approach, i.e., a B2C business approach with the bank functioning as a market orchestrator, is taken. Great, then I'll ask you, how would you explain it on a technical basis? How does customer-to-customer matching take place? Is it only through data analytics or also machine learning, or both? Or what measurement methods will be used?

INTERVIEWEE: To be honest, none at all, just a very classic marketplace model. There are various theories as to why a marketplace works. At Karla, we decided that it was (...) a relevant offering. And then the customers come. If there is no stand on the marketplace, then you won't win any customers. That means you first have to somehow get corporate customers from your region on board, whatever the topic. You have to have a relevant offering. And then you can send the consumers, the end customers, so to speak, to choose something? Exactly. That means step one is actually very classic door-to-door sales, if you will. The corporate customer advisors have to go out into the field, convince their customers that this makes sense, that it has added value, and that corporate customers can expand their business, secure it, whatever. In other words, that corporate customers benefit from it. And consumers then book these services if they are customers of this bank, for example, to get a discount or preferential treatment. So I can bypass the queue. There are certainly industries where this is the case. Craftsmen used to be a topic of discussion in the care sector, where I have to wait a very, very long time for certain services. It would of course be cool if, because I am a customer of a savings bank or Volksbank and a member of this network, I could skip the queue, so to speak, and have the gardener, craftsman, or care service tomorrow. Theoretically, that's conceivable, but there are a few hurdles to overcome. Exactly that, to that end. And at some point, you can certainly do that. So data analytics was used in this case, in that we simply pulled up an evaluation: Which corporate customers are there, which ones are relevant to us, and which ones can we approach? So it was more about quantity structures. But that's more of an Excel evaluation, I think.

INTERVIEWEE: A bit of manual work involved in that. (...) System, and they are then encrypted or coded by industry, so to speak. And then you can just say, give me the following industries, and off you go.

INTERVIEWER: Understood? That's exactly how I know it too. Yes, all right. I'd like to add something else. You said no in the summary proceedings. It doesn't exist. Is that okay with you?

INTERVIEWEE: Yes, I think what's interesting for the bank is... And this discussion comes up again and again. As a rule, you don't have just one provider for this service on the customer side. Let's take the craftsmen as an example. As a regional bank, you have, say, 1,000 tradespeople. Now the big question is: Which tradesperson do I give the job to? So, there you have it. Answering this question is not that easy, because everyone thinks, "Oh my gosh, how am I supposed to do that?" Because, so to speak, how can I make sure I don't upset my customers? Because if you give the job to one of 1,000 tradespeople, you'll have 999 angry customers, 900 of whom will probably call the board of directors and say, "Hey, guys, are you out of your minds? Why are you giving the jobs to my worst competitors?" Answering that question is difficult. On the one hand, it's extremely difficult, and on the other, it's extremely easy. You just apply marketplace logic, let them rate with stars, and steer them according to customer ratings, but of course that also has the potential for conflict, because long-standing relationships exist, especially in the corporate customer sector. There are also connections, so to speak, especially at the executive level through various bodies, committees, whatever, where people know each other. And, well, it's not entirely without conflict to put that out there. And yes, it's not so easy for some people.

INTERVIEWER: Understood. That's a really interesting insight. Above all, I hear a bit of a trade-off in there. Yes, if I give something to one person, I'm denying something to many others. And how could reputation also play a role here? Yes, it sounds a bit like a double-edged sword. Thank you very much. That sounds really good. And that's why we can jump straight to 1.4. Namely now. Well, it's a bit more extensive now, but you're welcome to answer it step by step, of course. It's about the acceptance of a scalable Beyond Ecosystem and the associated customization at levels two zero and 3.0. And how do you see the acceptance at these two levels, on the customer and provider side? Before you can say, okay, what organizational impact does this have or what new role concepts does this create in a bank? Yes, perhaps to increase acceptance.

INTERVIEWEE: I believe that acceptance on the customer side of the bank stands and falls with the use cases, and the closer they are to the core business, the

higher the acceptance tends to be. If you, as a bank, offer something completely out of the ordinary, then you just can't bring it together with . After all, the core of banking services is ultimately trust. So, if you now offer something related to gambling, I think that's the opposite of banking. If you suddenly say as a bank, "I'm going to cooperate with a gambling provider like Tipico or Bet 24 or something for whatever reason, and we're going to do this," I don't think that's going to work because you can't reconcile that as a customer, even if it might be a good business case or whatever. So I think you have to find something that fits your brand essence, something that customers can understand relatively easily. For example, estates, powers of attorney, estate planning, inheritances. That's very, very close to the core business, and at the same time, you need an extremely high level of trust. It's an emotional, exceptional situation and you need someone who cares. That could be a good fit and it also has something to do with money. So you have a problem and it needs to be solved somehow. That would be a good fit. So I think it has to be relatively close to the brand essence and perhaps also to the core business. It can't be anything that is even remotely disreputable, I would say, because that would undermine trust and actively jeopardize the customer relationship. I think that's extremely important. (..) Exactly. And ultimately, that applies to both customers. B2C, B2B, it has to be secure somehow. So, in other words, it has to fit with the brand essence and it has to fit somehow. What's more, when you're dealing with regional banks, scaling is always difficult, of course. Um, theoretically a good idea. Ultimately, 697 credit unions decide whether to do it or not, or 326 savings banks plus the regional principle. And so on and so forth. (..) So theoretically, you can scale it somehow. In practice, however, it's difficult to scale due to the organization, especially that of the regional banks. (..) Because there is no central authority. Theoretically, there is now, but we've only been up and running for a year. We also have no enforcement power. And even if the BVR or the DSGVO decides that this is how it should be, that doesn't mean that it will be implemented across the board. At the same time, you no longer have any presence at all in the private banking sector. This means that if Commerzbank decides to adopt a cool Beyond Banking approach, it may reach people in Hamburg, Berlin, Munich, and Cologne, but definitely not in the Bavarian Forest, East Frisia, or Prignitz in Brandenburg, because they are simply no longer there. So, and that's why? This scaling either fails due to the lack of presence of private banks or the

fragmented and decentralized structure of savings banks and cooperative banks. Or at least it is not promoted by it. I think it would be extremely difficult to scale that. On to Germany, if you will. Exactly. And what also stands in the way, so to speak, is precisely this last point. Organizational implications, role concepts. You need someone in the bank who takes on this topic, who says, "Yes, I am now the product owner, Beyond Banking is taking this on, negotiating with the startup, setting up the cooperation, taking care of sales." And that's not something you learned in banking training. And as a rule, 99% of the people in the bank are bankers who may even be able to do project business, but who generally can't do what is required here. Also, in a completely new environment with new players who are somehow involved. A startup, perhaps even an IT service provider like Advia, where you have to find solutions in this context that are not obvious and where I don't have to look in the organization manual, but where I have to be creative myself to find solutions. And I believe that very few banks have these capabilities. Also against the backdrop of a shortage of skilled workers. And so on and so forth. It's just difficult to find people who want to do this and who are then ultimately given the freedom by the board to do so. And especially when you look at the Volksbanks, some of which work with large amounts of funds. So there are definitely credit unions with 80 employees, and I think it's difficult to find someone who can do that and who also has the time to implement it. That means you also need a certain critical mass in the organization to be able to process it. At least, that would be my hypothesis. And the skills on the part of the employees to then anchor it somewhere in the organization. As a rule, I would always say that you need to have direct reports to the board in order to be able to make decisions quickly. If you go through the hierarchies, you might as well cancel the project right away, because it will simply take far too long.

INTERVIEWER: Yes, very exciting. That's what I'm hearing, too. Maybe a chief of staff or someone in a staff position who is responsible for this specific area and has this specific connection to the goal. Yes, interesting. Interesting.

INTERVIEWEE: Well, for example, when we founded this start-up with the savings banks, we reported directly to the board. So there was no one else. No one. No middle management in between, you reported directly to the board. They have to get involved, I think. The board has to take ownership of the issue. So they have to say, "I want this, I want that. And I'm going to devote part of my capacity to

building it up and developing it. And that's important to me." And then, ultimately, you have to deal directly with the board, with the decision-makers. In a \$20 billion bank, it might be the division manager. But anything under \$10 billion, you have to do it with the board.

INTERVIEWER: Understood. Once again, thank you for your insightful and nuanced perspective, including your comments on company size. That was a great answer. That covers the first research question. We can now move on to the next one. Thank you very much. So let's jump to number two. Now we're moving a little bit toward machine learning, data analytics, and beyond banking sales signals. So how can machine learning and data analytics methods be used to develop and implement effective beyond banking sales signals or recommenders? And what specific use cases show how they impact the sales side of the financial sector? Again, the same thing applies here. We'll address the sub-questions again, and here we'll start with a thesis. I already touched on this a bit in my introduction earlier. (...) I'll start with: In order to leverage the potential of Beyond Banking, are there still a lack of clear business models and the necessary skills? Do you agree? Can you explain why?

INTERVIEWEE: Yes, absolutely. I would completely agree. (...) I believe that, from my point of view, it all depends on whether both the banks and the relevant central service providers you need for this have enough to do with running the bank, setting up the core banking system, mapping the regulatory framework, doing everything that needs to be done in daily business, so to speak, opening the branches, conduct customer meetings, so that there is absolutely no time or capacity to think about beyond banking business models and then consistently develop the corresponding use cases and somehow drive this forward, because, as we said at the very beginning of our conversation, it probably won't generate any additional revenue in the short term, but will strengthen customer relationships in the long term. So, now contracts, especially at the board level, are usually concluded for 4 to 5 years. That means you have this agency problem again. If I know I still have five years left, why should I invest in something in the long term that will bear fruit in ten or 15 years? I think the question arises, and I can imagine that some people might have this problem, because there is sufficient research on this topic, that you simply have a problem with the fact that these horizons are

different, that from a corporate perspective, what happens in 20 years is of course extremely relevant. For me personally, I'll be retired by then. For me personally, what happens there is completely irrelevant. And that's just a problem, getting that match. At the same time, I believe you probably know how to implement all of this yourself. From Doraïda PSD 1 to 3, Basel 1 to 6. Then there are ESG issues. So you have to get all of that off the ground first before you can discuss nice-to-have topics like Beyond Banking. And I think that's extremely difficult because the books are full of orders and the other issues always fall by the wayside. The nice-to-have issues, because you have to implement the must-haves first, and that's why. I also think that's one reason why there's a lack of business models at the moment. Because the capabilities in terms of capacity aren't there. Mhm.

INTERVIEWER: Understood. Capacity, but also prioritization, because it takes a back seat due to capacity planning. Yes, that makes perfect sense. Thank you very much. You answered that really well. So we can move straight on to the two sub-questions. Okay, we've just talked about that. It seems that there is still a lack of clear business models or use cases. You already mentioned a few examples earlier, but could you mention some more use cases here, in the direction of levels 2.0 and 3.0?

INTERVIEWEE: Well, I think there are plenty. I don't think there are any limits to the imagination. To put it that way. Once you get started. What is the core business of banks? Somehow, it's also the processing of payment transactions. That means, if I were to analyze payment transactions and find that a customer of mine has been going to Budni every day for two years, which is a local drugstore in Hamburg that people with small children often go to because they sell diapers and baby food, this, that and the other. So if you notice something like that, you could make him an offer or ask him if he's had a baby and whether there might be any cross-selling or upselling opportunities. But no one does that because this analysis probably just doesn't exist. That means that this whole evaluation of payment transaction data would be extremely helpful, I think. And if you look at it, there are examples of Amazon knowing whether you're pregnant or not based on your purchasing behavior, because your purchasing behavior changes beforehand. So you look at it because, due to hormonal changes, you suddenly start doing different things, and they already know in advance that you are pregnant and recommend products to you, and the bank knows that, in case of doubt, my son will want to

open an account at some point. So, that's not the top priority right now, because theoretically he doesn't need an account until he's 14. And at the same time, I have other needs. If I suddenly have a child at home, my apartment may be too small. Maybe I need a bigger apartment, and then you're completely back in the core business of some financial service providers, banks. And this information, dealing with this information, evaluating it, utilizing it. I think that's extremely difficult. But it all depends somehow. Or you could read, analyze, and evaluate all of this via payment transactions. I think that's relatively clear. And then, as I said, especially for this topic 3.0, marketplace models, etc., there are no limits to the imagination. I think it has to fit in with the topic of trust somehow. It shouldn't be any services that are diametrically opposed to that. But otherwise, I think you can do a lot as a bank. That probably depends more on what customer access you have on the B2B side. So, will you succeed in creating a relevant offering? It doesn't have to be just your customers. But of course, it's easier to target the customers I already have as a nucleus.

INTERVIEWER: Good closing words. So let's move on to the next one. Thank you. Now let's move on to scaling. Um, yes. Of such ecosystems. So how do you assess the possibilities of dimensionalization and scaling of Beyond Banking Ecosystems? Are you aware of any? I mean, you are also a decision-maker as Head of. Or are you sufficiently aware of these as a decision-maker? And if so, what are they?

INTERVIEWEE: Well, I'm not aware of any. Um, and scaling. As I said earlier, I wrote that it's extremely difficult due to decentralization, especially that of the savings banks and credit unions, because you're not making decisions somewhere in Berlin, Frankfurt, or Munich. We're doing that now, but in case of doubt, you have to convince every single individual, every single institution, every single primary bank to do it. They then have implementation costs, even if it's just organizing the sales side of things themselves. And I think that's a long way off, too. Even if Arturia were to provide some kind of central service, it would still have to be customized for rollout on site, so to speak. And I don't know if Volksbank Rosenstein, with its 83 employees, has the capacity to do that. I think you have to start with an alliance of the willing, where you take a small number, a handful of banks, who say, "Ah, we're up for it, we believe in it, we can do it, we want it, and

we're going to go ahead with it, and then we'll see how it works and whether it works." And then there will probably be concentric circles. At the beginning there will be five, then 15, then at some point 25, and maybe at some point 50 or 100, and then I think that will be a huge success. And whether that will cover the entire German market, I dare to doubt. Yes.

INTERVIEWER: Super, super exciting. I hear that. Exactly this regional limitation due to, let's say, the regional roots of the banks. But. And you said that then you would have to initiate it through a central office, through a nucleus of willing parties. That's exactly how you explained it. I find that super exciting. Especially because customers don't care. Now I'm only in the neighboring village, but now I'm at the other Volksbank in the district. In the best case scenario, the customer doesn't know this and just wants to have his, let's say, his needs met. And that's why I think this central approach is crucial to eliminating these boundaries, which I'm not sure about for the customer. So it's exciting. Yes, thank you for the insight. Then let's move on to 2.3. Now, please answer these Beyond Banking Sales Signals questions with yes or no. Does your company use Beyond Banking Sales Signals, or do you know of other banks that use them?

INTERVIEWEE: No. No. And now I have to take a quick look. If so, why is that? How can we explain it?

INTERVIEWEE: Well, we're not a bank ourselves. That's why, I think. We don't use it because we're not a bank ourselves and ultimately don't have a data pool that we can draw on. And why don't banks do it? I think there are probably regulatory hurdles. I don't even know if I'm allowed to evaluate payment transactions as easily as I described earlier. I have no idea. If it were that easy, maybe someone would do it. But maybe I'm not allowed to. I don't know. I think the regulations probably set very narrow limits. And then? Even if I did that, there are other sales signals that come before that. Namely, in the sense of core banking financial products. I would evaluate those first, once I'm done with that. So once I've gone through all my sales signals for my core business, so to speak, I would then take care of beyond banking, and then it becomes a vicious circle. That won't happen because I can't keep up with my actual core business. Keyword: shortage of skilled workers and lack of digitalization in many products. And then I also don't have an offer with which I can count Beyond Banking. So even if I recognize them all, where am I supposed to lead them? I don't have any offerings to lead them to.

So if I now realize that I run to Budni six times a week to buy something and he has a child and might need a nanny, where am I supposed to find one? Am I supposed to get one?

INTERVIEWER: That sounds good. Exactly. I also hear from Henne, Ei, and others that there is a shortage of skilled workers, and that even if there were salespeople available, they might not be able to do the job. Yes, because they say they are busy with core banking and perhaps they don't have the skills. Yes, so first of all, you have to have the skills to understand this beyond banking topic and also to convey it to the customer. When we talk about beyond banking, we are primarily talking about traditional bankers or salespeople. Yes, that's also important. Or you could say, of course, that because of the shortage of skilled workers or staff bottlenecks, it might be a good idea to do this Beyond Banking Sales. If the chicken-and-egg problem were solved, of course, you could say that you do it as data-driven recommenders and play it directly to the customer via an app. Online banking, so that the customer can do it directly, i.e., via.

INTERVIEWEE: I don't think that will work because of the shortage of skilled workers you described. I know of regional banks where you have to wait six weeks for a personal consultation. So that's not the norm, but it's not completely the exception either, or that, especially when you look ahead to the fall and infectious diseases are on the rise, branches simply have to be closed because there isn't enough staff. So that's more the norm than the exception. And then, that's a tough economic issue, so to speak. And the other thing you mentioned is, I think, even more important. Because if you're a traditional bank advisor and suddenly you have to talk about something like nursing care, where you need a really high level of empathy, and you don't really know anything about the subject, and then you're suddenly supposed to tell someone about it, that's not your core business at all. And you're more of a WPhG two-sheet. I have to tick some boxes here. So it's more of a technocratic process, where you have to be regulatory compliant, so to speak, and map out the thing here. And suddenly you have products that involve finding nannies, care, deaths, inheritances, estate planning. You have to act completely differently, and you're neither trained nor present. Somehow, you have a context of experience. As humans, we ultimately tend to reproduce what we can

do. And as a salesperson in a bank, that means selling products with a financial background. That's at least as difficult as this issue of capacity.

INTERVIEWER: And above all, as you mentioned, care is just one domain, just one. An area that also requires a lot of empathy and explanation. As you already mentioned. But there are several use cases, and then there's the fact that I suspect the advisor would be overwhelmed anyway, having to advise on these as well or explain them in some way. Or at least he would be at a loss for words, because what happens even if he's not supposed to advise, but only address the issue. Customers ask questions, customers ask questions automatically. He's my advisor, after all. I want more information. I want to ask more questions. I want to be able to reach you by phone to discuss this further. So he probably wouldn't be able to juggle everything, even if he knew how to do it, to do justice to all of it. So I think you can almost automatically answer that with your statements. It has to be data-driven anyway, otherwise... Yes, to do that physically? Almost impossible. Yes, exactly. Yes, exactly.

INTERVIEWEE: So if you think in terms of a target vision, and I have something like a clock, a 360-degree disc, where I don't know, you have twelve use cases. We arrange nannies, we do something with care. We arrange tradespeople. We do something with inheritances. With us, you can also... So. Suddenly you have this colorful potpourri of beyond banking services. What you described earlier as an ecosystem makes total strategic sense, in my opinion. And if we really say that we'll have this somehow by 2050, then the challenge for the advisor is, do they need to know about it? I think it's difficult enough for them to even know about it, let alone be able to advise on it. Because these are completely different services, from nannies to pet care to death. There's a world of difference between them. And then, on the side, I need a craftsman to somehow, I don't know, maybe remodel my bathroom to make it age-appropriate or something. Or child-friendly. So just knowing that this exists. And that's why I think it's sales via digital channels. Yes, and at the same time, you have to prevent this Mediamarkt effect, where the customer is smarter than the advisor. You have to at least keep the advisors and the people who work at the bank up to date so that they know this exists and can say three sentences about it. Because if I, as a customer, look at it on the website or on my app, I'm smarter than the advisor. That can't happen, because then you really have this Mediamarkt effect, where I know the specifications of the TV better than

the guy at Mediamarkt because I've spent three days researching it and he only has about three minutes.

INTERVIEWER: Exactly. He has a lot of other TVs in his portfolio that he has to sell. Maybe. Exactly. Yes.

INTERVIEWEE: That's exactly right. No, you have to sell your product from Union and VB this and that, and then someone comes along and says, "You have such cool Beyond Banking offers here. I'd like to talk to you about use cases six, three, and twelve." He looks at me and says, "Yes, this is the first time I've heard about that from you." Thanks for that. That's interesting.

INTERVIEWER: Good that I'm learning through your presence. Exactly. Yes. Exciting. Yes. Great. Thank you very much. It's great fun discussing this with you. Exactly. We're still on schedule. (...) Nonsense. Number two is in favor of it. That answers the question for me. Thank you very much. Let's move on to number three. It just means a little bit at the data governance level. Yes, so, um, what are the most important influencing factors? Evaluation criteria for the successful creation of a scalable banking ecosystem? And how can they. How can these factors be integrated into the technical design of the model? And here we'll start with a question, a closed one. So please answer yes or no for now. Are you familiar with the use of a guideline concept, framework, or blueprint, whatever you want to call it, for the creation of a scalable Beyond Banking in the banking sector?

INTERVIEWEE: No.

INTERVIEWER: Okay, then let's move on to question 3.2. Which one? But what factors or decisive factors can then determine the value of a successful Beyond Banking ecosystem? So if you say there is no concept, what would be important to you? So what needs to be there if you want to design something like that?

INTERVIEWEE: I think that's why it doesn't exist, because you can't just decide it at the drawing board; you have to find some relevant customer value that you can deliver with your assets. Now let's look at regional banks. What do regional banks have? They usually have access to 50% plus of customers. That means you have extremely high customer penetration in the region where you operate. You have an extremely well-known brand, you've been around for 150 years, and you know these local networks extremely well. You know regional markets, you have customer access, you have trust. So, those are the ingredients

that are already on the plus side. And then, in quotation marks, it's relatively simple. You just have to identify some relevant customer problem. So, and that's the difficulty, I think, and this relevant customer problem may be different on the Baltic Sea than in the Bavarian Forest or in the Rhine-Ruhr region. But maybe it's the same. However, I don't think it will work to say from a central position somewhere that there is a master plan. I think you have to try out different topics in a decentralized way from the bottom up, and they will become an alliance of the willing. They will work in some regions, including the city-country issue. What works in Hamburg may not work in East Frisia, and what works in Düsseldorf may not work in Saxony, simply because the population groups and purchasing power are structurally different. So there are simply differences between the regions, and trying things out to see what works where could, I believe, be extremely relevant and helpful. But I think you have to build that from the bottom up, and then you have to extract guidelines from this bottom-up approach that could lead you to derive a kind of overarching framework and say, "We always need these ten guidelines, we can't do without them," but you can't just come up with them by decree in Münster, Karlsruhe, Frankfurt, Berlin, or somewhere else, and then say, "This is how it works!" Instead, I believe you have to work them out together with the participating banks on the basis of trial and error.

INTERVIEWER: Mhm. That sounds good. Understood. Driven primarily by customer needs. Yes, to then develop a model from that. Perhaps another sub-question here. What's more, if you say, okay, now you're on board. You've recognized the customer net. Now I really want you to move on to the technical development. What attributes or features would be important to you if I were to say something like that? I mean, I'm not. I don't know if you have the background, but you say you're into partnership and integration, that you now want to move on to the technical implementation of . What else would be important for you in terms of infrastructure? What attributes do you still need to consider in order to build such an ecosystem? Yes, well.

INTERVIEWEE: Yes, I believe that there is a political dimension and a technical dimension to this. If you want to scale this up somehow, you need a technical solution, and the central provider of technical solutions in the cooperative financial group in this context is Arturia. At the same time, Arturia has enough to do with administering the core banking system. In other words, simply the things

that have to be done, which are also to be expected. And somehow I believe that a sensible solution has to be found, and also one that... (..) Compromise always sounds as if people are losing something. It's more the opposite, that everyone gains something. You just have to keep it as close as possible to the established structures and to the partners who are responsible for it, in order to avoid this political wrangling. And at the same time, you have to keep it as far away from it as possible so as not to get caught up in the so-called core banking system. So there's no point in building some kind of ecosystem based on Agree 21. (..) It's not designed for that, but you have to make it work somehow. You have to strike a balance between being far enough away and yet close enough. A bit like the moon and the earth, perhaps. They belong together, they have to somehow, and you can't separate them. But it works. The moon can't crash into the Earth, and at the same time, the moon causes the tides and stuff, so it's like there's this construct where they somehow belong together, but they're not the same thing or one thing, that's kind of my idea about it. And then, technically speaking, you have to build on an infrastructure that is from 2024 and not based on Kobol, with interfaces that are somehow permeable, i.e., decoupling the front and back end with APIs, using the technical possibilities. You're in the cloud, using scalable solutions where you can quickly I think that's the key issue. Being able to quickly add or remove things, depending on what you need at the moment, and being open to third-party services. That's so abstract, but I think that's it. As I said, if we want to implement something now in 21, I don't know, we can probably start in 2033.

INTERVIEWER: We'd better not do that. That's fine. I think it's good that you differentiated between the organizational perspective and, let's say, the organizational framework concept at the technical level. I thought the moon-earth metaphor was great. I hadn't heard it before, but it's a great comparison because that's exactly what it is. A power imbalance, too. So, ideally, a shared value should be increased so that everyone benefits. And as you rightly said, there should be no disadvantage when entering into such an intra-community agreement. That's why it's important to maintain a good balance, including on a technical level. I think it's great that you explain how to make use of current modern infrastructure capacities that are best, yes, modular, quickly scalable, and adaptive. That sounds good. Great. Would you like to add anything else, or is that okay with you?

INTERVIEWEE: I think I've got it now. It's also a process of reflection for me. When we talk about it, something happens to me too. And I'm already noticing that the challenges are not insignificant when it comes to doing something in this situation. I don't know. Bringing five credit unions together with a startup and trying something out. That's one thing I'm confident I can do. Somehow, we'll manage that next year. And at the same time, if you think about it in terms of a scalable ecosystem, rolled out in the future, maybe not across the whole of Germany, but in, I don't know, half of the Volksbanks and Raiffeisenbanks on the basis of the technical platform, I'm 44 now, I don't know if I'll live to see that in my professional career. I would at least put a question mark behind it.

INTERVIEWER: Understood? And you've already mentioned challenges and automatically transitioned to them. So let's take the last few minutes before we wrap up to take another look at this and say, okay, we've talked a lot about opportunities. Potential, development, what I would call the components of a successful Beyond Banking system. But above all, it's also important to say, okay, what about the other side? Challenges and risks. And that's where we'll start, right? So, how do you basically classify the challenges? Perhaps you could also compare the 2.0 and 3.0 levels. First, that would be great. And then we can go into the individual risks. Legal IT or other risks that you may be aware of that haven't been mentioned. Exactly. Let's start with the challenges.

INTERVIEWEE: Yes, I think the challenge is actually that you're entering new territory and doing things that are unknown, for which there is no business case and for which I think many people don't see any need, because I have a functioning business model. I take money from customers, lend it out at higher interest rates, do a bit of maturity transformation, sell a few insurance policies and a few securities. Everything is running smoothly. So I have a functioning business model. It works. Why on earth should I do something new now? Something I don't know anything about, something I don't have the capacity for, something where the outcome is uncertain, so to speak, where there is no blueprint, where there are no sufficiently documented, validated cases that I can simply adapt, but where I have to take a risk. I have to assign people to it, I have to allocate money to it, I have to allocate management capacity to it. Why on earth should I do that when my core business is running smoothly? I think that's the central question. And I think you have to cross that intellectual bridge to realize that it's necessary. And then you're

faced with the classic innovator's dilemma, which is that if you don't do it, you'll eventually be left behind. There are examples of this, such as Kodak. (..) I think Karstadt can now be added to that list. Quelle catalog, etc. So you simply miss the connection to the future. Looking back, it's always easy to say that, but in the heat of the moment, decisions are often completely rational. You focus your resources on your core business, you try to become more efficient, to work more effectively, to expand your core business. And so on and so forth. But now, providing significant resources for , something that at first glance has nothing to do with it, is not so easy, I think. I believe that is the fundamental challenge. Then there is the challenge of decentralized networks. Where does that even come from, that you have so many primary banks? A few central service providers. Who should do this now? Who is even involved? Why, how, what for? It's not so easy to tie this all together organizationally. And then you also have to find some kind of governance, who is allowed to decide what and how, and who has to participate where and when, be picked up, captured, whatever. (...)

INTERVIEWEE: Then I think it really does come down to the people a little bit. Find people who are interested in it. People who can do it and who are enthusiastic about it. That's not so easy, because it's all still a relatively new field, at least in historical terms. And there aren't that many people who have already dealt with it and who have been reasonably successful or who have even tried it. To be honest, I don't even think it matters whether it was successful. Do you have any experience in this area? I think that's the key challenge. Whether it's 2.0 or 3.0 zero.

INTERVIEWER: Very interesting and also important challenges that you've addressed, basically. Then let's move on to the risks. First, the legal ones. What are they in your view?

INTERVIEWEE: I don't know anything about the law, so I wouldn't say there are many. You just have to check whether it complies with the regulations. I also wanted data comparison and payment transactions. As soon as you analyze any data, you're probably dealing with GDPR. Is that allowed? Yes, no. Can you share the data with third parties? You just have to check and clarify that somehow. Especially if you're thinking about collaborations. Can I now say in the startup that

the child has to be clarified? I'm not a fully qualified lawyer. So I think you have to be clear about that. You have to be clear, otherwise he has no legal risks.

INTERVIEWER: Everything is fine from his point of view. Exactly. Me neither. But let me put it this way, I. I. I've consulted several experts, so everything will come together. And then I'll hopefully have a good picture of it too. Exactly, there are various experts or various people, including those with a technical background. So, in that sense, it all adds up, perfect, thank you very much. Then let's move on to the risks. What do you see there?

INTERVIEWEE: Honestly, similar. I mean, sure. You have to be careful that your core banking system doesn't get infected in a manner of speaking. Or if you're building a scalable ecosystem based on whatever platform. That probably has to be kept separate from the core business so that there aren't any nasty feedback loops or, if one is infected, so to speak, the other doesn't somehow drag it down with it. I think you just have to be careful from an architectural point of view that you don't mess with it in any way. Otherwise, I think you have the usual risks. You can be hacked, it can be misused in some way. You just have to be careful. That works in banking. But it's good that that doesn't happen, that you have high availability, that you don't get hacked, that you don't get compromised in any way. And ultimately, you have to ensure that for this ecosystem as well. I think you always have the problem that, in case of doubt, you end up cooperating with third parties, let's say startups, which of course have a different background and probably set different security requirements for themselves than a bank might, because they are also startups and may not be able to invest as much. This means that when you team up with any partners, you are always somewhat liable for them. Perhaps not legally, but at least in terms of perception. Let's take the example of you cooperating with startups and they get hacked tomorrow. Then some of the damage will always fall back on you. I think you just have to be sensitive and see how deep the integration and cooperation are and what technical considerations need to be taken into account. That actually exceeds my capacity to assess.

INTERVIEWER: That fits. Thank you very much. Then we'll move on to the last question. What other risks are there? Basically, in such ecosystem constructs. Print. Here I also have the ones that, for example, also roll themselves. If the bank really acts as a market orchestra in this other role. What other risks come to mind?

INTERVIEWEE: I think you have the operational risks when you are a market orchestrator and you refer a service provider to AN, I don't know. Let's say a craftsman to the customer, and the customer is dissatisfied with the service provided. Then you're stuck. So the bank can't do anything about it for now. But if I'm dissatisfied, I know... Classic case: I rent something through Airbnb, I'm dissatisfied with it, then that reflects back on the platform because I'm dissatisfied with what I got there. And I need some kind of mechanism to resolve the issue, or at least a process to motivate me to find a solution for the customer. And in case of doubt, I have to refund the customer, even though I, as the market provider, am not responsible for the problem. But I have to somehow ensure that the services offered on the platform, on the marketplace, meet very high standards and that I make sure that everyone follows the rules. That's not the bank's core business, so I think it's extremely difficult to maintain and somehow make it clear that one thing is one thing and another thing is another thing. In fact, we've already moved past that strategic level. I have to be careful to protect my brand essence and not get discredited in any way by being associated with anything that could cause lasting damage to what is now, so to speak, my core business, my brand essence. I think it's extremely important that you can't put up any Chinese walls there, but you are, you're just stuck in there. When you do something, you have to at least have some idea, some kind of process, in case something goes wrong, and be prepared for it. A risk analysis, what could go wrong and how do we respond? I think that's extremely important, and and and. You have to do it, otherwise you'll find yourself in deep water relatively quickly.

INTERVIEWER: Wonderful. That works for me. Especially eliminating reputational risk. Exactly. It could happen. Or it might not. Exactly. Yes, exactly. Thank you very much. We're done here. Just one final question, basically. Would you like to add anything to what we've already discussed? Or any final words or recommendations for the future? Or is that okay with you?

INTERVIEWEE: No, that's fine with me. Thank you very much. I believe my insights are extremely important and valuable from a strategic perspective, but extremely difficult to implement from an operational perspective. So I'm excited to see what you'll bring to us here at Berger in the coming years. That's exactly what we want to do. The challenge hasn't gotten any smaller after this interview.

INTERVIEWER: Yes, exactly. Perfect. Yes, great closing statement, as they say. Thank you very much.

APPENDIX 7. Semi-Standardized Expert Interviews: Transcript from Expert 5

INTERVIEWER: So, moving on to the research questions. (..) I will mention the questions. But don't worry, we don't always have to answer the big research questions directly in the research sessions; instead, we always address the individual sub-questions, which of course contribute to and answer the overall research question. So, the first question is: How can the combination of intra- and inter-institutional customer data matching improve the dimensioning and scaling of Beyond Banking ecosystems in the financial sector, and what impact does this have on data protection, integration, and technological infrastructure? And now let's look at the first question: How do you see the revenue potential of Beyond Banking? (...)

INTERVIEWEE: My experience somehow suggests the opposite. I have already spoken to many banks and I often see that everyone smiles and nods and says, "Yes, of course, Beyond Banking is important, it's the future, and so on." But when it comes to actually doing it, everyone is somewhere else, dealing with other issues. And what I've also noticed is that it depends on the timing. Take, for example, the period of low interest rates and negative interest rates, when it was impossible to earn money from interest. Of course, there was a huge demand for alternative revenue opportunities, but by then it was already too late. Now there are interest rates again. Banks are earning money again with traditional banking business and see less of a need for it. It's a very broad field and a very difficult question. And I have to say, there is definitely revenue potential. Everyone, and I mean everyone, who had any kind of good business idea had potential. Period. Yes, that applies to Beyond Banking as well. But I think banks are having a hard time because there are two sides to it. On the one hand, banks have the great advantage of being in a position of trust with their customers. That means banks or the. Customers are more likely to entrust their data to their banks than to any internet company. Although that is also changing with increasing, or rather decreasing, age. This is evident among younger people. They are more liberal when it comes to customer data. (...) If there are thousands of people who say, "Hey, this is great, affordable, sustainable, etc.," then it becomes increasingly difficult for banks to get a foothold there. And I personally believe that banks need this and should definitely do it. I am still firmly convinced that the banking of the future will not

need banks, but that in the future there will only be banking services and other players will bring these banking services to the customer. But I don't think the banks have understood this yet, or they don't see this development, or they are ignoring it?

INTERVIEWER: To sum it up briefly, you've already answered the first question in great detail. Thank you, that works for me too. So you take a very nuanced view of the question of what I want to achieve. I also hear that it doesn't always have to be monetary. There are also, let's say, non-monetary monetary characteristics. Things like customer loyalty, increasing reach and so on are always a question of what you want. So I see it the same way you do, and that's a very nuanced view and answer. So, great job. Let's move on, because we've spent a really long time on this question, but it was super valuable. Thank you. Yes, let's move on to the next one. So what developments do you see in the area of Beyond Banking 2.0? That is, the second stage with the interinstitutional customer matching approach by non-banks. What is happening there today? (..)

INTERVIEWEE: Yes, what do we see? (..) Me? I need to think for a moment. I had the questions I thought I had. Among them, I considered what developments we are seeing in general. Well, of course we see, um, that's B2C. Do you have a 2.0 now? Exactly. There is. There is a variety of offerings, I would say. So I do believe that most banks have understood that they... I don't know about the market. First of all, there is, of course, pressure to consolidate, which means that certain services that are offered are always new standards, hygiene factors. That means that as a bank, you simply have to offer certain things. And secondly, of course, there is also the desire and the hope. I offer some great service that maybe another bank doesn't have, and that allows me to differentiate myself and maybe stand out from the crowd. Of course, everyone is doing this in different ways. In that respect, it's already mainstream again, but um, yes, I definitely see a wide range of offers. I think that's a good thing, and I believe the market will ultimately regulate it. In other words, there are a lot of start-ups, there are a lot of fintechs that are somehow pushing their way onto the market. There are banks that accept the offer, and there are also very different ones. There are, let's say, banks that are very receptive to digital solutions and less receptive ones, or digital guards, who are lagging behind and somehow think, okay, we have to do something now, even though they have no idea how to do it. Um, that ranges from "I use great partnerships" to "I need

some kind of digital offering at some point." Then I know someone through a friend of a friend, a buddy of a student who somehow cobbled something together in his garage with his two fellow students. In the end, they come up with some small solution for the bank that is supposedly cost-effective. But in the end, they're tapping into customer data. So there's a certain danger there that can be exploited through ignorance or naivety. But I think on the whole, there's a consensus. So, exchange data for services. That's already laid out in the GDPR. Explain to the customer what I get in return for handing over my data. What do I use it for? On the other hand, it also pays for services, so to speak. And I think that's going to become more and more normal. As I said at the beginning, younger people are less hesitant to give out their personal data if you explain to them why and what for. And they are more accessible. Not all of them, but on average they are more open to this type of service. I mean, this is a completely normal demographic change. This means that young people will eventually become the majority. Because the older generation will eventually no longer be around. And in this respect, the customer base will change. And in this respect, banks and their offerings will also have to adapt and change. Exactly. And now, of course, the question is What developments are there? Yes, of course there are also wild growths. We also had an example in our group. It was the Theo app, where they had somehow added a 111 value-added app on top of the banking service and expected customers to use it. First you had to click through wild advertising and more value offers before you could even get to your account balance or make a transfer. That didn't go down well, it was too much. So it was quite clear that it missed the target group and was too early. Um. And I think that most people aren't there yet in that form. Um. But I think, when I look at the trend toward super apps, which is also very strong, this kind of added value will be increasingly in demand and will have to be placed. So I see a very clear trend in that direction.

INTERVIEWER: Perfect, because you're already steering us towards the next sub-question, namely what added value is generated for customers, i.e. from the customer's and the bank's perspective, by this ecosystem construct? Yes, of course.

INTERVIEWEE: Well, the added value for the customer is obvious. As I said, there is usually a cost reduction. So I get something that is supposedly free. I get added value that really benefits me, that I think is great, such as analysis services

or, I don't know, research tasks or anything that someone else does for me, or even just the fact that the advertising is tailored to me and is relevant. If I have to look at advertising anyway, then please let it be something that interests me. Yes, that's the advantage for the customer. Um, in the past, people used to say that customers feel comfortable when they feel that the retailer or business partner knows them. So when you're addressed by name, you feel taken care of because you know that the other person knows what you want. Of course, that's also suggested. Yes, if I offer these data-driven services and collect more and more data about my customers, I have a better picture of them. I have a broader, wider view and can offer more suitable services or even services at all. And ideally, the customer will see this as something positive. Because they say, it's relevant, it's more cost-effective, it's just right, and perhaps the timing is also important when these things come along. For banks, of course, the other side, or the other side, is also collecting data, and for me that would be the main reason, i.e., this 360-degree view of the customer, so that we have a clear understanding of what my customer wants, what my customer does, what their standing behavior is, what their preferences are. Is he married? Does he have children? Is he single? Is he environmentally conscious or does he drive a Porsche? Is he a frequent flyer or does he take the train? All these things are somehow exciting for a bank, so that it can also have a targeted impact there. Ultimately, of course, always with the view. I have great customer loyalty. First of all, customers don't leave because they feel they are in good hands. I can advise them and really advise them, also in that sense. I can make targeted offers that the customer welcomes because, first of all, they think, "Oh, he knows what I need, I think that's great. I hadn't even thought of that myself". And secondly, the timing is right, for example, just having a child, which you can then see on your bank statement. The first child benefit payment has come in and you can say, "Oh, have you thought about this and that? Don't you want to provide for your child, or do you want to start saving for their university education abroad later on?" Whatever it is. So you can approach the customer in a very targeted way and increase the chance of closing a deal. Or even several deals. You know. You have higher customer loyalty through targeted, holistic advice, and I think that's the real added value, on the whole. Of course, it would often be referred to in monetary terms, such as "I have additional potential." I think that's negligible, because the value of the data and the insights gained from it and the generation of follow-up business

is, I believe, much more significant, i.e., significantly higher than some small commission that somehow falls by the wayside.

INTERVIEWER: That sounds very good. Thank you. Above all, I hear you mentioning investments in future business, including in the core banking area and, above all, personalization. I also hear you mentioning key. That sounds good. And you've already touched on it. You've already moved on a bit to the next question. So, what partnerships are being formed and what offers are being made to customers? Maybe you'd like to say something more about that. For example, you mentioned the contract manager earlier. What exactly is happening there today?

INTERVIEWEE: Ultimately, it's a classic separation of core business and, in a way, what else can I do? Do something good for the customer? Earn money that I can't or don't want to earn myself because it's too expensive, because I don't have the skills, etc. That's why I bring in partnerships, specialists in various areas, so to speak. I already mentioned the contract manager. We have partnerships with Wechselpilot, who calculate the specific offers for switching electricity or gas providers or for a DSL contract, i.e., various products that are then simply compared with each other. And then the long list of internet offers is simply combed through. Based on my personal needs, which I have of course entered or selected via parameters. Ideally, I can offer a very targeted product with clear savings. This means that there is also a great monetary added value for the customer. And as I said, on the other hand, data is evaluated and leads to a better view of the customer for the provider. We have had other examples, such as with Finno. Together, we have linked a property tax app that directs the customer to the application, where they can file their tax return. This service provider simplifies the process for the customer, charges a fee for this, and, yes, has also achieved noticeable added value for the customer. There are offers such as Raisin, which is about investing money, where you can compare different options and say, "Where can I get the best interest rates or the highest interest rates for my, for my, yes, for my, for my investment?" So there are various collaborations that are currently being implemented, and I believe there are a wide range of offers on the market. I mean, we have a few now, but I think you just need to look at the usual suspects. Things like tax returns, all kinds of investments, consulting services. That goes all the way to... I don't know. Digital household accounts or receipt analysis? CO2Check, for

example, which we developed, calculates the carbon footprint or equivalent. Based on customer data, i.e., account activity, the aim is to do something good for the customer, raise awareness, and, of course, leverage further upselling and cross-selling potential in the background to see what else can be achieved with it. But primarily, of course, it's about gaining insight into customer data and understanding customers better so that we can continue to guide them and accompany them through life with the right banking services. But I think what can be said clearly, based on my observations, is that banks are using these beyond banking offerings to gain this customer perspective. So, to put it bluntly, they select and evaluate customer data in order to then return to their core banking business and, so to speak, close the deals there. Because I believe that this kind of "I am now a marketplace operator" approach is where you want to go with your 3.0 version. I don't think this has yet entered the mindset of banks in this form. So they still see themselves as, "I manage money, I invest it, I earn interest here and/or I lend money and charge fees for it." That's still the prevailing mindset. And they have now understood that in order to be successful, you need data, because this direct customer contact is steadily declining. That means I have to find a replacement somehow, and that replacement is digital touchpoints, which are what used to be years of conversations or Friday night barbecues at my father-in-law's house, who also happens to be a bank advisor. That no longer exists in that form, or is becoming less and less common, and something else is needed to replace it. Yes, how do I get in touch with customers? How do I maintain contact with customers and, above all, how do I get the information that used to be exchanged over a beer? To do that, I now need technical solutions that enable me to get to know my customers better. Otherwise, they would just be any random users on the internet, and I wouldn't have any added value if I simply offered them a STANDARD service. So I don't know. For example, you don't go into banking trends, so to speak. So how, how, how is banking behavior changing, also across Gen Z? And in the future? So there are very clear needs for things that are more specifically tailored to me personally. I want to pick the best from all the different pots. I want to compare, I want transparency. That's what's in demand, so to speak. And I can only address and respond to such a simple request or requirement if I know who I'm dealing with. And if I don't know my customers, I have no chance of doing business with them in the future.

INTERVIEWER: How could I continue, because I'm really making great progress in terms of content. Um, we've now settled on this B2C approach. Now let's look at this third stage. Now let's take a look at this approach, ecosystem level 3.0. This infra-institutional approach with a B2C business model can also be B2C or B2C, because one customer, , may also be a business customer. But from the bank's point of view, both are customers in a way. That's why I chose the B2C definition here. Now here's a simple question. Please answer with just a yes or no. Do you already have experience with this 3.0 C2C approach, or where the bank acts as a market orchestrator?

INTERVIEWEE: Well, when I think about it. I've already thought about it. I have. I couldn't come up with anything. Now you would think of something like C2. Of course, it's something like PayPal, which is a very simple example. But of course, that's not a bank either. With Vero, we now have direct money transfers from customer to customer, and there's some kind of facilitator in between. Which is the bank, but ultimately that's not AB. Yes, if I take the question seriously, I have to say no. I haven't seen a real example of CC yet.

INTERVIEWER: All right, that's fine with me. Then I'll move straight on to the next two questions, namely, if not, how can this customer matching, i.e., this data analysis, take place at the 2.0 level? How does that happen? So how will the data analytics or machine learning take place? What methodologies will be used?

INTERVIEWEE: That brings me back to the example I mentioned at the beginning, the contract manager. Ultimately, it's really about analyzing cash flows. So I look at what recurring payments I have and identify recurring patterns. I think that's very important to see. First of all, I have a monthly payment. Can I deduce from this that the customer has a standing order or has entered into some kind of contractual obligation? Then, of course, I can find out. For example, I have the option of using a Beyond Banking approach to give the customer the opportunity to store their contract data with me for analysis. That's great, of course. Then I would have a very simple game. If not, there is also the option of reading the headers, for example. So, who is the transfer going to? Is it going to a large, well-known energy provider or something? Is it in the transfer text? Is there perhaps a keyword or some kind of catchphrase that I can use to deduce what kind of contract it is? And maybe also to deduce the terms and conditions involved. And that would

be the matching, so to speak. So, ideally, I first look at all my customers, look at all my payment flows, and first identify different subgroups out there. I'll say that one group is people of a certain age with a certain type of contractual relationship. There, I have the potential to offer XY product. That's a very simplified explanation of how this type of analysis takes place. And then you can also select from different, let's say subsets, which I look at, which customer groups do I have there, which ones have I identified, and then I can generate targeted advertising and customer approaches and evaluate responses. For example, if I have received a reason for a rejection or " " or a restriction on the contract, I can also derive follow-up decisions from this, because I can also derive important insights from this data set. Okay, does that make sense so far?

INTERVIEWER: That's great. Thank you. Let's move on to the last question of this research question. So, first of all, how do you see the acceptance of a lived Beyond Banking ecosystem and the associated customer matching? First, level 2.0, and then 3.0 on the customer and provider side, if you know. Before we move on to the next question.

INTERVIEWEE: Um. Well, first of all, to put it briefly, it's difficult. Yes, in terms of acceptance. Because there are two perspectives on this. On the one hand, of course, there are the customers, the customer side, the customer. The customer must first recognize that my bank can, wants to, and is allowed to be my partner. Yes, because many people are still stuck in this classic idea of a bank connection. A bank is where you go, where your salary goes, and then my, my, my. I don't know. Can I have an overdraft facility? And somehow. My. My. I have my house or apartment. I financed it through the bank, and every month a little bit of money is deducted, and I pay a little interest, and I'm not interested in anything else. So, as I said, if I want a cheap contract, I go to Check24 or look at another site. I think that's the first thing. Yes, so we. Acceptance means knowing first. That means we have to create awareness among customers. Well, not us, but I'm speaking for myself now, we are now the bank. So the bank has to start with the customer, to create awareness. Hey, dear customer, I can do much more than just move money from A to B or take money from you or give you money. I can really accompany you as a partner. I can create real added value for you in my advice. That could be, for example. There could also be examples such as, um, I know my customer, I know he's a homeowner and he may have an old house, and I know the new energy laws

are coming. I know for a fact that in five years, the heating system will need to be replaced, and in. I don't know. In the next ten or 20 years, the following renovation work will need to be done. He may not even know that. Um, then I might bring it up and say, "Hey, dear customer, did you know that?" And he said, "Oh no, I had no idea, thank you very much." And, oh, by the way, I can also help you finance the whole thing. Would you like to set up a savings plan so that we can pay into it over the next five years? It doesn't always have to be a savings account, etc. No, it's simply about the customer. Really actively addressing them, taking them by the hand, generating a feeling of real added value, so that the customer is grateful and says, "Wow, you've told me something I didn't know. And I hadn't even thought about the fact that you could also, let's say, advise me when it comes to renovating my house." Or things like that, so that I'm simply compliant with legal requirements. If. If we can achieve that, then I believe it's possible to gain a high level of acceptance among customers, and I'm sure that will happen. Because if I bring such great added value to a customer and they also feel that I am accepted as a partner or on the side of the bank. I'm not just any random customer (), but the bank knows me and has an interest in my well-being and really focuses on my financial well-being. Then there will also be a high level of acceptance among customers. I'm sure of that. The same problem exists on the banking side. I also believe banks, as I said at the beginning, have already recognized that they have to do more than just their traditional business. Many have already recognized that they need to do more than just their traditional business. But I think there are still too few who are actually doing it. And I would say that banks need to break away from their traditional ways of thinking and their traditional business model. They have to do it. They have to understand that they are banking service providers, even if they are still banks. But ultimately, they have to see themselves as service providers. Orchestrating, providing consulting services, occupying the customer interface. And if you don't do that, there will be no acceptance for such an ecosystem within these banks, because then these people will turn to the gurus or financial gurus and fintechs of this world who offer better services for less money. And ultimately, as I said at the beginning, in the future, banking services will be consolidated by third-party providers and presented to customers at the customer interface. (...) And that acceptance will definitely be greater, which is why banks need to make significant changes. And the question is, what impact will this have

on role concepts? The type of advice has to change. As I said, the bank must first understand that it is a consulting company and the customer is the customer. It's not a case of "I bring money and want money," but rather "I have a customer who wants a service." And that means the goal is the customer's financial well-being. I have to understand that I am the expert. I know about, about, about, about, about money. And ultimately, I have to perceive the customer, ideally as the customer doesn't have to worry about anything. I have the customer fully on my radar. I know what they need. I know when they need it. And I also have the best offers for this customer. This goes so far that I say I am opening myself up to the market in such a transparent way that, ideally, I also make my customer an offer that runs counter to my own portfolio. For example, I say I am now offering them a fixed-term deposit account with a competing bank or a fintech company. Because I simply want the customer to trust me and see that hey, I'm not just interested in money, but I want the customer to really develop in the best possible way. And, um, if you can achieve that, if there is that acceptance that the bank is my partner and only has partnership in mind, then I'm also willing to talk about certain account management fees, if I know. Hey, yes, I have a great advisor, but that costs money. Then I'm also willing to pay a little money for that, if I know. But that afterwards, they really advise me in a value-neutral way and in my best, um, um, interest, and don't always have it in the back of their mind, "Oh, I have to close the next, the next loan." So that's always the bad taste you get with normal advisors. They just want to sell their own products. And if the banks stick to this concept, they will go under. That's for sure. That's absolutely certain. This type of customer interface will disappear, and that's why these are the implications for the bank. So the way of thinking has to change, and the role concepts in the sense that bank advisors have to offer holistic advice and focus on the people and their well-being. This clearly goes beyond typical traditional banking. And of course, help will be needed from . So you have to give AI-driven tools a chance. We need IT solutions for, I don't know, when it comes to fulfilling compliance requirements or, as I already said, when I have to renovate my house. What are the legal requirements for that? By when do they have to be completed? You can't expect every bank advisor to know all this inside out. That's why you need tools, and a bank has to orchestrate that too. In other words, the bank is, so to speak, an administrator of knowledge and offers this knowledge in the form of services, sprinkling the whole thing with

financial products. And that makes for a big, round number. And if the customer then feels that they are important to the bank for a long-term partnership, then there is also a high level of acceptance for this type of ecosystem.

INTERVIEWER: Understood. What I hear above all is partnership, finding the best solution for customers, and also the topic. You didn't mention it, but that's how you described it. Everyday companion. Yes, I want to listen to and understand the customer in every way, and then if the competition's offer is better in some way, But I have found the best solution for them, or it goes beyond banking. But you may need new tools for your DIY projects because you are currently building, and we have already given you a loan, so we can also provide you with this beyond banking service because we have it in our portfolio. So, a lot of understanding, a lot of questions, and partnership. So, I hear that. That's great, and that.

INTERVIEWEE: Timing is important, the timing, the right offer.

INTERVIEWER: At the best possible time. Just right.

INTERVIEWEE: That's exactly the big advantage we had from data. If you have real-time data, you can strike at the right moment, because nothing is as stupid as an offer that comes five years too late. That's it.

INTERVIEWER: Just annoying and upsetting the customer again. That's exactly right. Let's move on to the second research topic. Thank you very much. That sounded really great. Lots of insights. And now let's take a look at, let's say, a methodologically driven, technically driven approach to Beyond Banking Sales Signals. So how can Michelin Learning and data analytics methods be used to develop and implement effective Beyond Banking Sales? And what specific use cases show how they impact sales performance in the financial sector? This time, we'll start with a thesis or thesis hypothesis, and then I'll ask you whether you agree or not. So, in order to leverage the potential of Beyond Banking, there is still a lack of clear business models and the necessary skills. Do you agree? Please explain.

INTERVIEWEE: Exactly. So, a very clear yes. I've said this many times before. The problem I see right now is that banks still don't sufficiently accept or see the need for or or recognize it. To invest and earn money outside of interest rates. So, what I said at the beginning, this countercyclical investment, which is now due, is not happening. (..) The necessity isn't there, and then somehow there's always this feeling that they're still thinking too much in monetary terms. They're

still the controllers, the business people, the ones who see. I invest one euro and what do I get in return? Maybe less than €1. So it's a bad deal. They don't see the treasure trove of data they're accumulating. And those who are second and third in line behind them, which then lies in further upselling and cross-selling potential. You can explain that to people. Then they say yes, yes, but in the end, they still do their business case with a sharp pencil. And that's where it will often fail in many, many ways. Added to that, as I said, is the uncertainty: Do I really need this? Am I sure? I'm unsure about the investment. So much money and then I don't even know what I'll get out of it. I have a skill in banking, of course, so these new, let's say digital solutions, naturally also need to be understood and supported, also in the direction of this holistic consulting. There are also skill gaps there that people want. Especially not when a customer comes to them with a question, to the branch, and, um, asks a question about their tax return or about, I don't know, changing their electricity contract or something? Then they say, "Wow, I can't answer that, I don't want to, I don't need to." And the banks are just too short-sighted in that regard. For me, that's a very clear criticism of the banks. Those who are now looking at the obvious, the big core business with interest rates, which is currently earning them really good money. And they are simply ignoring the repetition of ups and downs in the markets. The next phase will also come, in which banks will no longer earn money so easily and so well. And they should actually be preparing for that now. They are not doing that, or at least not to a sufficient extent, I would say, and on the customer side. (...) As I have already said, customers still do not see the bank as this kind of partner. Ideally, a customer would (...) as soon as they think about money, immediately think of their bank and say, "Doesn't my bank have something for me?" I'll check the app. Or somehow on the online portal, to see if there's anything cool there. Are there any vouchers or consulting services or or or. No, money equals bank, yes, but not only that. Not just money, but somehow any kind of, uh, what? Anything to do with money should somehow lead me to my bank. Ideally. But it doesn't. And the customer benefit. There are still independent comparison portals. They don't want branded offers, i.e., branded in the sense that I don't go to my advisor and ask them to explain it to me because I know full well that they will explain it to me in a way that sells their own product. And this kind of trust just isn't there yet because it's not being practiced by either side. And that's

why I still see a huge construction site there. And yes, the potential is far from being used as it could or should be.

INTERVIEWER: Thank you very much. So you agree with the thesis. You agree. You can still do it. Even if there are no clear, often no clear news business cases yet, can you still name some for level 2.0 and/or level 3.0?

INTERVIEWEE: Yes, we're back to the same examples of contract managers. As I said, I use the tool to save money for the customer, so to speak. In addition, there is a commission from the provider to the bank, which means that the customer and the bank really earn money from it. That's the monetary advantage, which is a simple, clear business case. As I said, all the secondary positive effects are actually even more valuable, but in the business case it's difficult to break that down into figures. So that used to be a property tax. We also had a property tax declaration. Forwarding an external tool and also collecting a commission for that is also a simple business case, which in my experience is or was far too little used. (..) But the business case is actually there. It exists, and there are also great positive side effects, such as, "Oh, I know my customer owns property or has larger assets in the form of real estate. I could certainly make good use of that." But, as I said, this is also far too rarely accepted and not thought through and implemented. Unfortunately, I can't give you anything specific for 3.0. So that's where it falls.

INTERVIEWER: You mentioned that. That's exactly right. Then let's move on to the possibilities of dimensionalization and scaling of Beyond Banking Ecosystems. That is, how do you see the possibilities of this dimensionless dimensionalization and scaling? So how do you assess that, and are they? Yes, I mean, if you can say it's great, then it's great for other decision-makers too. Are you aware that there are such possibilities for scaling this? (...)

INTERVIEWEE: Well, that's a different question, isn't it? I've already answered it implicitly. So I think, um. (...) Well, there are possibilities for scaling. That also has to do with the potential. So I can scale the thing if I think yes, it will be accepted and the dimension can always get bigger. But what is it? But that brings us back to the previous answers. There are a lot of things missing, and the banks still have a lot to learn. They have to implement it, put a strategy in place, and then really get it into the customers' heads. Um, that means, and here I am back to the big, big warning sign: banking of the future doesn't need banks, and these banks

are currently at this crossroads. And either they get it and realize that they have to keep the customer interface open at all costs, and they can only do that if they present themselves as interesting and really helpful, then they can do it. Then they can scale this thing really big, because once you have an example like Amazon, which started out as a small bookstore and today you can buy everything on Amazon. How did they do it? Well, they did. They were cheap, they were fast. They delivered the books for free. You could return things, they had cool customer service, and many people don't even look anywhere else anymore and just say, "I'll just order from Amazon because I have Prime. I'll get it delivered to my house for free. It arrives tomorrow, and if it doesn't fit, I can easily return it, no stress at all. Those are the kinds of things that matter. There's a brand, there's a concept that has stuck in people's minds. Amazon stands for a lot of values. Of course, there are also negative values. Yes, there's a huge debate about . I'd rather not get into that right now. But for those who use it, and that's a hell of a lot of people, it has very, very positive values and personal advantages. And that's what a bank has to achieve when it comes to money. Yes, everything that has anything to do with money and so on. Financial, I would say, this financial well-being. Unfortunately, I can't find a German word for it. I think it's a very fitting term. Um, financial well-being must be the number one priority for every bank. In other words, financial planning for their customers. And if you focus on that, then a whole lot of necessities arise. And, yes, for me, that's the opportunity for dimensioning, for scaling. If you take that to heart and focus on it, then a whole lot is possible and there's a whole lot of potential.

INTERVIEWER: That means, I'm also hearing something like, what? Yes, some people are already starting, and it has to prove itself first. Let's say a revenue stream or a direction in an ecosystem, and then, if it's successful, you can start thinking about how to scale up to other levels. Or you have to ask yourself where you are at the very beginning. Okay, what am I actually getting at? And that has to work first, i.e., work successfully, in order to then scale it up or perhaps, in the previous analysis, if something is working successfully, then you can say, okay, we can scale that up too. That's what I'm hearing. Thank you very much. Then I would say let's jump to the next question, which you can also answer with yes or no. So does your company use Beyond Banking Sales Signals, or do you know of other banks that use it? (5)

INTERVIEWEE: I believe Sales Signals, yes. (..) Yes, we already use it. So what I said, it will be. (..) Insights derived from data streams. Like the simple example of child benefit. Yes, I see. First, there's child benefit, and that gives me a starting point for a conversation with my customer. Can I start by congratulating them on their child? I can ask right away, "Hey, what were you thinking?" As a safeguard, and and and and, of course, I can clearly use that as a signal for my core business.

INTERVIEWEE: So, I'm from Beyond Banking, from an application where I gave, let's say, my consent. I agree that you can evaluate my data. That's arbitrary. There are various applications that allow me to do that, and the sales signal would come from that. Then, hey, I've recognized a new father, a new mother. Talk to the customer about that, about addressing the issue of securing your child's future right away and maybe setting up an ETF savings plan or maybe even something bigger. (..) It still is. So there are initial cases, but it is still being used very hesitantly. And as I said at the beginning, there are also cases where this has been reversed, such as with the contract manager, because we have the issue of data protection as a really limiting factor there, which is actually not true and not correct at all. But at least for now, the perception of many hesitant banks is that they are afraid of running into a potential legal risk and trying out things that checks 5000 times beforehand. And in that respect, yes, that's the answer, but still very little and significantly less than they perhaps should and need to.

INTERVIEWER: Okay, I think you've already answered my other questions. So, are these Beyond Banking Sales Signets established in sales? I mean, of course they can be played out via sales, and then, let's say, closed via acquisition. It can also be a data-driven recommender and say, come on, it runs fully automatically via an application and the customer is automatically informed. That means it's not yet being used consistently. Is that correct?

INTERVIEWEE: As I said, there are some tentative examples. I think it's more of a learning phase. Maybe, but, um, exactly. But in order to really exploit the potential we have, we are far from using it. Yes.

INTERVIEWER: Perfect. That concludes the second research question. Thank you very much. Let's move on to the last one. We'll focus a little more on the data governance level. Namely, what are the most important influencing factors

and evaluation criteria for the successful creation of a scalable Beyond Banking Ecosystem? And how can these factors be integrated into the technical design of the model? And here again, a yes or no question first. So, are you familiar with the use of a guideline concept, framework, construct, blueprint, whatever you want to call it, for the creation of a scalable Beyond Banking Ecosystem in the banking sector?

INTERVIEWEE: No. (...). Which makes sense, in a way. So I'd say no. No.

INTERVIEWER: Perfect. Perfect. Thank you. Then let's move on to 3.2. Namely, what decisive influencing factors and criteria can then determine the value of a successful Beyond Banking Ecosystem? So, what would be relevant to you from a design or system perspective?

INTERVIEWEE: Of course, we always ask ourselves that question. Constantly and always. (...) You have to make a clear distinction, as I said at the beginning. For me, it's more about non-monetary facts. As I said, monetary factors are a nice by-product, but they cannot and will not be the main driver when it comes to simply staying in the black. Criteria So, ultimately, it's important to ask how I measure success in terms of KPIs. I have to think about KPIs, and that's also your question: what criteria do I apply? For example, you can look at things like satisfaction and churn rate. In other words, how many customers are leaving? Retention also includes things like bank account details. Of course, many customers have more than one bank account. How can I identify and count that? And do I even count that I am the first bank account? Because the keyword is customer interface. Yes, I use the app, that's the first thing I look at, and I get my other accounts into my bank via multi-banking. My banking app. That's important. It's a bank account. topic New customer acquisition can be measured. Yes, but how much? I can also, so to speak. Where do you come from? How? How did you find out about us? So there are certain things that need to be evaluated, because, so to speak, the ecosystem or part of the ecosystem is, I would say, responsible in a positive sense for the customer coming to us. Another topic or other KPI would be the usage rate of this ecosystem. How many applications are actually offered and used by the bank or the customer? That can also be counted and would provide another criterion, a criterion by which I can measure success factors.

INTERVIEWER: Great. Maybe another question here, because this question is particularly important to me. In the later design process with other experts and

focus groups. If we go into the technical concept a little bit, what else would be important to you? I'll say that's possible now. I can now name a few classic key points, such as performance, reputation of partners, i.e., of partners. So, are the bankers on board or not? That has already come up in the expert interviews. Um. (..) Yes. Stability also in terms of data. Let's say data exchange. Is that also standardized among the various partners? So, what else could be important when it comes to the technical concept?

INTERVIEWEE: Yes, you've already mentioned the most important ones, or many of the most important ones. So, performance. Availability in general. Do I have a reliable partner that I can also hold accountable? If necessary, GTS. I also have a contractual option to claim damages or receive penalty payments for poor or inadequate service quality. Could they just close up shop overnight because two students decide they want to go traveling for two years? You never know. So you have to be very clear beforehand about the risks you are taking. Do these suppliers comply with all legal requirements? Are they compliant? Do they comply with data protection regulations? Where? Cloud storage. Where do you store your data, and so on. Are these things really fail-safe? Replicated? Still secure, so that no one who is not authorized to access it can do so? What about data breaches? It happens to everyone at some point, so how do they deal with it? What are their processes? Reputation is also a big thing, of course. I have a partner who has a somewhat bad reputation. That then reflects on me too. Especially when something happens. These are all big issues, they are important and you have to look at them in advance. Price is also an issue, of course. So am I making myself dependent? Are there standards where I say, I don't really know, I have a solution in containers and I can simply migrate it from, let's say, cloud provider A to B. It's never easy, but at least I can do it. No, um, or do I buy a solution from a niche agency, as I said, that they've built for me in some programming language that no one knows anymore? Am I completely dependent on them, and can I get out of it somehow? I have. How have I contractually ensured that this will continue to run for years on reasonable terms for both sides, without either side being forced into an emergency situation? Or, of course, I also ask myself the question: Can I maybe build it myself somehow? So, in the long term, might it even be cheaper to offer the things myself? Especially if I have a large, powerful IT department, then of course the bank's self-image is that I am a bank in the traditional sense. I still have my books, which of course no one

else does anymore. Or am I an IT company that has a technical focus in the sense that I do banking processes and more? These are the kinds of questions you have to ask yourself in advance, and you have to ask them regularly and review them again and again, and, um, yes, and act accordingly. That's really important.

INTERVIEWER: Yes, you've explained that in great detail. Thank you very much, because you've already made a few points, or rather, you've seen things correctly. I'd call them criteria. Influencing factors can also represent risks. So let's move on to the last questions. That means we've focused a lot on opportunities. Okay. Potential, where we will certainly also look at the challenges and the risks again. To reiterate that. So here we'll take another look at the first one. How do you now rank the challenges in the ecosystem constructs? You've already mentioned a few degrees.

INTERVIEWEE: Exactly. I think we've discussed IT in detail now. Legal risks, of course. Quite clearly. Number one. Data protection is always an issue. It always will be, and it will continue to be. It's not going to get any less, but rather more. Regulations are becoming increasingly strict and increasingly worse. That's a huge issue for him too. I mean, when I look at it from a legal perspective, contracts, SLAs, delivery, delivery promises, but also the issue of, let's say, intellectual property. So now I'm offering something that might infringe on the rights of others who have already done this, etc. So that's also an important issue that you have to look at and always take into account and check. What else comes to mind? (...) Anything bigger? No, well, first of all, of course, the loss of my core business. No, if I start doing something else and focus on a whole bunch of other things, I might lose my core business. Or even if I don't, I'll lose my core business. Also, as I already said, banking will no longer need banks. That's a big, big issue, and it can also be a great opportunity. So if I maintain customer contact, if I'm a reliable partner there, if I have a great relationship with my customers, it doesn't really matter what I do. Ultimately, I just have to deliver the services to the customer. And whether I do that myself or not. It doesn't matter at all, but as I said, for me it's a risk and also a huge opportunity. To the same extent, the risk itself is, of course, a clear loss of reputation. If I choose bad partners and money is lost or data is lost. That's a huge problem, and of course I'll immediately be in the spotlight of the press and the customers. Uh, a very, very, very bad risk. And, of course, it's always there, every day. Yes, from a purely economic point of view, I always have

an investment risk, of course. We're talking about an ecosystem here. That means it costs money to design, set up, and operate the thing. That means I have to invest money first and see if it works and how. With every business or business idea, there is a risk that it will simply fail. So the risk is immense, of course, especially if I do it half-heartedly. Yes, exactly. And otherwise? What else comes to mind, especially in the Geno area, which we have directly with us, I can think of something like customer relationships. That means if I operate a platform where I offer various products, they could be or will most certainly be competing products from my own customers. This can and will most likely lead to a deterioration in my customer relationships. I have to compensate for that, I have to manage it. But the risk is there, of course. And I have to weigh up very carefully what is more important to me: this one customer relationship or transparency and a happy relationship. I have to weigh up all the other factors and, of course, consider what management activities I can initiate to minimize this. Perhaps this customer won't be so unhappy if I explain to them exactly why I'm doing this. And maybe they can even earn money from it. Maybe they have their own no-name products that they also offer, etc. So there are various possibilities, but in any case, I have to minimize the risk of upsetting my customers when I open myself up to the market and alienate my own customers. That's also a big risk that I see.

INTERVIEWER: So I hear both a curse and a blessing in that. Absolutely. Exactly. You've highlighted many risks, including the upside. And I think that's great. I have one more question before we wrap up. We're right on schedule. I'd like to add something to what has been said or to something that has already been said. So also about potential, opportunities, or risks. Or any remarks. (...) What would you like to add, or have you already said everything?

INTERVIEWEE: I think I've already covered most of it. I've answered most questions in great detail. So really just to summarize. There are risks and opportunities at the same time. I see a really big risk for the banking world that if they miss the boat, they will really catapult themselves out of business. That will happen. Let's take something like Trade Republic as an example. Of course, they started out with, "I'll set up a small deposit account here, cheap or for free." And now they somehow have a banking license and offer a checking account, and then there's the card, and at some point they'll probably start giving out loans or fixed-

term deposits and, uh, I don't know. So there is a risk. And that's also the issue with, let's say, this younger generation, who have different expectations. They see traditional banking, the traditional bank advisor, the branch as totally outdated, no longer relevant, non-transparent, and untrustworthy in the sense that I don't believe the advisor is giving me the best offer because, first of all, he may not even know about it because he doesn't look on the internet, and secondly, he doesn't want to because he wants to sell his own products. This is a huge risk for these banks, this advantage they have over the evil internet, that a bank is still seen as trustworthy, as reliable. I entrust them with my data and that's not a problem at all, because the bank is regulated and there are lots of rules and there's no crime. Yes, because they don't take advantage of me, but um, this advantage still exists among the older generation, but it will fade and eventually disappear. And then they will realize that young customers are no longer coming because they are going to the Shiny New World. No, they are going to a financial guru. They are going to Trade Republic and whatever else they are called. And even if it's just the direct bank, yes. They don't want to pay money. They want the best transparent offers. And if that means I have to disclose all my data, then that's fine with me. Yes, because that's only fair. But that's what young people are doing, and it's going to become more and more common. And if the established banks don't get any new customers, at some point they won't have any banks left. And that's what I said at the beginning. That's also a very important credo for me. The banking of the future won't need banks, there will only be banking services. There may be banks that offer these services, but they will no longer have the customer interface. And they will no longer have control over the entire follow-up business. And if they miss this opportunity, the banking market will change radically in the next few years. Really radically. That's my point.

INTERVIEWER: Great closing speech. Closing statement. Thank you very much.

APPENDIX 8. Semi-Standardized Expert Interviews: Transcript from Expert 6

INTERVIEWER: In the three research questions that we, that I brought with me, the first one is: How can the combination of intra- and inter-institutional customer data matching improve the dimensioning and scaling of Beyond Banking Ecosystems in the financial sector? And what impact does this have on data protection, integration, and technological infrastructure? Don't worry, you don't have to answer the first question in full, because all the individual sub-questions will then follow. Because the big research question is very weighty at first. So let's focus on the sub-questions. So, for 1.1. How do you see the revenue potential of Beyond Banking? (..)

INTERVIEWEE: Well, I would say that the revenue potential is generally high. With Beyond Banking. But I think that for banks, the loss potential that we are facing is almost more decisive, I would almost say. Due to various issues. Embedded finance is a very big issue for me. Financial services are no longer sold in branches. (..) And the question is, how can I still reach people and get to them? I think that's the greater danger, losing the customer interface here. So in that respect, there is really a potential for loss, as opposed to potential for revenue. For me, the potential for revenue is always high when I have a functioning platform. That means a platform that also has the appropriate users.

INTERVIEWER: Great, very interesting. Also an interesting perspective, which you explained with the potential loss. Thank you. Let's move on to the next question. First, what developments do you see in the area of Beyond Banking 2.0? That is, this inter-institutional customization alignment by non-banks. (...) So this B2C. I have a bank with a third-party provider. Exactly. What do you see there today?

INTERVIEWEE: Yes, this is where the topic of embedded finance comes into play again, where you can see that more and more third-party providers are entering this area, that insurance policies, for example, are no longer sold in banks, but are simply taken out when booking a trip, or when buying a car, the loan is taken out directly, or when ordering online, the financing. So it doesn't even reach the bank anymore, but happens beforehand. I see tremendous competition in this area. And of course, everyone is trying things like this. You mentioned some earlier. Telecommunications services are often like that, insurance companies check

everything that I can easily compare and contrast digitally. Compare account maintenance fees, compare cell phone contracts. That's where I see the focus.

INTERVIEWER: Okay. Thank you very much. If we go one step further, what added value do you see for customers and also from a banking perspective through this ecosystem construct? (..)

INTERVIEWEE: Well, for customers, there's definitely added value. At least with the approach we're taking. Making this information, which is often not yet digitally structured in the region, available and findable in one place, thereby providing a good overview. And yes, it's like having your home with you in your pocket as an app. To know what's going on outside my front door, what's happening there. (...) Yes, they have a reliable partner. Customers with a bank that naturally also has a certain trust bonus and deals with things fairly, for example, complies with GDPR, etc., and is very strict in this regard. For me, banks clearly have the advantage of securing their customer interface. Towards the customer. And as is the case with so many platform models, there is the nice winner-takes-all principle. We can assume that in the long term, only one or two providers will prevail in the region. And it would be unfortunate if that weren't us, or if we hadn't at least fought for such a position as a bank, because, of course, if things go well, the orchestrator here also has a certain revenue potential, but also visibility potential, and perhaps power is the wrong word, because the ecosystem is often about collaboration. But of course, the orchestrator determines the rules of the game in a certain way. In that respect, it is of course a very important position.

INTERVIEWER: Sounds very good. Lots of interesting insights from the customer and bank perspective. Thank you very much, Kathi. Um, let's move straight on to the next one. So, you realize that if I don't have any more questions, then that's a very good answer for me. But perfect, because otherwise I'll have some more questions to clarify, right? And again, I'll say a few little things in between so that we can answer the question. But that's fine. So, keep it up! Um, now then. You just mentioned one or two collaborations. What else do you see? So what kind of collaborations are generally established in this construct and what offers are made to customers? Or what do you do? Please tell us about it. What? What is available?

INTERVIEWEE: You mentioned earlier that this is the classic model. Yes, that someone pays for access to this customer structure. That's what we ultimately want in an ecosystem. But for me, that only works once I've passed a critical point,

namely once I've solved the chicken-and-egg problem, i.e., once I've integrated users and providers into my ecosystem. Until then, it's more a matter of weighing things up together with others. What can we offer? Perhaps the potential of users who might come along. And then, of course, the other party can also pay for added value and benefits for these users, for example, access, by offering their services there. And possible collaborations in the region are a major focus for us, for example. The topic of clubs, including associations, software, and support for clubs. But there are also collaborations with various news providers, for example, who provide regional and national news. There are collaborations with associations directly, who, for example, publish their events there. There are collaborations with other partners in the cooperative financial group in order to do justice to this idea of having everything in one place. Because at the moment, we already have many great services in the association. However, these are very difficult for people to find because they are all located at different addresses. For example, the digital care advisor has its own domain where it can be found. VR Meine Reise has its own domain, mein Plus has its own domain, and we are trying to make these easy to find in one place through cooperation via VR, without having to remember anything extra, so that you can access them directly. So these kinds of collaborations are also important. And it's important to always focus on what already exists as a great solution in the cooperative group, not to develop something new or better, but to cooperate and work together wherever possible. And when we go outside, as in the case of clubs, where there is nothing in the cooperative group, then we look at how we can currently gain any advantages for our users in order to overcome a certain threshold as quickly as possible and increase the number of users and providers on the platform. I think we'll put a price tag on it when there are enough people. That's no longer the challenge.

INTERVIEWER: Perfect, that sounds very good. Above all, lots of interesting collaborations. Offers that are made to the customer. Thank you very much. We can move on to 1.3. And that's easy. I would ask you to simply answer yes or no. So you already have experience with an expanded view at ecosystem level 3.0, with an interinstitutional approach, i.e., a B2C business approach with the bank acting as market orchestrator. (..)

INTERVIEWEE: Exactly. You explained it earlier. You did. I was there. It came across a bit. One could possibly also be a commercial customer or a commercial provider who is a customer of the bank, but can also reach their customers there. Because otherwise, it would be classic. Does it really attract private individuals to private individuals? Exactly.

INTERVIEWER: It's good that you're explaining it to me again or asking me. That's exactly how it should be understood from the bank's point of view. So because both customers, whether they are commercial customers, are still customers of the bank, this is also covered. So yes, the bank can also match a commercial customer, who is a customer of a bank, with a private customer of a bank? Yes.

INTERVIEWEE: Yes, we are working on things like that and are also looking at commercial customers to see what kind of cooperation is possible in order to open up and enable this user structure. So there would be, for example, partnerships with education providers. (...) From the commercial customer sector.

INTERVIEWER: Yes, exactly. You've already jumped ahead to 6:31. So you can confirm that for now. Yes! I would say that VHS is also aiming for that. Yes, that's one reason why you might have been asked to do an expert interview for . Right. That fits well. I would have been surprised if you had said no. Then I would have... Oh, then I didn't understand that correctly. So that's fine with me. Would you like to add anything else? So, what's interesting is what you just said about including educational institutions and commercial customers. Do you have any other areas that might have potential or are heading in that direction?

INTERVIEWEE: In principle, club software is also something that goes in the direction of offering services. (...) But it could also be something like a regional newspaper that offers its news, which then becomes the user group. These could be real estate providers, and I don't mean the bank, which already has its real estate on there anyway. But theoretically, it could also be a third party who can list their real estate there and make it accessible to users. It always gets really exciting when I have a large number of users. Then, of course, the willingness on the other side also increases.

INTERVIEWER: Yes. Critical mass, as they say. Yes, exactly. Perfect. Thank you very much, Kathi. Then I would say. Let's move on to 1.3.1.1. So, how does that

work on the technical side? That's how I would understand it. How do you feel about connecting these two customers with each other? Can you tell me how this is done using data analytics and/or machine learning? What measurement methods and functions are used? How would you explain the current state of affairs?

INTERVIEWEE: Not at all yet. Currently, providers can list or offer their services on the marketplace. Customers then decide whether they want to use a service or not and can select and purchase it accordingly. In the long term, however, the goal would of course be to collect data to the extent that is legally possible and use it to identify trends at an early stage, such as someone's interest in real estate. (..) We have a partnership with a student association that provides care services—well, that's an exaggeration, but they offer household-related services such as setting up new televisions, etc. The aim is to use this data to identify early signs that someone might need to talk to someone about their living situation, whether it might need to be remodeled in the future, or something like that. So, the aim is to identify issues at a very early stage in order to address them later on. Up to now, it has really been the case that the customer chooses: do I want to buy or don't I?

INTERVIEWER: Okay, perfect. You explained that really well. So that means you're still in the early stages. That means you're running the ecosystem. You've already gained a few partners and want to expand it further. But so that there's an automated, let's say data linking approach, as well as sales impulses, as you mentioned. So to go one step further and be proactive, i.e. to recognize in advance what the customer wants, then act on it and make a personalized offer accordingly. That is, I would say, your vision, a later version of your expansion stage, which you would then like to implement. I believe that is what you said. Right? Yes, perfect. Great, then we can still move on to the next question. Yes, that means you can describe it more accurately, i.e., the previous one. No, it's not yet about data analytics or machine learning. Do you have any experience with this? Either you find it yourself in your ecosystem, or maybe you've seen it at other banks or providers, and can then say how this data analytics machine learning model, or let's say approaches at this 2.0 level, works? Can you share any insights or experiences? (..)

INTERVIEWEE: So if I understand correctly. I don't know if it's always really machine learning, then it's once that other customers also bought or something

along those lines. (..) And of course, what there is, of course, is the recognition of any transactions on accounts or drawing conclusions from them, for example, that cell phone contracts are being debited or electricity costs, etc.

INTERVIEWER: Okay, so what you can share from your observations, or what might be interesting for you later, in whatever form, is fine. The database consists mainly of transaction data and attempts to read it. Of course, with the consent of the customer, data and impulses can then be generated from it.

INTERVIEWEE: So I would say that the current situation is what many are doing. I think it would be better for the future to really recognize customer needs, which would then be more in the direction of click behavior or which areas they are interested in, provided that it is still legally possible.

INTERVIEWER: Exciting. Yes, definitely. Thank you. Or did you want to add anything else? Sorry, perfect. Then I just heard something else. It was ambient noise. All right. Perfect. Thank you very much. Then let's move on to the last question of this research question one. How do you see the acceptance of a scaled Beyond Banking ecosystem and the associated customer-customer matching? On the second and third levels on the customer and provider side. So, what do you see today? Maybe your own feeling, because you are also the CEO of your ecosystem. Do you perhaps have other experiences? Or also on the banking side? What is happening there? Do decision-makers also perceive this? Okay, yes, I find the Beyond Banking ecosystem exciting. I see acceptance. Both on the provider side and, you know, okay. Customers want it too. Yes, there is also acceptance. What can you say about this before we move on to the next sub-question on organizational implications?

INTERVIEWEE: Well, I would say that providers are definitely interested. If I don't always use the method, there has to be a price tag first. I've often seen this in the past when such marketplaces were built. Even during the coronavirus pandemic, something like this often came up, where they said, "Dear company, you can enter your data, but it will cost you €90 per month." I think many people are overwhelmed by this. Too many of them have been shut down again. When it comes to real cooperation models, where, especially at the beginning, payment is not necessarily in the form of monetary services, but rather in the form of providing advantages or developing special services, then I think providers are quite open and a lot can be achieved. Users are quite open to the idea of having everything in

one place, including a map of the region. But I would also like to mention a very important lesson. That's why Fausta, for example, was just an app, because our users said, "For me, home is not the same as the bank's business area." (...) That's why we integrated all banks into this one app at Fausta, because it allows us to gain a supra-regional presence. By connecting and networking everything, users can ultimately search within their desired radius or in whatever way suits them best. And what users also reflected back to us was that it's perfectly okay for a bank to support or do this. But they don't want to feel like they're using a banking app when they're interested in their private events, etc. So it should look different, it has to be more open, it has to be cooler. It shouldn't give that feeling. My account transactions are coming up now. That was also important user feedback. And with the banks that say, "Oh, yes, yes." The banks are currently in a kind of sponsor role with us, building and financing the whole thing for the people in their region and playing a special role there. (...) There are great pioneers who are going along with this. But it's still a challenge to understand that our world is changing. And I think there's often still the hope that our banking business will simply remain as it has been in recent years and just continue as before, and that nothing needs to be done here. And there's a certain inertia that can sometimes be felt among banks, especially when it comes to taking on an active role. I always believe that if you want to create a regional ecosystem, the added value is to channel the information available in the region that is not yet all digitally available and organized. Because if it were, then large technical providers such as Google, Apple, etc. would probably already be way ahead. But for me as a bank, that means I have to be active, I have to build a network, I have to bring people together. And some people still find this active role very difficult.

INTERVIEWER: Very interesting insights on the customer and provider side. And as the banking partner and customer side so nicely puts it, that's great. Very detailed explanation. Let's move straight on to the next question. In the same context, you have explained the customer side of the provider very well, which again is acceptance. But what about the organizational impact, i.e., what organizational impact does this have and what other new role concepts does this give rise to? Especially on the banking side.

INTERVIEWEE: Well, on the banking side, I think the role of an active networker is emerging. We often have this idea, and I sometimes compare it to social media, that just because I create a Facebook or Instagram account, the matter is settled, but I have to post regularly in order to achieve something and make a difference. And it's the same with any kind of network I want to build. It's not enough to just do something, I have to stay on top of it and maintain it. And I believe that every bank will eventually need someone to do that. I don't know if that can only be one person in the long term, . In a way, it will probably have to become the job of every employee to network in the region and listen to what's going on there. But of course there will be someone who focuses on this, does it, and, let's say, drives it forward in particular and perhaps also knows more about it. But that's an issue with all these platforms. So if I want to build a member network, I have the same challenge, which is to take on this new role. I think that's still a learning curve and it's only just beginning. (...)

INTERVIEWER: Very exciting. Thank you very much. I would say let's conclude the first major research question with that. I would say we are on track. On track, right on schedule. That fits. Let's move on to number two. I'll explain it. I'll give you a brief overview first. So, how can machine learning and data analytics methods be used to develop and implement effective beyond banking sales signals? And what specific use cases show how they impact sales performance in the financial sector? Same thing here. We don't have to answer those two. There are many sub-questions that contribute to the two. So 2.1. And this time we'll start with a thesis. I find that very exciting. In order to exploit the potential of Beyond Banking, there is still a lack of clear business models and the necessary skills. Do you agree? Please explain your point of view. (5)

INTERVIEWEE: I don't really see any business models. At least, that's what I believe. They would definitely be available. I do believe in skills. On the one hand, because banks don't always have specialists who can do this kind of thing. And I'm not necessarily talking about programming. But when I look at the experience we have in our bank, in sales, then the correct preparation of data for a service provider is definitely a challenge and a rather lengthy learning process in order to then be able to read the relevant information from it. To deal with it. And what's also a real challenge is that we often still have a kind of black box when it comes to things like this. That means we don't know exactly what triggered it, or perhaps it's not always

100% explainable. But that's often very difficult for advisors to deal with and then find the right way to address it. They always want to understand why this person is coming now or what exactly triggered it. It would be, it's often just patterns that are recognized. And maybe the pattern is completely abstruse and says who knows what. Everyone who has built a house. (...) What do I know, also buys a car or something. So, and that's sometimes hard for people to understand, that you can't explain it logically and deal with it and incorporate it into a conversation. So I think these skills are still lacking in the bank. And maybe it will get better with new models that perhaps don't have this black box anymore, but can explain it better.

INTERVIEWER: Understood. You explained that well. Above all, you explained it in two parts. That means you say no, I don't see it that way, there are business models, and when it comes to the necessary skills, you said I can already do that. I can go along with the thesis " " Thank you very much. And then we'll go straight to the next sub-question, which provides a bit of context for this thesis. So you mentioned business models, that there are some, i.e., that there are use cases. Are there any that you can name for this level 2.0? (..)

INTERVIEWEE: But is that what I said earlier, where I can clearly say, what do I know? Cell phones, direct debits, and I can run them through some comparison portal and say they're too high in relation to other things, right? (..) Electricity costs, insurance comparisons, anything that can be easily compared digitally, I can map here. But of course, I can also theoretically have data sets or larger data sets, such as various sales, evaluated and try to identify patterns. For example, which products others who had this data were receptive to, or calculate purchase probabilities, so to speak.

INTERVIEWER: Yes, so in principle, if you think about it, that's how you just explained it. In principle, any product or any cooperation is conceivable, because you say, okay, but of course there has to be a critical mass that takes the lead and seeks out demand. But in principle, you said that any product that can be sold digitally, anything that can be gained from sales, could be a possible cooperation with a third-party partner. Exactly. So it's very exciting. Thank you very much! And now let's revisit the same question. But below level 3.0, what can you do in this ecosystem? CC, you mentioned something earlier, feel free to add to that or mention it again, as you like.

INTERVIEWEE: For me, the approach would be to start from the ecosystem concept, where companies join forces to better meet customer needs because they can't do it alone. And what often emerges from this are what we call living environments or customer journeys. And for me, there would actually be a signal to recognize at a very early stage and then it would be best to guide the customer directly through such a journey, which is something that everyone usually does in this situation. For example, if someone wants to buy a property, they don't just want to go to the real estate agent and sign the purchase contract, they also clearly need a notary somewhere. He will most likely need a moving company or at least moving boxes and a car. He may need craftsmen. And to really live this ecosystem idea and say, "Look, we'll guide you through it, you can experience it all here, you don't have to go anywhere." That would be the dream scenario. (5)

INTERVIEWER: I think that's a good conclusion. That's exactly the question I had in mind. Thank you very much. I like that. Let's move on to the next one, which is, um, how would you assess the possibilities for dimensionalization and scaling of the Beyond Banking Ecosystem? (...)

INTERVIEWEE: Well, I think there is definitely scalability there. (...) But I believe that, based on the winner-takes-all principle, we will eventually have to join forces as a cooperative group, for example, in order to get something off the ground. Because the competition from is immense in this area. So what's emerging there, and of course there are huge players who have much, much, much more money than we do. That's why I believe that being a large group is crucial for scalability and for growing and really achieving something. (...)

INTERVIEWER: Being a large group. Probably the network. Or building an essential, crucial network. On the other hand, of course, as I said, it's always nice to have the critical mass that needs to be achieved so that there's no chicken-and-egg problem, but rather enough traffic on both sides. Exactly. Yes. Uh. Perfect. Um. (...) Yes, that. That. That's fine with me. I just had a quick question, but I've forgotten it now. Again, um. That actually suits me quite well. Let me think about it for a moment. I just thought of something else. The possibilities of dimensioning, scaling. Um. (4) Okay, I can't remember it anymore, but you explained it, so it's fine with me. We'll gladly pass it on. Then it wasn't important, apparently. So let's move on to the next question. I mean, you've now explained it as if you're a decision-maker. CEO As before, yes. You're aware of it. So you would know what you need

to do so that you could, let's say, advise your ecosystem or perhaps others based on your experience, saying okay, this is important in order to scale the ecosystem now. But if you look outside your bubble for a moment, you also know that other decision-makers are aware of this. So how can you scale something like this, what are the important possibilities? Or would you say, no, I'm the only one who's working on this right now. How would you assess the situation? (..)

INTERVIEWEE: Well, we're currently trying to convey this to the cooperative group, to help them understand what it means. And I believe that as a regional bank, we have a big advantage when it comes to scaling, namely that we know all these people in the region and we can still reach them, at least at the moment. For someone new to the market, it's not that easy to appeal to users. And doing all that with a completely unknown brand via online marketing is a real challenge. We have the opportunity to approach our customers directly and possibly win them over as users. And the same goes for the provider side. We have the opportunity to address people and commercial customers directly and approach them. And, of course, as a bank, we always have a certain position of trust. We're not coming in as a tiny start-up that no one knows how long will be around. That means that cooperation partners may have a little more trust in us than in a newly founded start-up. And that's a big advantage. But whether everyone is already aware of this and whether everyone realizes that we only have the chance to make something of it now, because at some point the train will have left the station. If someone manages to make it from the bottom up, then that's probably it. I don't think everyone has realized that yet.

INTERVIEWER: Okay, well summarized. Thank you very much. That works for me. So let's move on. Now we're going to talk about sales impulses. First, please answer this question with a yes or no: . Does your company use B and E Banking Sales Signals, or do you know of other banks that do? (...)

INTERVIEWEE: Exactly, yes, we don't use sales signals yet. And as far as Beyond Banking is concerned, I think we do. But I'm not 100% sure. But I mean, we don't use them in the bank yet, but we tend to focus on banking business and purchase probabilities. But I know that banks use something like contract managers, for example, where such signals are recognized and actively offered to customers. (..)

INTERVIEWEE: There are also Wechselgott or whatever they're called. Yes, exactly, who do similar things. Where I also... I know that some banks use something like that, which then actively offers customers things like cell phone contracts, electricity contracts, etc. (...) Otherwise, really. Well, it's not really banking stuff for us, we have people for real estate. But real beyond banking services? No.

INTERVIEWER: Perfect. You explained that really well. Especially with this contract person, with this, with this application, the bank is buying, let's say, a tool where you can then use this integrated tool to recognize Beyond Banking signals, where you say okay, the customer may then be interested in switching electricity providers, cell phone providers, etc. So, by purchasing it, you might be able to do it, but otherwise, you're saying it's not established. Exactly, that makes sense to me. Interesting insight. That means... No, you don't see any. Do you know why no one is using it? (...) So why isn't it established yet? Why not yet? Banks using it? Can you explain it or pinpoint anything?

INTERVIEWEE: Well, I would say that not all banks have yet recognized the need to change their business model and also to pursue new sources of income. And then, how should I put it? But sometimes there is perhaps a certain arrogance in saying, "If we do something like that, we'll do it right away with huge returns." Those who don't want to go down this path, this, let's say, classic exponential learning curve, which may be painful at the beginning and only generate very small returns. So when I look at something like a contract manager or exchange rates, for example, the bank doesn't get infinite commissions, but rather generates small amounts. And often they say, we don't need that, it's too little. But they forget the learning effect they also gain from it and what they learn about their customers and. (..)

INTERVIEWER: Exactly, very exciting. So it's not always just about the money, but it can also be indirect, let's say factors or influencing factors on customers, such as, for example, I now have added value. Through this offer of these services, I find my bank even more attractive, I want to stay even longer. So it's a customer loyalty factor or even a reputation factor. Hey, that's exciting. I think it's great that my bank offers something like this. Yes, a recommendation factor. There are various, as they say, soft factors that banks don't immediately recognize, which may also indirectly contribute to monetary aspects, but which you can't

immediately grasp or track. And if there are monetary aspects, I think this exponential curve explains it perfectly. It's an investment first and foremost, and many banks don't see that and want to make big money right from the start, as you said. It's best to have a linear curve and not start from zero, but to generate income right away. But that's not usually how it works.

INTERVIEWEE: A return that is also really noticeable. And yes, that is often the challenge. I think that with real banking issues, it's often also a matter of knowledge. You also have to know how to build new business models. So I don't know if every institution has the knowledge of how to approach this, how to manage innovation projects, and that's also painful because not every project will be successful. I believe that, in general, investment in research and development at banks is still far too low, and as a result, so are the ideas of what could be offered beyond banking. And unfortunately, you can't measure the potential loss so directly, because I always think that would be another very important factor in convincing banks. Because if they don't offer it, it's not that the customer won't do it, they'll just do it somewhere else. (..)

INTERVIEWER: I think that's great. A great conclusion to this research question. Thank you very much. That works perfectly for me. We can move on to the last one, the last big research question. We're still well on schedule. That's fine. And now let's take a look at, let's say, the framework blueprint for designing a Beyond Banking ecosystem. Research question three: What are the most important influencing factors and evaluation criteria for the successful creation of a scalable Beyond Banking ecosystem, and how can these factors be integrated into the technical design of the model? Let's take a look at the next sub-question. Again, please answer with yes or no. So, you are familiar with the use of a guideline, concept, framework, construct, blueprint, or whatever you want to call it, for the creation of a scalable Beyond Banking ecosystem in the banking sector.

INTERVIEWEE: No, I am not familiar with any.

INTERVIEWER: None are known here. All right. Then we can skip the next question. Um, what would be important? So, to create a framework construct, let's say, or imagine you want to reach the next level of your ecosystem now. You want to create a data model behind it, an automated digital one? So, what are the key

influencing factors and criteria that can determine the value of a successful Beyond Banking Ecosystem? What would be particularly important to you? (...)

INTERVIEWEE: Well, I think the number of providers and users at the beginning is always crucial. Because I believe that for it to be successful, it really has to be used, and preferably used regularly. So apart from the number of users, it would then be perhaps also statements about how often they use it, what they use, how much time they spend there. And once this factor has been skipped, then of course I can pay afterwards. How much money do I earn with it? (..)

INTERVIEWER: Sounds good. Do you have any other criteria? Factors that you would like to include. Also. Perhaps also increasing the value of such an ecosystem. Or, let's say, building up this scalability. Can you think of any other criteria, or is that okay for you? (4)

INTERVIEWEE: The number of services or possibilities, perhaps also the areas that are represented there, would certainly be something else to make it interesting. (..) And then, of course, the closing rates for the individual partners. How many people buy something from them or how high the possibilities are for placing their products.

INTERVIEWER: So, if I summarize that a little, also a little bit of tracking options, what happens, where, and how often is best. Um, I think so. Anyone can be there for each partner. So, actually, the bank itself. So, of course, the third-party partners who, in this ecosystem, um, yes, also, um, um, yes, benefit and participate there. Exactly. Okay. What do you have for yourself? Yes, perfect. Then we've skipped the next question because you were able to mention factors and criteria to me. I think that's great. And you noticed that I probed a little bit because I wanted to know exactly this 3.2. So I want to try to design a concept later. Not now in this expert interview. But you've already given me the first ideas, which I will of course take up with my expert so that I can write a first essay and then, in further iteration steps with other experts, build on that and design something. Yes, very exciting. Thank you very much for that, especially for 3.2. Very important for me and for the research. And with that, we're done with the first three big research questions. But now let's move on to the last ones, the concluding questions, so to speak. We've been looking at a lot of potential. What developments do you see in these Beyond Banking ecosystems? Especially opportunities. But now we also have to look at the other side of the coin, namely the risks and challenges. So, how do you classify the

challenges in ecosystem constructs 2.0 and 3.0? If you compare the two again, what could 2.0 and 3.0 say? What challenges do you see there? (5)

INTERVIEWEE: Well, I do see challenges. Above all, the competition that exists. Especially when you go supra-regional, you have to say that everything is already taken and done. You have virtually no chance of building anything real against the big tech giants. But you shouldn't underestimate the regional market either. There is definitely competition there too. Of course, that could be other banks and other banking groups. But it could also be small start-ups and, in particular, municipal utilities that are active in this area and regional newspaper publishers that are trying to build something here. So the challenge is to prevail against the competition, because, as I said, I believe that only one or at most two providers will prevail in this area, simply because that's often the case with these platform models. I want to be where everyone else is. So there won't be countless providers existing side by side. And. (..) Then I immediately have specific questions about legal challenges and IT risks.

INTERVIEWER: First, perhaps legal risks. Exactly. Very good.

INTERVIEWEE: I agree, that's coming up next. Once again, once again. Of course, those exist too. The issue of data protection is certainly still a major challenge. And it's also said that, especially when it comes to concepts involving machine learning and data analysis, perhaps even AI models, it's not yet entirely clear to what extent this is always permissible in Germany. There are still challenges to be overcome in regulating all of this. (...) That will certainly continue to be an issue. Another challenge is the role of banks, where there is not always an understanding of the need to change or to try new things and just get started. Because, as I said, once someone has established themselves, we no longer need to get started, because they won't all switch because of us. (...) This active approach in banks and, of course, the fear of banks, of legal risks, of loss risks is a major challenge. Legal risks, even in areas that I may not be so familiar with. What happens if I broker a cell phone contract for something and it turns out to be wrong or something happens, can I be prosecuted? Will it affect me? Do I have any reputational risk? Banks tend to be very fearful in these matters. (...)

INTERVIEWER: Thank you very much. That means you've already moved on to the next question about legal risks. I'd like to add something.

INTERVIEWEE: Data protection is always a huge issue. Of course, the larger the ecosystem, the more difficult it is to map it. Especially when you pursue this real ecosystem idea, where several providers come together to solve customer problems or customer journeys even better, you notice this with such connections. When is data transferred and where? Which backend does it reside in? Who can access it and how? This is a very broad topic and a real challenge when working with different providers. After all, they don't necessarily give up their independence. It's not that everything is subordinate to one entity. That's definitely an issue. Then there's still some uncertainty about how certain things will be used in the future. Even when I think about the issues, for example. (...) Yes, and people always say that banks are always the focus of attention because there is supposedly money to be made. So there are also legal risks in the sense of warnings and possibly also from brokerage transactions. (...) Getting any recourse claims, etc. What happens if a partner no longer wants to participate and withdraws? You have made development contributions. What happens if, for example, a partner becomes insolvent and can no longer represent that? So there is definitely a great deal of potential for legal risks.

INTERVIEWER: Very detailed, very good. Great insights, very exciting. So there is a lot of potential. I think you also have to be aware of the risks. There are quite a few, as you so aptly put it, in this ecosystem construct. The more participants there are, the more this applies. They are networked. That means you scale the opportunities, but of course also the risks. So it's very exciting from that perspective. Would you like to say anything else about IT risks?

INTERVIEWEE: Well, I would say that, of course, as everywhere else in the world, they are increasing significantly. These can be things like simply no longer being available due to attacks. Takeover of the system, theoretically. But the more data I store and analyze, the greater the risk that data will be stolen or that the system will be attacked more intensively. And the more well-known it becomes, I believe, the greater the risks. In other words, the potential for attack. Yes.

INTERVIEWER: Exactly. So I think you can confirm that too. Of course, you now have multiple access points to data. You have multiple partners, which means you have multiple channels, and you have to protect them all. Yes, you distribute more data from one partner to another. That means this large, networked amount of data, i.e., the amount of data increases. That means the load. That means I also

have to make sure that the performance is right and is expanded accordingly. But the data flow is also increasing, and with the whole ecosystem concept, I naturally have potential, yes, points of contact, to attack from the outside, to perhaps incorporate or extract the data treasure, an entire ecosystem. Therefore, every end must of course be strongly secured and also comply with banking standards. So I think it's important to mention clearly that partners are also aware of the relevance of banks or the banking environment. Previous studies and surveys have also made it clear that it's important for partners to have experience in banking. And if they don't have it, they must be prepared for data protection and risks to be secured even more. As we know from the non-banking sector, even higher requirements apply there. That's exactly what it is. I think you can confirm that.

INTERVIEWEE: Yes, that's one of the reasons why we have it as a limited liability company here. Because we say that developing it ourselves as a bank would be almost legally impossible. The challenges would be so great, what we would then have to achieve. Which doesn't mean that they aren't already great, because we develop for banks. We are still relatively at the beginning. That means our data is still very, very manageable. The risk is also still manageable. But there's not much to lose, so to speak. And it's not yet the focus of any criminals. But the bigger the whole thing gets and the more data, especially personal data, there is, the more relevant the issue of security and the costs involved become, of course. And then, of course, adapting to the bank's requirements, which are even higher. When I think about it, even if the banks introduce such a product, maybe or some other company would say, "Yes, I'll do it," or "No, I won't." But then everything that happens at the banks, whether it's new products, data protection checks, or whatever else, is of course also a challenge and requires a lot of support. (..)

INTERVIEWER: Thank you very much, Kathi. Then I would say let's move on to the last question. Can you think of any other risks that should be mentioned now? Especially if we now... I only included it as an example, but if we look at this ecosystem construct and the bank now takes on the role of market orchestrator, are there perhaps also role-specific risks because I am now acting as a market orchestrator? How do you see it? What other risks might there be? (..)

INTERVIEWEE: Well, one thing is, of course, understanding this role, which means being active, maintaining the network, and keeping the other players happy,

so to speak. That requires capacity and has to be done, and it's not something that can be defined as a classic project, as banks sometimes like to do. And I don't do it for three months and then it's done, but rather it has to be done constantly. And of course there is a risk. If I slack off or if I stop doing it, then I lose relevance or lose things. And the same goes for me, keeping up with technology and continuing to develop, because the world won't stand still, others will come along and there will be new technical challenges. If I look at how an app has developed in recent years, how a design looked a few years ago and how it looks today. I have to work on my UX design again. So there is a constant need for further development, and of course that is also a real financial issue, which is why I say that I believe we will only be able to do something like this on a permanent basis in a large group, because the financial resources required are not insignificant. And unfortunately, we are always measured against what other providers are doing. That means we can't say it's much nicer than usual, but rather we are compared with other apps or other providers. And in that context, it has to meet the requirements of the users. (...)

INTERVIEWER: That sounds good, I would say. We can conclude with that.

APPENDIX 9. Semi-Standardized Expert Interviews: Transcript from Expert 7

INTERVIEWER: Namely, the three major research questions I brought with me. I'll mention those first. But don't worry, they are of course so complex that they cannot be answered right away. Yes, that means the sub-questions are important, all of which naturally contribute to the main question in some way. So, the first research question. How can the combination of intra- and inter-institutional customer data matching improve the dimensioning and scaling of beyond banking ecosystems in the financial sector? And what impact does this have on data protection, integration, and technological infrastructure? And now let's look at the first sub-question, 1.1. How do you see the revenue potential of beyond banking?

INTERVIEWEE: I believe the revenue potential. You say there are always two parties. The potential on the one hand is certainly that they, let's say the non-bank, can sell their products through other, I'll call them marketplaces, and thus reach more customers. On the other hand, with the banks, depending on the business model, will you have revenue sharing with this partner? Yes, there may also be use cases where the banks themselves develop services beyond traditional banking and then generate the revenue themselves. And what I also find important in this context is always indirect revenue. What does that mean? Banks can provide value-added services, such as our Finance Manager. It doesn't generate revenue per se. But by providing free value-added digital banking services, you retain customers and can differentiate yourself. You can retain new customers, win new customers, and convince customers of your value. And that ultimately offers cross-selling and upselling potential. Where, for example, in the mortgage business, because nowadays. There are the classic open banking models or open finance. And if you now offer banking as a service there, you don't generate revenue directly from the end customer and you are away from the customer interface. And the banks are also under pressure from new competitors. I'm talking about Apple Revolut, to name just a few examples, and they offer exactly this kind of value-added service. And that makes it all the more important for them to offer such value-added services so that they can differentiate themselves and retain their customers. (..)

INTERVIEWER: That sounds great. You've given a lot of ideas, especially focusing on the indirect revenue potential. I think it's absolutely right to

differentiate between direct and indirect revenue when offering value-added services. Does that sound about right to you? Shall we move on? Wonderful. Let's take a look at that. Let's look at 1.2! So, here we are in Beyond Banking Level 2.0. That's what I mentioned earlier with this B2C approach. Um, how do you see the current developments there? What's happening there?

INTERVIEWEE: Yes, of course it depends a bit on the definition, but you mentioned earlier that in the beginning you had the classic things and made a slight expansion, and now it's really going beyond that. So I definitely see the development there with what I deliberately call an "ei," because it's supposed to encompass everything, so that you can address customers in an even more targeted way. For example, making personalized offers, but also providing personalized insights and responding to individual needs. What we are seeing in Switzerland, for example, is that banks are giving their customers so-called rewards, and these are really personalized based on their purchasing behavior, based on data where they see that this offers benefits for the end customer. I think that's extremely important. Yes, I also believe that everything is becoming more and more connected. Exactly. Platform economies and ecosystems are becoming more and more prevalent. So there will be more and more players involved. I see a development there. You can also see, but this is still in its infancy in Switzerland, that things are really emerging based on blockchain technology. But for me, that's still a long way off. And yes, what we always see in Switzerland is open banking. We're not there yet, but everyone is talking about super apps. And yes, many have the ambition to become that super app, whether they are banks or non-banks. I think Revolut, for example, is doing quite well on the European market, coming from the Asian market, where everyone is already much, much further ahead. But yes, everyone. So I'm currently working with open banking. Now you see that in Switzerland, small startups are coming along and they have the impression that you can just easily make the next best super app where you can then do everything. And that's relatively difficult. But in the Asian market, it works very well and it really works there. So I'm now Alipay and Bitpay. That was already there when I wrote my thesis in 2017. I wrote my thesis, and it was crazy. They were already much further ahead there than we were in Switzerland. For example, you can order your groceries there, you can book your suitcase there, you can also use it as your

messenger service. All in all. And no bank. So the bank has virtually disappeared from the interface in Asia. You don't really notice it anymore. (...)

INTERVIEWER: Yes, very exciting. (..) Lots of insights, really good, and you've already shed some light on what the added value is for customers and also for banks. So let's move on to the next question, which is what added value you see for customers. From the customer's perspective and from the bank's perspective through this ecosystem construct. What can you tell us about the customer and bank side?

INTERVIEWEE: Yes, I think customers are really interested in getting better services and better advice, which is also something we're seeing a bit of a trend towards. In addition to personalization, there's financial literacy, where you can actually give initial financial advice and recommendations directly in your app based on data, making financial advice and knowledge available to as many people as possible. I think this is even less of an issue in Europe than, for example, in Africa. Financial literacy is extremely low there, and it's extremely important. So I think I'm convinced that it's also important in Europe. There are numerous studies, including one by Gartner. I think it's from 2017, but I still find it applicable, or 2016, it says. (..) The strength between what banks or end customers want and what banks offer. Banks sell products, but end customers want to improve their financial situation. However, banks only have such products to a limited extent, and I believe there is a growing trend towards end customers receiving a more holistic service. (..) In finance and around it, i.e. really the entire value chain. (..) To open up. So is lateral change then more valuable for banks? Yes, I believe that if you do it right, you can win more customers. You bind customers to yourself. You have cross-selling and upselling potential for your existing, classic core business. But you also have really new cash flows or new revenue potential. We already explained this at the beginning. Yes, and we are still a long way from Switzerland. But I still see potential. To monetize the data in the medium to long term. (..)

INTERVIEWER: That sounds good. Exactly. Especially the last point, data monetization, because that's the basis for various use cases. Um, exactly. You already mentioned transaction analysis earlier. Very exciting. And thank you, that fits perfectly. Let's go into more detail. Um, added value. You already mentioned a few technological trends and where they might lead. Can you see any current or

perhaps foreseeable collaborations that have been established, which ones are being established, and which ones are already being offered in this area today? To customers? (..)

INTERVIEWEE: Yes, I think you have to differentiate strongly here. On the one hand, in Switzerland we are not very far along yet, I keep saying that. Everything is fine. I don't do much advertising for Switzerland. But yes, what we're seeing in Switzerland is a bit like a rewards program, where you really offer customers certain rewards in your applications. For example, the Swiss Cantonal Bank has launched a program where customers who meet certain criteria receive a voucher for a particular store, or something similar with their app. I don't think I have any data-based information yet based on behavior, but the Swiss are really moving in the direction of wanting to incorporate data so that it can be personalized. (...) I'm looking a little beyond the horizon now, for example, at what I see there. So that's already on the Swiss market. I think Revolut is still one of my favorites. I think they're doing very well, even though they also position themselves as a bank. They now offer countless services that go beyond banking. You can book vacations there. Yes. What else can you do? You can now do things that don't correspond to traditional banking. And on the other hand, do you only want to look at it from the perspective of banks or also from non-banks?

INTERVIEWER: I'd be happy to. So exactly what's happening there, because they usually cooperate with banks. No, exactly right.

INTERVIEWEE: So, you can take Apple Pay, for example. Yes, the classic. They started with Apple Pay, the Apple Card. Now they're launching an account where they're collaborating with Goldman Sachs. Yes, we still don't know how far they will go. There are different theories at . Some say they are only interested in payments. Others say they want to get into the financing business, etc. A move, a move, that's an example of something that will happen sooner or later with us too, but not all the functions are available yet, and then there's the blue leaf. It's a topic where you can handle the entire payment process directly in the non-bank and no longer pay in the traditional way via the bank. (...)

INTERVIEWER: Great, that sounds very good. I especially like the comparison with Revolut. It's a bit like your role model, you could say, you can hear that a little bit. But I think it's good, because that's certainly the case.

INTERVIEWEE: If you take the theory, I think you're implementing very well what we have available here on the Swiss market.

INTERVIEWER: Absolutely. Let me put it this way: at least you can see yourself as a good benchmark to say, okay, what are you already doing? Where are you? A pioneer? There. Um, that's certainly true. That's exciting. Yes, thank you very much, that fits. Lots of insights already on the first part. And now let's jump from stage two to stage three. Um, now we're leaving this B2C. Now we're jumping to this. What? I'm leaving this B2C approach. Yes, well, um, that I'm now acting as an orchestrator as a bank and trying to connect my customer A with customer B. Yes, because one can act as a supplier and the other as a consumer. And that's where I ask myself this question. So this question is a closed question that you answer with yes or no. And then we'll see what documents we need to answer it. So you already have experience with an expanded view at ecosystem level 3.0, i.e., an intra-institutional approach, a business model with the bank functioning as a market orchestrator.

INTERVIEWEE: Off the top of my head, I can think of a system that comes to mind in retrospect. I don't have any experience with it, but I am familiar with the concepts. (...) Yes, and I definitely see potential there, because the bank knows a great deal about its customers and can therefore really target the right customers and match supply and demand. So the bank is essentially the marketplace.

INTERVIEWER: Yes. (..) Exactly. So you're saying no for now, but you understand the concept and see the potential. That's good. If you come up with something later, we can always change our answer from no to yes. That's no problem. Perfect. Nevertheless, I would still like to ask you, perhaps you can tell me, does the question below relate to customer-to-customer matching? You answered the question with no, but I'd still like to ask the question. What might customer-to-customer matching look like using data analytics or machine learning? What measurement methods could be used? If it's always presented as a marketplace, could you perhaps say a few words about it? Yes.

INTERVIEWEE: Gladly. Marketplace The platform is then the bank. Exactly right. And from the outside, it's sometimes difficult for customers to see who I'm entering into a contract with. For example, I use Revolut or, yes, also like now, etc. They will have such offers, but I simply don't know the contractual constructs

there, whether it really does. It is. Or it does. Yes, B2B is a bit difficult to define because you have to know the contractual aspects behind it.

INTERVIEWER: Exactly. Quite right.

INTERVIEWEE: Coming back to your question. Can you repeat that again?

INTERVIEWER: Gladly. Gladly, gladly. Always gladly. No problem. Um, exactly. How could you imagine what a customer-to-customer matching might look like? So I want to connect one customer with another customer. I'm saying, how could that work? Because you also have data science, I'm saying. (..) Professional experience as well as what you've learned. Can you. Do you perhaps have an idea of how data analytics or machine learning models could be used? Yes.

INTERVIEWEE: Yes, I mean, it can be quite simple. I mean, I can't tell you right now that you should use this or that model, because you always have to test it on the data. But you will see patterns, for example. An example: I see that a customer has health insurance, is a certain age, and lives in this region. I know most of the components that are relevant for health insurance, but I see that they have a much cheaper offer, and you could make a suggestion there, for example. I can't say whether you should use a random forest or something else. I mean, I don't think there are any roles or other examples that you can see. Ah, the customer. (..) That's so good. Yes, they were identified purely on the basis of their transactions, that they have a child, that they make a lot of transactions in the baby store, and there you could really put up additional offers. Maybe for a daycare center. If you see that they don't have a daycare center yet, then maybe you make recommendations for a daycare center. Really, to help the customer get the right offers that they need. And really not with the scattergun approach. I always think it's important to make offers that add value for the customer or, above all, are cheaper. And I think the bank is already in a good position there, as it can compare prices, and we always see that very clearly in our data. For example, you can also find out which customers always get a discount, get talked into something, and which ones just browse when you look at distributions. (..)

INTERVIEWER: I can imagine that. Yes, that sounds good. So, I hear that if you have the offer on the one hand, you then look at the demand side? Okay. Um, where could the personal data or the selection from the personal data, i.e., personal data and transaction data, be? And I hear a bit of profiling in there too. You try to

create patterns and then match this data with each other () so that you can offer exactly this added value. That sounds good. Can you think of anything else or is that okay for you?

INTERVIEWEE: Well, I could give you tens of thousands of use cases, but we'll get to that in a moment.

INTERVIEWER: That's good. Exactly. Perfect. But regarding the basic construct, how data analytics or a profile works, as you mentioned. So it just fits in with the methodologies that come out of it. Exactly. And that answers the question. Thank you very much. We'll get to the news in a moment. So go ahead and tell us everything you can. Gladly. That's fine with me. And that brings us to the last question on this big research question. Namely, acceptance. So we're focusing on the acceptance of such beyond banking ecosystems. And here, please, how do you see the acceptance of such beyond banking ecosystems at level two zero or even three zero or even one connected, as you like? What is the situation on the customer and provider side, i.e., customers in the sense of bank customers and providers to the banks? Um, what is the acceptance on both sides? And then a sub-question: What organizational impact does this have on the bank, or what role concepts might change as a result on the bank side? Exactly.

INTERVIEWEE: Yes, well, I think acceptance, if you take the classic example, is, I believe, with insurance companies, which is also the case in Switzerland and everywhere else. (..) They tried it, but it didn't really work out. I think the technical term is "bankassurance." They had hoped for more there. I am firmly convinced that such offers take time. But if the customer gets added value, then it will be accepted. And yes, we do a lot of user research, i.e., research with end customers. And it's very clear that I'm willing to provide the data if I get added value. And what's also exciting there, as with data science, is that you're never 100% accurate, and we see that a lot with banks. Banks are afraid of making a false statement or giving the wrong recommendation. And there, it's just extremely important that, first, you make it visible that you're using it, and second, the banks also need to realize that, hey, the end customers—and the end customers always tell us this—if the majority of it is correct, then definitely provide value-added services. So if 80% of the recommendations are correct, then definitely. And you appreciate that too. I'm saying this more in reference to our recommendations, but I think it can be

applied here as well. I really believe that it takes a little time for the customer to adapt. But we've seen with many business models that it's not a revolution, but an evolution. Until the customer adapts. Um, yes. Many will still buy their cell phones from their traditional provider. But when you see that it's growing. It gives me added value. I get a better deal. Then there will be acceptance. I think what's really important for acceptance is the added value for the end customer. And you can really look at other markets. It's worked successfully there. So I'm looking at Asia again. Otherwise, that wouldn't be the case. They wouldn't have expanded it if it weren't so successful. I'm also aware th , Asia is totally different, purely in terms of regulations. Yes, I can't tell you, I'm sticking with Revolut for now, for example with vacations, and that's certainly not yet groundbreaking. I don't know the current figures, but I think it will take time for customers to adapt. I think it's very important that banks have trust and so on. That's an important asset. So I might prefer to get a recommendation from a bank, any bank, rather than from a salesperson I don't really know. (..)

INTERVIEWER: That sounds good. Would you like to comment on the sub-question or the second question, Organizational Impact? Could you perhaps share another thought on that? Or what role concepts are emerging at banks? Or have you seen anything there? Is there anything there? I mean, you're such a classic example, right? You're the head of, so in your case, you have this, where the company... well, it was also created. I think with this approach to marketing open banking. Yes, exactly. Maybe you can even explain it from your own position. Are you a prime example of this? Maybe you've had other experiences? Exactly. Maybe you can share something else. Yes, well.

INTERVIEWEE: Our business, our customers are banks. That's why I can't use us as an example. But I mean, what. What is certainly needed is that we are B2B, B2C. Just as a note in the context of open banking, what is certainly needed. Yes, organizational development is needed. (..) If everything is done in digital banking, then you simply need one. One? Yes, one organization. A department that is responsible for managing B2B, negotiating contracts, and providing services. You also need experts. If you want to do this digitally, then you also have to get the user journey right. So you have to expand your digital banking department. Let's assume that yes, there will also be a decline in sales, in traditional bank branches. Then you also have to train your staff. You may need new skills. Specialists for that.

Yes, but where? You often see people from banking going to work in other industries. For example, Coop, which is the largest in Switzerland. Incidentally, they tried a Beyond Banking approach. By the way, after less than a year, they scrapped it again. That's a bit of a shame, but I think there were also experts from banks who helped and vice versa. If you move into the travel industry, do you need experts from that field? You need new skills and you also have to train existing skills. Yes, that's right.

INTERVIEWER: I think that's good. Very detailed, lots of different pointers. Suggestions as to where the journey could take us, especially in terms of expertise. That's true on both sides. You're not the only expert who says that. It's mentioned very often, precisely because there's a strong consensus behind it. Um, sounds very good, and I would also like to say thank you very much for the great insights into, let's say, the biggest research question. So don't worry, we're really good on time. We're now coming to the second one, and I don't think so either. I think we're now moving in the direction of the US business case again. Just to repeat what you were about to say. Many people have " " in mind, but now we're moving a little bit in the technical direction, namely to machine learning and data analytics methodologies, how to create such sales recommenders or observe what's available on the market. So, once again, here's the research question. How can machine learning and data analytics methods be used to develop and implement effective Beyond Making Sales? And what specific use cases show how they impact sales performance in the financial sector? So, here we go again. Of course, we're looking at the challenges that are important to address. And this time, I'll start with a thesis, which is: In order to leverage the potential of bot making, there is still a lack of clear business models and the necessary skills. Do you agree? Please explain.

INTERVIEWEE: Yes and no. Well, if you look at it from the bank's perspective, I would say they are still doing too well. I haven't seen the risk yet. They still have a lot of revenue from interest rate business, i.e., their core business, and they don't have the price. If you then look at non-banks, yes, there are examples where it works. But you also see time and again that I, that I try a few and then again, um, yes. So I had to discontinue the service because they generated too little. Um, yes, too little revenue, and there, especially when you think of super apps or something like that, you certainly always have to take that into consideration. Yes,

it takes a lot of marketing, you have to make the brand known before you can generate revenue. I think that's the biggest hurdle there. So the marketing activities or the costs.

INTERVIEWER: Okay, wonderful. You explained that very clearly, and it can be summed up in one phrase: the chicken and egg problem, right? Exactly. So you've actually explained it perfectly. Yes, on the supplier side, you can confirm this thesis that they don't feel this pressure yet, but there are solutions or suppliers out there who may already have the right solution for the customer, but it's difficult to reach a consensus with the banks to push forward together. Um. Exciting. Yes, and that's why let's take a look now. Namely at the news business case, namely at the two sub-questions. Um, precisely because you've taken a more differentiated view, um, which news business case scenarios then first apply to the ecosystems construct 2.0. So this classic B2C, everything you like to know, yes, also plan to do or perhaps have seen.

INTERVIEWEE: Yes, where I still see more potential. As I already mentioned, personalized financial advice goes beyond banking. It also covers insurance. Taxes, financial advice. Um, yes, Jens, the things where I also go beyond classic banking, then also marketplaces where you really bring supply and demand together and really act as an intermediary, so to speak. I also see that as potential. Yes, and now there are spin-offs. I think if you're a marketplace. If you're a marketplace. I think that's the classic model. But if you then offer personalized advice or recommendations, that can extend into other areas. I'm talking about travel with mobile providers, , but it could also be insurance, whatever. So I don't think we need to go through every single use case here. Or would you be happy to? Yes, exactly. Examples. Use cases. Travel, or another area where I see potential, for example, is that you don't have to define whether it's a bank, because it's not really the bank that's lending the money, but someone else, someone who bundles supply and demand. If someone has free liquidity that they can make available and pass on, and then it is passed on by the intermediary, that's also the issue. Yes, you can take it up again almost more plainly. Where I have integrated banking into the journey for non-banks, directly and, if necessary, also a loan, yes, a short-term loan is granted and you can benefit from the interest there. The topic of e-commerce. That it is integrated, yes.

INTERVIEWER: Okay, that sounds good. Thank you. That also means for me that we can conclude the sub-questions and move on to the next one. Now let's take a look at this, let's say, scaling concept of such ecosystems. So how do you assess the possibilities of dimensionalization and scaling of Beyond Banking ecosystems? (..) Do you have other characteristics? Yes, exactly.

INTERVIEWEE: Scaling? Yes. If you do it right. If you do it right, then you can scale very well. I think that requires standardized technologies. It requires standardized APIs. As a bank, I don't want to say to everyone else, "I am the marketplace." I don't want to have a separate API for every provider. And I think that's the crux of the matter, that you can then assert yourself with an API, that you can establish the STANDARD and reuse it. I think that's certainly extremely important for scaling, and then also for all the processes. It has to be move, the journey has to be integrated, if the deal is closed, if I'm now acting as a marketplace provider. (..) I sell cell phone subscriptions. It really has to be streamlined and there can't be any manual processes afterwards. Then you can scale it, and that's relatively easy with the models, using the right product at the right time. Yes, you can train the models first, and then you have a basis and can simply continue training. But that can be scaled relatively well. I think what's important when it comes to scaling is that you really enforce standards where they are applicable for use cases. I think that's key. (..)

INTERVIEWER: Great. That's fine with me. Would you like to add anything else, or is that okay from your side?

INTERVIEWEE: No, I just think that if you have the right people who can connect with each other, you can scale. And that ultimately leads to flexibility. It sounds simple, but it's not! I'm already seeing this in Switzerland with open banking.

INTERVIEWER: Okay, perfect. Thank you very much. Exactly. So that automatically answers the question for me. I mean you too, as the decision-maker and Head of Open Banking. I can see you've mentioned enough possibilities. You know what you're talking about. That's great. Yes. So, what?

INTERVIEWEE: Perhaps technologically, which I may not have mentioned yet, but when it comes to scaling, where we in Switzerland are not yet that far along, it really is about building the whole thing on the cloud. (...) That the services

are on the cloud. Because email models that run on-premise require too much storage. You have less flexibility. Then we're happy to add that you have even less flexibility. I think that's where all the hype is. (..) Whatever has already done us good, that banks are now slowly venturing more and more into the cloud, even if it is a private cloud. (..)

INTERVIEWER: That sounds good. Yes, definitely. Perhaps one more question about you as a decision-maker. You know what you're talking about, as I can tell. That sounds great. Is it the same for other decision-makers who actually know or should know what you've told me? Or do you perhaps see things differently?

INTERVIEWEE: Yes, I think so. (..) Point A: I don't work at a bank. Point B: Yes, digital banking representatives or innovation representatives are more likely to see that. But there are also other regulations at the bank. And I think that non-banks have a big advantage over banks in that respect. I always say that the easiest thing would be to just set up a new bank today and then do everything directly in the cloud, because that's what banks will have to do when they migrate their business from the cloud. There are always customers who say no. And that's much, much more difficult. And that's why neo-banks or non-banks certainly have an advantage, and the other decision-makers are precisely because of these detours or because of the effort and resistance of legacy issues to transform to cloud computing. They really do have reservations, and I can understand that to a certain extent, because I think they also have to position themselves on the board of directors.

INTERVIEWER: Definitely, yes, very well explained once again. And you made that comparison again. That fits. Thank you very much. Let's move on to question 2.3. Again, yes or no? Please answer. Here's a closed question: Does your company use it, or because you are also, um, a provider of services for banks? Or do you know other banks that use Beyond Banking?

INTERVIEWEE: Yes, well, I have the Swiss market, I don't know directly that it still exists above and beyond traditional distribution. But there are examples where you can really do it directly in the app. I have you. Do you know Twint? (..)

INTERVIEWER: Twint. Yes, I've heard of it. But yes, you're welcome to use it as an app.

INTERVIEWEE: Where everyone pays with it? For example, they also have their payment deals on their app, which they offer to their customers. It's not that personalized yet, but the ambition is clearly to make it personalized. Exactly. I also chose the reward program from BTC that I would like to initiate, if I, let's say, if I shop locally a lot, then maybe I'll get vouchers from XY. You can already see that you make the right offers based on end customer patterns or simply give rewards to reward customers and retain them. And Twint is still exciting. These are really partner offers, i.e., the farmers there really have a partner system. But I don't know what the contract looks like, whether I sign a contract with them, the conclusion of the contract, or with the TV seller when I buy a TV.

INTERVIEWER: Understood. So you would say no for now, but it could be that Twitter is moving in that direction or at least has the potential to do so. What I've often heard from previous expert interviews is that they say yes, often such beyond ecosystems are still in their infancy. We're just getting started, whether it's in Germany or other markets, it has to run successfully first, be scaled, and then it makes sense to turn it into a data-driven recommender, maybe even bring in the sales team, because now you have this database or a successful basis for controlling these partial signals. Um, exactly.

INTERVIEWEE: Yes, I think you might have to say that I'm perhaps biased because I'm saying it has to be mega sophisticated, but I, I, I. I'm firmly convinced that there are certain conditions behind it, such as how they already compare their apps or provide digital vouchers and so on. But that's perhaps not yet so sophisticated that you really get personalized offers specifically tailored to pattern XY. Exactly.

INTERVIEWER: That sounds good, and it answers research question two for me. Thank you very much. Um, we can move on to the last one before we get to the concluding questions. Namely, we're now going to take a closer look at data governance, focusing in particular on influencing factors and evaluation criteria. So, I will mention again here what the most important influencing factors and evaluation criteria are for the successful creation of a scalable Beyond Banking Ecosystem and how these factors can be integrated into the technical design of the

model. And here we will look at the sub-questions again. Here again, there is a closed question, which you can answer with yes or no, and based on that, we will then look at the sub-questions. So Liliane, are you familiar with the use of a guideline concept framework blueprint, perhaps also for the creation of a scalable Beyond Banking Ecosystem in the banking sector?

INTERVIEWEE: Yes, but not specifically for Beyond Banking. But I think you can take the classic concepts from business administration or ecosystem theory and build on them. Yes, yes, maybe that also means Framework XY. The point there is that you first write the companies. So first, management has to decide that we want to open up in our corporate strategy. Developing strategically in that direction. And that's where we see it, especially when it comes to open banking in Switzerland. I find it extremely exciting when we talk to the banks, and I'm speaking for myself here. I really ask the management of larger Swiss banks: What is your strategy in the area of open finance? And I've already received the answer from a member of the executive board of one of the largest Swiss banks. We want to introduce multi-banking, and I think that's where it starts! I believe you have to have a strategy and a vision of where you want to go. You have to define goals and analyze the market. Does classic strategy development then have another component? Once you have the whole strategic vision, then there is certainly also the technological infrastructure, where an important field of action is setting up the architecture with API First approaches. You also have to set up the data economy. Banks in particular, which are still lagging behind a bit in this area, now really need to provide data expertise internally. In my opinion, moving to the cloud is almost a must. And then you really have to develop the platform. And that's another area that banks are still neglecting somewhat. Is it really the UX, the user-centered approach? (...) Development? Involving the user in the development, iterating, developing with them, developing a modular design that you can easily expand. So not just on the technical side, but also on the platform side. I would say that's definitely a point. Another aspect that needs to be taken into account is certainly security. Yes, that's part of it. Especially when you're drunk, that's also what makes the end customer feel safe. The topic of data. (..) Data governance, data protection is extremely important, and then really just the ecosystem. So you have to build partnerships, you have to form the community, you have to manage the partners, you have to evaluate and conclude contracts. Yes, and then there's pricing. You

have to make money from it if you want to. So let's assume the intention is to monetize and offer rewards, then you have to do it. And ultimately, you have the vision strategy, then the implementation. Then it's very important to be iterative, starting with the MVP and then continuously monitoring success, yes. (..)

INTERVIEWER: Hm. Yes, very exciting. Lots of approaches provided. Great. Above all, I also hear that. Um, once. Yes, there are models. Not directly for banking, but certainly for the existing ecosystem or for open banking frameworks, where you say you can build on that and then adjust it to customer needs, adapt it to only the banking needs. So also, as the saying goes, modularity. It depends on the bank's strategy: what do I actually want to achieve? My Beyond Banking ecosystem. That means it's nice to have a concept, maybe later on, but of course it has to be adapted to the bank's respective NIT for it to work. Um, exactly. And I think you've already answered one of the next questions a little bit, if I'm hearing that correctly. That's good. Um, that fits in with a lot of my insights. Thank you very much. Then let's move on to the next one. Um, even though you've already mentioned some of this. But I'd like to ask it again because it's really important. Um, so , what are the key influencing factors and criteria that can determine the value of a successful Beyond Banking Ecosystem? What is particularly important to you? Which factors influence the criteria?

INTERVIEWEE: So, purely from a business perspective, it's ultimately about revenue. When I invest, I want to see revenue, or yes, maybe you can also reduce costs internally, but that's probably less the revenue approach process. But if I now take the product success, for example. Engagement is certainly extremely important there. How much interaction is there with the platform? Conversion? How many deals are closed? Stickiness? How much do customers come back? How can I retain customers and so on? If you don't focus on the review, but rather on retaining the bank customer, and I then have the customer much more on my platform, then I have an indirect value, also because I can address them much more and indirectly generate revenue. For me, those are the ones. If I were to measure that now, I would certainly apply that. Then you surely also have KPIs for the business where costs are relevant? Yes, keyword cloud. And that costs money. It always costs money. You certainly have to manage that too.

INTERVIEWER: Exactly. Absolutely. Let me ask you one more question. I have one more sub-question to ask, which may not be directly related to this, but you'll see why, because my focus is naturally leaning a bit toward research question three in designing an ecosystem or framework. What does it look like from a technical perspective? So, if you imagine, okay, you are perhaps a bank or perhaps a consulting firm for a bank. Now you really have to get down to business. You really want a framework like this, you really want to implement it, and you can now see a framework in front of you. From a technical point of view, which attributes, which characteristics are particularly important? Well, in order to design a banking ecosystem, to really develop it.

INTERVIEWEE: STANDARD Say the APIs. Then. (..) Yes. You also have to be data-savvy. I would now also look at the technical side. The whole thing has to be compliant. Regulatory requirements must be met. So, you have to encrypt and anonymize the whole thing. Depending on the situation, only the data may be allowed. For example, when I pass on data to the end customer, which data is passed on to third-party providers. All of that has to be taken into account. Then. Cloud Cloud always sounds so simple, but it always requires a lot, a lot more. Yes, but I think the key thing is really that you have API IP and so on. Ultimately, you also need a scalable platform. In other words, it needs to be modular so that you can easily scale it and it's flexible. And for me, that's the foundation, just like the cloud. Okay.

INTERVIEWER: I'm picking up on something. Maybe you mentioned it, maybe you didn't. When I say that data harmonization is certainly important, you'll probably agree, right? Yes.

INTERVIEWEE: I think what you can do with data. The silos. So you have to have all the data. Ideally. In my view, banks are still not doing enough in this area. I have to link internal and external company data with external company data. So maybe I can also take information from social media or something like that and generate information there.

INTERVIEWER: Because we can now move on to what I would call the last small block of questions before we conclude. Um, we've talked a lot now about, well, opportunities and potential for the Beyond Banking Ecosystem, what it can and should do. But of course, it's also important now to examine the challenges and risks, or at least to acknowledge them. So let's start with the challenges. How do

you see them, or what challenges can you identify in this ecosystem construct? What comes to mind first? Before we move on to the individual risks. Basically, sorry, IT risks are one of the risks. Yes, exactly.

INTERVIEWEE: Yes, basically, I believe so. (..) One is a strategic risk. You need a new culture. Yes, because you're entering a new one. Change management. That's not easy. New structures, processes, and the mindset that needs to be adapted. And that's certainly a risk. And also internally. Employees may feel uncertain when they enter a new business area. That's where I still come in. Then there's also the market, the competition. I said that many are missing. It's not an easy market. Certainly also a risk. Technologically and regulatory, I'm still leaving that case out? Um. Is that okay?

INTERVIEWER: That fits well. Exactly. Can you think of any other challenges? Yes. Well.

INTERVIEWEE: I mean, what risks do you see? You have no customers. Acceptance. Loyalty. Extremely important. It could also lead to a loss of trust. I could imagine that. Because. Yes. You're suddenly selling cell phone subscriptions. That doesn't always go down well, because. The bank was reputable, only sold mortgages. To put it bluntly. And then I had the financial impact. You can't do that. (...) You can't forget that. I mean, you're investing a lot and it'll probably take a long time before you can monetize and scale that.

INTERVIEWER: Absolutely. Yes, sounds very good. Anything else, or is that okay for you?

INTERVIEWEE: That's exactly it. I think what's definitely not there is tech and regulatory when it comes to data.

INTERVIEWER: Perfect, and that's what we're going to talk about now. That's a great transition you've made yourself, namely regulatory, legal, and tech. So IT risks, what legal risks come to mind in general?

INTERVIEWEE: Yes, exactly. Legally, there is certainly the issue of data protection regulations, which are changing extremely quickly. If you operate internationally, you have different laws. We have different laws in Switzerland than in the EU, for example. The EU certainly has it easier because they all have different GDPRs. You run the risk of violating data protection regulations, for example. Bank customer confidentiality also falls under this. I have it a little stricter

here in Switzerland. What data am I allowed to pass on? I always have to have the customer's consent, and that's extremely important. Yes, and there you have it. Depending on what you sell, you have to ensure further legal regulations. This then requires new compliance experts, because the existing ones were primarily geared towards banks in the financial market. I think it's also important to mention that. (..)

INTERVIEWER: Okay, that sounds good. Let's move on to IT risks. (..)

INTERVIEWEE: Yes, I think so. Or would you like to continue? I think data protection is the crux of the matter.

INTERVIEWER: That fits too. You're right. I just want to give you some space, in case. In case you were still within that scope. We're on schedule, so you're welcome to take another minute or two if you say you can think of something else off the top of your head, but you have.

INTERVIEWEE: It's always a big topic, and I think it's worth mentioning. Generally speaking, as a business economist from a business perspective, if you're legal. You have the rule of always saying no to cover all risks. But then you're holding back the business. And that's where you really have to weigh things up, because it's not always black and white. How far do I go? (...) I have greater revenue potential, but I accept a certain amount of risk. And I think that's central to this issue. (...)

INTERVIEWER: Great. Wonderful. Thank you very much. Let's move on to IT risks. What comes to mind? (..)

INTERVIEWEE: Yes. IT. Well, I mentioned it at the beginning. It sounds so simple. Creating a standardized API is easy. We see it here in Switzerland with Open Finance, just getting everyone to agree on a STANDARD. I'm in a business working group with the banks. You can't even imagine. Yes, and then you have a STANDARD, and then the STANDARD isn't implemented. And how do you approach it then? Well, it's extremely complex. Then you also have to implement the integration of the various systems, including the silos in the data area, and really network the whole thing, i.e., standardize it, bring everyone onto the same approach, and then, above all, implement the standardization. And I think it's extremely important to have rules. What if provider XY doesn't provide the appropriate data formats and data? Not in the appropriate format? It sounds so

trivial, but I can tell you how. We have it here. When I look at our multi-banking solutions, we have a field called "Address Name Account"? No, it's called "Account Holder" and there you have 15 different variations. It feels like every other bank provides different data. A few still have the address in there. " " Both only have first names. It's really very entertaining. Although the requirements are clear to me. Then there's data security. (...) Or IT security, so really security in general. I think cyberattacks are on the rise. He in particular has given this another boost. They are becoming increasingly sophisticated. You have to adapt quickly here, you have to be able to react quickly so that you don't run into a security issue. Yes, for me, those are the key issues, and then there are the technological risks. Yes, switching to the cloud also brings certain risks. It's not as easy as you might think. Although I always want to do it, there's the risk of losing customers if you migrate to the cloud, for example. There are various other risks and then, on the one hand, vanity, financial risks, precisely because you're investing. It's expensive. The cloud too. If we think about running models on the cloud, then you have to keep the costs under control there as well. Yes, if the general... (..) If the general runs it, it quickly becomes expensive if you haven't built in any tricks.

INTERVIEWER: Absolutely wonderful. Sounds very good to me, and a very good answer. And that's why we're jumping to the last question, namely, what other risks come to mind? You can just mention anything else here. I've also taken an example here. For example, what happens in the role of the bank as a market orchestrator when it acts as a constructor in this branch? But you're also welcome to mention any other risks that come to mind. (4)

INTERVIEWEE: Difficult. I also think that the others are central. As an orchestrator, you also have similar risks to those I mentioned earlier, including the risks. So, with orchestration, you simply have to ensure that the APIs are standardized, which is certainly also the case with integration, where you always have a risk, and that's where you have it. It sounds so simple, but if you want to integrate big players, where they are extremely important, I'm talking about those in Germany, they have a certain amount of negotiating power. You want to bring them in, or Zalando, but they really have negotiating power and there is certainly a big integration risk there, I think. From a regulatory point of view, I see the risks. When I think about it now, yes, it's similar to what I mentioned above. I mean, you

just have to... you have IT security risks there. You have to make sure that the partners who ensure regulatory compliance also ensure security. Yes, and what else might I add? Well, you could talk about everything. I don't think so. Only Market Orchestra really has a certain reputation risk because it's venturing into new waters.

INTERVIEWER: Mhm. Very good. I was waiting for that. (..) Perfect. Great that you also mentioned reputational risk. Also these integration risks? Bargaining power? Room for maneuver? Oh yes, absolutely. Depending on the strength of the player, this can perhaps work in favor of or to the detriment of your business model. Yes, exciting. Is that okay with you, or would you like to mention anything else?

INTERVIEWEE: No, I think I've covered the most important points. I'm really looking forward to seeing the output.

INTERVIEWER: Exactly. Sounds very good. Yes, exactly. I'll tell you right away that I'll definitely answer all your questions. We've made great progress. Um. I can give you another minute. Just to be sure. Would you like to add anything to what you've already said, or give Remarque a recommendation? Or an outlook? Or would you like to share anything else, or have you already said everything?

INTERVIEWEE: No, I see great potential. And that's where it's going to develop. We would also like to offer certain services related to Beyond Banking, but I see great potential for us. For example, something else that might be exciting. We are currently looking into whether we can make certain credit checks available to non-banks via open banking, so that they can then use the data, for example leasing companies. If you buy a car and you can immediately take out a lease and do a check there via open banking. But that's more open banking and finance. And yes, I hope things are slowly moving. Me

INTERVIEWER: I can understand that. Good, great closing words. Thank you very much.

APPENDIX 10. Semi-Standardized Expert Interviews: Transcript from Expert 8

INTERVIEWER: I will introduce the first question. Research question is how can the combination of intra and institutional customers customer data matching improves the dimensioning and scaling of beyond banking ecosystems in the financial sector? And what impact does this have on data protection, integration and technological infrastructure? Here you don't have to answer. We go step by step to each subquestion that is somehow paying to or somehow collecting the answers for this overall question. So let's deep dive in this first one. How do you see the revenue potential of beyond banking?

INTERVIEWEE: So just to to to go back to what I just said previously, our, our main goal, in our activity is really to provide to the customer a decision which will be fully automated, meaning that the full process, end to end for the customer is in self care. Okay, with no interaction with with our financial company. So when we say that, of course, it doesn't mean that we're going to grant a loan. We're going to give money to everyone. Of course not. But it means we need to find a workaround, a way to get all information in order to assess the the risk profile of the customer and his ability to, to repay a loan in the classical, in the traditional, banking approach, we're going to ask the customer the payslip. Where are you? Where do you work? How long have you been working in your company? What's the seniority? We're going to ask many questions to the customer and we're going to ask many documentation, you know. (...) Sorry, sorry. My son is just asking me a question. And, you know, the approach we have today is completely different because no interaction with the customer. So how are we going to get all this information without, without any interaction with the customer? To do that, we're going to use the open banking. Okay. So what are we going to use with the open banking? So open banking allows us to get, of course, with the consent of the customer, all the banking transactions in his bank account. Okay. So in the process, the customer will upload, our application, he will provide, all ID, like first name, last name, phone number, etc. by, fulfill the questionnaire in the app. And at some point in the process, he will be required to give the consent in order in order for us to get access to his bank account. Okay. So it's it is what we call, in the open banking sector, the banking aggregation. So the banking aggregation, it's just, the event when the customer provide the consent, for us to access to all his bank account,

hold his, his transaction, etc.. So the main value of getting access to this information is that we can we can, build, a scoring model with, with the machine learning, approach or statistical approach, and then we can use it in our, decision, trees. So to summarize in this first question, I would say that the, the the value, the the potential of the open banking when we are doing a fully automated, when we have a fully automated process, is first, for the customer to have, 100% digital experience. Okay. So it's really a friendly approach for the customer because he is at home, for example, relaxing, in, in front of the TV and he, he's just uploading an app and he is giving, the consent, to, to access to his account. And maybe one minute after, he will know if he can get a loan with us. So it is fully digital, fully automated, user friendly for the customer. And of course it is, it is how to say we save time. We save time because we don't need manual intervention in the interaction. So we save time, in the company because it's fully automated. And, and I think it's, it's good.

INTERVIEWER: Perfect. Because you already answered, what added value is generated for customers and bank? You already answered that question. That's really cool. And maybe let's go to the development or what are you see when you see this beyond banking open banking approach, especially with, cooperating with third party providers, right to offering also their, use cases in the banking environment. And what do you see which developments are you see seeing there. And maybe also to 1.2.2. But corporations are included concluded or what offers are made to the customers there.

INTERVIEWEE: You mean partner, for example? Because for example, in my in my activity, of course, we have we have external partner because in order to, to access to all banking information of the customer. We need to, to have external, providers that. Yes, exactly that, that provide to us all the data. So, we have so far, one external provider, which calls poems. I don't know if it's if it's, famous in the place, but anyway. And this external provider, is, let's say, the intermediary between us. Okay, the company, the financial company and the bank of the customer. So when the when our customer will, give the consent for us to use his data. Okay, then we are, we are calling, an external provider, so points who will then, get from the bank directly all the data and send to us after. And then we can use in our granting process. You see my point?

INTERVIEWER: Yes, yes. That's that's super nice. Do we have more external parts or you are planning to implement more partners or are you going with that?

INTERVIEWEE: We're going to. Yes, we plan to have other and I will explain you why. So today the main difficulty by, by using the open banking is, our capacity to interpret, okay, a transaction in the bank. I will give you an example. Perfect. When I get the data, so from this external provider. So I get sometimes, more than 5000, lines of of transaction. Okay. 5000 lines of transaction for only one customer. So in in this data set, which is you is huge. We have many information but but they are how to say they are not they are not readable easily because, you know, in, in, in the transaction, in, in the banking transaction, you have a long, how to say, a long description of the transaction, for example, credit card, purchase in, Amazon, you have the amount of the transaction, etcetera, etcetera. So the main difficulty for us is to be able to interpret to, to, to, to give a sense, to give a mean of a banking transaction for us. What is very important, of course, is to be able to identify the revenue. What is the frequency of the revenue of the customer? We need to identify what's, What are the the. Sorry, I, I lose my English. So we're gonna we're gonna identify all the allowance. Allowance? Family allowance. Health allowance. Housing. We need to identify in the account. If this customer has already, for example, some credits ongoing. Because if the customer has. Has already, for example, five, loans in, other companies, maybe we want we we don't want to. To grant a new loan for this customer, you know, to avoid, how to say bankruptcy, to avoid, Let's say, really important financial difficulty. So we need to be able to identify in the account the revenue, the allowance. If there are some incidents in the account, for example, fees, overdraft fees, payments, rejection. We have other example. If the customer is spending is spends money in gambling, it can be, a risk, for us in terms of behavior. So all this kind of information we need, we need a very, powerful tool in order to categorize, one by one, each transaction, of the of of the customer. If we don't have this, we won't be able to build a good, credit decision. Okay, so to do that, we need to, to to work with the an external provider who is really specialized on doing the categorization of the transaction. And then so it's something that will, will come in the future because today we don't have it, but we are we are doing a POC, a proof of concept with an external provider to, to be able to make this categorization. And then when you will have this category, this categorization of the of all transaction, then you can build a very strong and powerful, scoring model, statistical scoring model. And you can build,

all your, solvability, you know, it's okay. Solvability. I don't know if it's, if it's understandable. You understand when I say solvability. Solvability of the customer.

INTERVIEWEE: So indebtedness ratio. Disposable. Disposable income? Yes. Affordability is maybe the most important. So when we grant a loan, whatever the loan is, what gauge consumer and split payment as we do, you need to assess the affordability of the customer. And if you want to assess the affordability of the customer, you need to be able to identify, in the, in the banking transaction, the revenue of the customer, and so on, the rent, the rent amount, the all, all expenses like loan repayment, utilities, insurance, etc. etc..

INTERVIEWER: Super sounds great. Yeah. You also already described the next question. It's really good. Or answering the next question. For example, how you use data analytics models, right, to identify the customer. That's really cool. And can you also tell about machine learning or where is machine learning coming to action I guess for the decision making right at the end. Or can you tell me about more about this?

INTERVIEWEE: So basically, we the machine learning, the machine learning is used to build the, the scoring model. So the statistical scoring model. So just to explain you how it works, in, in the, in life. So, so first of all, we, we, we don't build we have not built yet our own, machine learning model. Why? Because we don't have enough staff to do it. So we are working with an external provider. This same provider that is able to, you know, to make the category, the categorization of the transaction. So this external partner is providing to us a scoring model which is developed with the machine learning approach. So this model at the end, is just a note between 0 and 100. Zero means that the customer has a very high probability of default, and 100 means that the customer has a very low probability of default. So as, a financial, company, we, we define what we call, a cut. Okay. It means that, starting from, a score, We decide to decline the request of the customer because we consider that the probability, the probability of default. So to not pay to not to not pay the loan is too high to, too high for us. So the machine learning is doing by the external provider they use mainly I would say it's more than 95% information coming from the banking, from the open banking. So in this model, you have, many information that you can find in the, in the open banking, for example, you will you will integrate, all the flow, the positive flow that you have observed in the account. So the revenue, the allowance, etc. you will cross this information with the

frequency because for example, in January I see in your account you have 2000. Positive, flow in the account. It seems to be good, but if it's not, monthly, revenue at the end, maybe there is a risk because, maybe you just own this money for one month, but it's not regular revenue. So if you don't have regular revenue, of course, in the, in the scoring model, you're not will be will be lower. So it takes so this machine learning model takes into consideration the positive flow, the negative flow, the incident that you may have in your account. For example, you have, an unpaid monthly installment. You have a loan with a company, let's say a competitor company. Okay. And, so you don't pay this loan. So if you don't pay this loan, you will have in the, in your, bank banking transaction, you will you will have, Reject. Transaction. Loan. Credit. Loan. So by identifying in the account of the customer, some incident, some payment rejection, some fees, overdraft, all this kind of information, I would I would call this negative. Negative information. So the machine learning model include positive information, like the positive revenue, in a regular, in a regular, way. And the negative information and all this information combining, maybe I guess they can include also gambling. If the customer use more than 40% of his revenue by doing gambling, I guess it's very risky, you know? So by combining all these kind of information. Positive information, negative information. The machine learning model will make an aggregation or all of this information, and at the end the outcome will be, a very synthetic, note between 0 and 100. And then to us it's very useful and it's very simple to use it because I don't need to treat more than, 10 or 20 million of transactions of all our customers at the end for each customer, in order to assess the risk behavior and in order to make sure that this customer can afford for this loan, we will just use this aggregated note. So between 0 and 100, as I said, and then define the the the level of risk we want to take. So I think this is this is what it is in the in the in this part.

INTERVIEWER: It sounds very great. Thanks a lot for figuring out this. How it how it's working this process in the machine learning approach. Thank you. So we are just, quite close to finishing the first research question. Let me ask you another question. The 1.3. And this you can only answer with yes or no. So quite easy. So I ask you, have you already gained experience with a broader view at equilibrium level 3.0 means what I said, this intra institutional approach where a customer of a bank will be interconnected with the customer, with the second

customer of the same bank, and where the bank is or where the bank is figuring or acting as a market orchestrator. Do you know something or like approach like this?

INTERVIEWEE: Answer is no, because our business is completely different. Because to me, a customer is a physical person, for example. So it don't I mean, it doesn't make sense to me to make in to to make in relation, to, to physical customer. You see my point.

INTERVIEWER: Thanks a lot. Perfect. Then let's jump to 1.4. So the last question to this research question how would you how do you see the acceptance of a scale beyond banking ecosystem. You can also take your approach or your business approach especially with the external partner. Right. In this approach. Okay. Do you see the acceptance on the customer and you as a bank site is their acceptance outside their right, on both sides, on bank and customer side. How do you see this? (15)

INTERVIEWEE: I would say that, so, so our company is very young. Of course. So we are, we are building a step by step and optimizing our process step by step. So, of course, even if we have, we have some, some, request, some, so we have customer, who are interesting by our services. I will probably answer more generally in the, in the French market. I think there have been some statistics on that, that, more and more French people are interested to use the split payment, in their way of managing their budget. Why? Because cost of living is increasing. Because, you know, with all the geopolitical issue with the, the Covid, etc., etc., it has, it impacted a lot, the, the, the, the cost of living of, of the customer. So more and more French, are using this, this, services, because it helps to manage their budget. So for example, my fridge, is broken. I don't have the money to spend €500 to buy a new fridge, so I will ask, from, I will ask to this company, to get, €500, but I will reimburse this €500 in three times. So I would say that more and more people are interested with this financial solution we offer with our services. And if the question behind is really to talk about the open banking, I think in the side of the customer, it's completely transparent. You know, the customer, when they need money, they don't care about the, the, the full process. They just fulfill the information. Provide consent, the sign, the sign, like electronically, of course. And then they see if they are eligible, with the offer or not. So it's completely transparent. I think we we we have never received any question, Position of the customer. With the open banking data, they just give the consent. They even maybe don't know.

Even if, of course, it is written because legally we need to to inform the customer that we're going to use his, his confidential information. And because banking and banking information are confidential. So they give the consent and that's that's it. They don't see more than that. They are interested of the financial solution, of course, because they need money, but they don't go through each details, let's say, of the process at the end. Sometimes they complain, you know, for example, if they don't get the, the the money, they complain, they will call to us and say, okay, why did you decline me? So we can explain that we have done an analysis, to assess, the affordability, okay, the capacity of the customer to, to pay back the loan and we tell to the customer that it's not possible to to finance him. What else? What else? Sometimes some people call and complain of complain also because we, we use their, their data so they didn't understand when they give the consent, because they didn't read them. You know, when you, when you cite for when you, when you grant, I mean, when you get a loan, most of people when they get a loan, they just sign at the end of the paper, they don't read, you know, line by line. What is, what's the engagement, behind this? So sometimes they call and complain because, they said you you don't have the right to use our, my data. They are, it's confidential data. You cannot use it. But of course we can, because, you sign and you give the consent. And of course, there is, you know, the the data protection policy that we need to respect. So when we decline a customer, we cannot keep store. I mean. We cannot store the the data, for life. We, we need to, to, to delete the, the data that we, we got from, from, from the open banking.

INTERVIEWER: Thanks a lot. So I hear also out of that that if there is a need and the customer needs, need like, for example, loan, then they don't care so much about content and data governance. It's more like.

INTERVIEWEE: They don't pay attention. Really. You know, because yeah, I mean in, in, in my business, in my business. But I guess it's the same everywhere because the customer don't pay really attention to that. We do. Because for us it's really important to use this data.

INTERVIEWER: Perfect. Thanks a lot. So let's jump to the second one. So we are now getting more into machine learning and data analytics methods. So how can machine learning and data analytics methods be used to develop and implement effective beyond banking sales signals? And what specific use case how

show how they impact sales performance in the financial sector? Here is the same. We just going to the Subquestions and I start with a thesis. So I say or maybe also some experts are aligned. They there is still a lack of clear business models and the necessary skills to utilize the potential of beyond banking or open banking. Do you agree or not with that thesis?

INTERVIEWEE: I agree, and maybe I have already answered, partially to this question, because, for example, for example, in our company, we have been using the open banking for the from the beginning, meaning when we started, the, the business, we, we already we, we started, to collect the open banking data, very early in the process. But what we, when. Sorry, where we we we were not, so, so efficient is in this, way of, of reading the open banking data. Because, as I told you, when you have when you have millions of customers, it means sometimes billions of transactions to use. You know, it's it's a lot of, I mean, so to treat this, this enormous, you know, set of data, we need to, to have a very performant tool. Okay. So in our company, we we use Python. I think mainly most of the financial companies use Python because we can treat, a big set of data quite easily. But, first of all, so first of all, we need to know that, open banking data is huge. And this data, are not structured data. What does that what does that mean with structured data? In the traditional, in the traditional, decision making system, we have structured data. Structured data. It means that for one data, okay, one field, you have the direct meaning of it. Date of birth. You can use it and create a rule based on the age you have the revenue. You can use it and create your own rule. For example, if you. Oh, if if your salary, if your monthly salary is less than €1,000 reject, for example, it's a, it's an example of use. So in the traditional banking, in the traditional let's say, consumer loan, granting process, we have data very well structured and usable. I mean, you can use it as is when you use the open banking data. It's not like this at all. And I think it's the main point of using the open banking data, first of all, because, you know, we are not talking about five information Date of birth. Revenue. Your job code. This is the traditional data we use to to, to include in our decision making system. But when you use the open banking data, it's completely different. First of all, it's not five information. It is million of information. You cannot imagine all the information you get from a bank account. It's like the life of the customer. He went to McDonald's yesterday. He bought a things in Amazon. He paid utilities, power, electricity. You have all the life of the

customer. But how you can use this information, you cannot use it directly from the from the the data you got from the bank because you need to treat the data. And the treatment of the data is key, is key really if you don't have a good way to treat, to transform the data. It's like useless. It's like you don't. You have nothing at the end. So the main challenge with the open banking data is the capacity to treat, to transform the the data, this million of data into useful data. You know, so useful data, as I told you, as example is I will give you example. So you received million okay. Million or billion of transaction okay. Because this is open banking. Open banking. You call the bank and he send you one year of transaction of the customer. You can imagine one year. So one year it's a lot. It's a lot. So when you have this billion of information, you need to, to give a meaning of each transaction. This is what I call the categorization of the transaction. And then when you transform this, this, this transaction, meaning you will have aggregated information, for example, in the incomes, you will have, the retirement patient, you will have the allowance, you will have, in the expenses, you will have utilities, insurance, loan repayment. But all this aggregated information is the result of a treatment a big treatment. Okay. So you need a really powerful tool algorithm to, to make this categorization. So at the end, instead of having having billion of data, you will make some group because you will, you know, aggregate your data and then finally you will have around let's say in average it's 90 category okay. So 90 category I will give you some, some, some of them in the, in this 90 category, you have, as I told all this allowance. So you have the family allowance, the housing allowance, etc., you have all the credit information. So this customer has already, mortgage, a revolving loan, a consumer loan. They will have then the negative information fees, incident fees, overdraft etcetera, etcetera. So if I make a recap, open banking is is at first billion of Formation that it's very, very difficult to use. As you cannot use billion of information. You need to give a sense, a meaning to each of them and then to group by categories. So starting from Billion of information you have 80 categories of information from income to expenses to I don't know, advertising, power utilities, energy and so on. So you see the way to, to go from billion of non-structural information to aggregated structural information, it's it's a lot of work. And for me, it's as I told, it's really, really, really the key of success of the open banking and and what we did in our company. I mean, where we failed is that at first we didn't have this, aggregation, you know, this this categorization. So it was very, very difficult

for us to use to use the data, efficiently. So we were not so good at identifying, but by bad customer, for example. But today, because we are doing a proof of concept with an external provider, today, we, we will probably buy, I mean, make, a contract and sign a contract with this external provider because they are really specialized on it. And then for us, it will be very useful at the end instead of, instead of, using this billion of data, we will just receive 80 aggregated information. And then we can we can create our credit policy with only 80 information.

INTERVIEWER: I know that sounds really great. I guess it's already you're already touching the next question. For example. You you said already you get the already aggregated information with the 80, categories. And you also mentioned some use cases. Do you have some other use business cases in that direction that you can mention?

INTERVIEWEE: As I told you. So the main challenge is really to to be able to have aggregated information, from this open banking data. So we start from billions of information to, at the end, 80 big categories. A use case of using this, this aggregated data, for example, is to calculate, the, the, the affordability of the customer. So it is something mandatory, of course, because you cannot, the customer cannot be in the, how to say that the indebtedness ratio of the customer, you know, in France, it's limited. It cannot exceed 35%. It means what it means that, the sum of all credit you have divided by your revenue. okay? Cannot exceed 35%. Okay. It's it's it's the norm in France. So what does it mean? It means that first you need to identify, to identify all the credit of the customer and to identify all the credit of the customer. I mean, credit ongoing. You will use open banking, of course, because when you're going to read, all the transaction, you will then, provide a category. Okay. And all credit that the customer has will go through the category credit. And so you will use this aggregated information to build your indebtedness ratio. So at the end in your decision making system you will have a rule okay which calls indebtedness rules. And this rule will simply be the, the division. So you will have credit divided by revenue, and if it is greater than 35%, then the customer will be declined. So it is a use case, an example of use of using open banking data. (..)

INTERVIEWER: Okay. Super. Thanks a lot. Many information to that. Thanks. Let's jump to the next one. No, I also give you some information or give you some examples. Everything is good. That is a dialogue. So nobody knows

everything in advance. That's just for your expectations. So everything is good. So let's jump to the next one. So we are talking about the possibilities of dimensionalization and scaling of these ecosystems. How do you assess these possibilities or what are the, yeah, possibilities of scaling these approaches. What you are mentioning, especially when you're integrating partners, right. You have one of external partners, maybe in future will integrate more partners in your ecosystem. So what are the. Yeah. The possibilities. So do you know how you how you do how you manage that? (..)

INTERVIEWEE: Okay. Of course the use of of the open banking data in the decision making process, helps to, to how to say to get more and more customer because as I told you, in the, in the open banking data set, you have two types of information. You have the positive information and the negative information. So when you have positive information, of the customer, then you can then of course the, the, the scoring, the the scoring model, statistical model. So machine learning model. will catch this positive information. And by catching this positive information, it will it will it will give a positive impact on the on the assessment of this customer. I will give you an example, in the, in the banking, in the open banking, data transaction, I can identify that, this customer get, every year. Okay, a big bonus. Okay. So in in the account, it means that there will be a positive flow, with a high amount coming into the into the account, every year. So by knowing this information, so it is quite positive. Then we can, we can give for example, more money to the customer because we know that in some way he has some saving money and so he will be able to pay back the loan we are going to grant. Okay. So so this is from the customer, view, let's say. So if we, if we use in a, well, in a well, how to say if we use, if we use efficiently, the open banking data, we can do two, two different things. Regarding the customer, the first thing is to penalize the customer by with, by using the negative information. So penalize the customer. It means that, unfortunately, we won't be able to, to grant to finance a loan to some customer. For example, if I can identify in the account, unpaid, loans or, some irregularity in the account, or if, for example, the customer, is, in overdraft, all the time. So this negative, this negative information will, will penalize the customer. And for those customer, we want, grant a loan. But in the other way, for all other customer with positive information, this will be a benefit for, for him because we can, for example, increase the indebtedness ratio. If we see positive information in

your account, for example, instead of having an indebtedness ratio, to 35%, which is mainly the norm, we can increase to 40%. Okay. Because you have, positive information in your account. So it is a way to get more and more customers by using the open banking data. Now, talking, talking about, new partner. I think something, all companies pay attention attention to is the cost. Because keep in mind that the main objective objective of each company is to make money. So if we if you have more and more partner, external partner, then it will be a huge cost for you. And at the end, maybe you won't be profitable. So we have some external partner in order to, to, to make, our, decision, efficient. Okay. But, if we can do, things, by our own, we're going to do it. But sometimes you don't have the expertise, so you you need to have external partner to do that.

INTERVIEWER: That's true. Yes. And super. Thanks a lot. Nice insights from especially from both sides for reaching customers and to integrate more partners in your banking ecosystem. And then next question we are now at 2.3. And this you can also answer this by yes and no. And does your company or other banks maybe, you know, use beyond banking sales signals or like data driven sales signals.

INTERVIEWEE: Data recommender in the in the back office, maybe. Yes. So, as an example, of course, in our, in our process, when we will have integrated, all the things I described you, I mean, the, all the categorization, etc., we're going to use, this, open banking cell signal, for example, in the back office. So of course we have, you know, recovery department. So when the customer is, is not able to pay. So he's, in, unpaid, status, he will be treated by our, collection department, recovery and collection department. So what we call the the back office and, in the CRM, back office, of course, we're going to display we have some today, but they are not so, So reliable. Reliable. But we we have some information coming from the open banking, for example, when you have a customer, in difficulty. So the customer was not able to pay the first monthly installment, for example, he will go through the to, through the recovery, department process and and we're going to see, what's the current situation of the customer as an example, in the back office, we're going to see, okay, today the customer is -€500 in the, in his account, and he owes, us, for example, €1,000. So for him, we know it's not possible to, to, to pay the loan, you know, so we use this kind of information we use for example, the balance, the current balance of the customer. We it's displayed I mean, in the screen of the of

the the of of my colleagues who are working on the on the recovery side. We use of course, the, the open banking score because so the machine learning model, it's what we call an open banking score. So we know what is the the current, score of the customer. Maybe, maybe the profile of the customer has been, deteriorated because he lost his job. For example, maybe at the time we grant the loan, the situation was quite okay for him. And, 2 or 3 months ago, he lost his job. So the situation, is, is coming is is being difficult for him. And so you can have, the, the, the new, score of the customer knowing that in between, he, he faced some personal issue. So we use we. We use we display some open banking information especially for the, recovery and collection department.

INTERVIEWER: Good insight. But on the other side, I mean, you are more, taking these sales recommends for the risk side, right? Do you are you aware of it, that you're also using this for the sales team as a for like.

INTERVIEWEE: We can use open banking data, of course, for doing some, marketing communication also. Of course. This is, this is, so far, for example, if we use the positive information we get from the open banking data, it's, it's, totally possible to make some marketing information, for, dedicated population, you know. For example, I want to send an email, to all customer, who are interested in multimedia and who have, of course, positive information in the account. Then I will make a marketing campaign only for this customer and to identify those, this population, we will use the open banking data, for example, because we have a category, you know, in this 80 categories, one of them is a multimedia. So what does it mean? It means this customer is really interested with the multimedia. He spends some money to buy some, I mean, I don't know, technological tools or something like that. So if we have a dedicated marketing campaign on multimedia, we're going to send a mail to this population and say, hey, Guy, if you want to buy a new laptop or if you want to have, the last, iPhone, 12.33 or, I don't know, whatever, then we can we can do it thanks to this, banking, open banking data. So it's really, really rich open banking. Because, as I told you, if I just in one sentence tell you what is it? It's all life of a person or all his habits, what he likes to do, where he. He's eating. Which restaurant? You know, everything about the customer. So of course, in sales, you can use it. It's very useful because you can, you know, you can have a communication more, how to say more, linked to, the, the habit of the

customer, you know, this customer like multimedia. You're going to send a communication dedicated, you know, that this customer is, a fan of, I don't know. Flowers. You're going to send a communication dedicated to. Flowers. You know, it's it's, You have many, many, many combinations possible to do to do some marketing campaign. So when you do that, of course, it's a way to, to to sell your product. Okay.

INTERVIEWER: That sounds great. So yes. So you you so you say. Yeah that is used by your company this sales signals. And so then we go to the question then. But are these sales signals well established in sales. And are they used consistently. Do you know that? (4)

INTERVIEWEE: To so today, we don't really use because as I told you, we were not we were not so, so good. Without, the categorization of transaction. But we we know that in the future we are going to use all information from the open banking data to make some dedicated marketing campaign in sales. I mean, so they're going to use this information.

INTERVIEWER: Okay. So you're planning to do this to also implement sales signals for later. But first you say you have to understand more your model more categorization. And if you are really succeeding with that approach and you say, okay, now we have a really super database, we know our customers, then we also can generate nice sales signals for our sales teams or also data driven, right. That can automatically send to the customer it without any sales intermediate. Why not. But this is for later planning approaches right. Super then thanks a lot for the second research question. We can jump to the last one. It's more a shorter one. And I'm quite confident that from the risk side of of your knowledge, you can, I guess, give nice insight to that. So we are talking now about more data governance. So what are the most important influencing factors and evaluation criteria for the successful creation of a scalable beyond banking ecosystem? And how can these factors be integrated into the technical design of the model? Here again we go to the sub questions. And this one you can also answer please with yes or no. So are you aware of the use of a guideline, concept, framework or blueprint, for example, for the creation of a scalable beyond banking ecosystem in the banking sector?

INTERVIEWEE: No, I'm not aware of any guideline. And that's why we started not in the in the best way, I think because we we didn't have the the guideline. I mean, it was new for us to use this, this new, this new data. And, I think

it could be really useful to have it. But at the end, you know, we, I think in the, in the, in the market, we have more and more startup startups, especially in France, who, who are specialized on the open banking, data use. So for us, it's a way to make money, of course. And to us, we can, we can, how to say, we can use their, their experience, on open banking data to build our making decision process. So this is what we're going to do. The new partner we we will have. He is he's very specialized on the open banking data. So he knows perfectly how to treat data. How to make the categorization. How to build a statistical model with machine learning approach. So basically all these kind of skills that we cannot do because we don't have enough time first and we don't have enough staff to do it. We gonna externalize this by having an external, partner.

INTERVIEWER: Makes sense. So maybe you also, as you already said, this partner maybe has a clue. Of course. Otherwise this partner won't do that. So maybe he has a guideline or concept of designing of, system like this. Right. Okay.

INTERVIEWEE: But you know, for example, I mean, the the question about, a guideline concept framework, for example, the provider, the, the external, partner, we we, we will have, in few weeks. He provided all this kind of thing guideline, concept, framework, step by step, end to end process.

INTERVIEWER: Okay. Super. We can directly jump to the next question means, because you said, no, but it's still quite interesting. For example, which key influence influencing factors and criteria can determine the value of a successful beyond banking ecosystem? So what is so in case you would like to design now a ecosystem like this right. Or as I said maybe you would like to integrate more partners. To you would like to scale your, your ecosystem, open banking ecosystem and so on. So which key influencing factors and criteria are very important for you then?

INTERVIEWEE: I would say first the data quality this because I didn't talk about that, but the data quality is also key, of course, because when you have a statistical model based on data, if the data is not reliable, your model is bad. Okay. Correct. So if you need if you want to have an efficient machine learning model, what is key is the data quality. And we have sometimes we we sometimes faced on some data quality issue. Okay. I would give you maybe two examples. The customer is, giving the consent, the consent so we can get, all the data from open

banking, flow. Okay. We receive, only 30 days of transaction. If we receive only 30 days of transaction for this customer, we won't be able to make a good assessment of this customer. Most of the time, most of the time, what we receive from the bank is between six months and one year of transaction of banking transaction. But we have some technical issues. Sometimes we we are working on it to fix, for for some reason, we don't understand. We only receive 30 days and not six months, not one year. So when you receive only 30 days of transaction, it's really complicated, to, to assess the, the, the risk behavior of this customer because you don't have enough information regarding this customer. So the data quality is key, to assess the risk behavior and of course, to build a good machine learning model, because the machine learning model of course is based on data. So I would I would say this for, for this question.

INTERVIEWER: Perfect. Do you have other, criteria or evaluation criteria influencing factors that it's important for you?

INTERVIEWEE: So the second one, but I have already, talk about talked about this a lot. It's the categorization. So, so there is two keys factor, criteria you need to, to pay attention to, to have an open banking, ecosystem, success. Successful, successfully implemented. First is the data quality. And second is, the the categorization of the transaction. If you don't have these two, two, two criteria, completed, I think you, you won't be, so efficient.

INTERVIEWER: Super. That sounds great. Let's finish this one. Thanks a lot for that. And let's go to the last question. So we are heading now to the risk and challenges side. We talked about a lot about opportunities, potential development and the open and beyond banking ecosystem. But let's now give a chance for the risk and challenges side. So let's talk about the first one. How do you categorize the challenges of the ecosystem constructs? I mean like like you have or maybe also some other potential you see in the future? What what challenges are there? (..)

INTERVIEWEE: In in my in my use case because I am working on risk. So so for us, the big challenge, of course, is, to not, to not grant loan to, to customer who are not able to, to pay back the loan. Okay. So, because if we grant too much loan to bad customer at the end, we're going to be in bankruptcy. Okay. Because we're going to lose more money that we're going to earn money. So this is my first challenge, is how I can, mitigate risk, how I can, have a, a good, control of my risk appetite. And of course, the the main, the main tool, I mean, information to control

my risk is the open banking data. So the main challenge is, I mean, from a business, from a business point of view, my main challenge is to control my cost of risk. Okay, is to control that. I won't lose too much money by granting loan to bad customer. And open banking is a good tool to help, mitigating the risk. Okay, so the cost of risk, the challenge in terms of technology. I think it's, what I have already mentioned, open banking data is sometimes billion, billion of transactions. So you need to, to be, skilled, in a, in a good way to be able to integrate all this information in your data warehouse. If, you know, we have already faced some issue on that because, the the database is so big that, the the how to say this in English, the server, the maybe the network, I don't know, server. The server crashed because the volume of data was too big. We were not prepared to integrate such volume of data. It's really not traditional data. It's really huge and big. So it's a challenge, from technical point of view. Then frankly, frankly speaking, when we are talking about partner, because when you have partner, it means, exchanges of information, okay, between us and the partner, it's quite easy and smooth because we know we use AP, APA, calls, you see. So it's it's, it's I think it's, Yeah, it's, it's easy and it is, it is smooth.

INTERVIEWER: Super. That sounds great. Let's directly jump in the risk side because you mentioned nice challenges. I mean, and challenges could be also risk as well. Of course. So how do you see the legal risk on this side and you see the open banking approach, or maybe also some potential risk.

INTERVIEWEE: The legal risk is, we need to pay attention how we we use this information. Of course. First of all, when we use, inform, banking, open banking, data, information, from a customer, we we, we have to make sure that the customer gives the consent. Otherwise, I mean, we can be in trouble, legally. Okay? We are not able. We we don't have the right to use, this confidential information if if the customer doesn't give the consent. So, first of all, it's make sure that we get the consent of the customer. Secondly, I would say, that we need to respect, the, the data protection, related to to to the customer. So when we when we reject, for example, a customer, ask for a loan, at the end the answer is no. So we, we will not, grant this customer. We will not finance him. We cannot keep, the data of the customer as long as we want. We have, period of time where legally, when legally, we, we can keep, for many purposes, some, for example, sometimes we have some

fraud suspicion. So we need to keep the data to make all the analysis, etc.. But we need to respect, this, this, rules. I think so far we cannot keep more than three months of the data. So if you are a customer, you ask for a loan, I say no. I cannot keep your data, your personal and confidential data for more than three months. Okay. So this is this is a this is a legal risk. If we don't, we don't respect this. What, what which which, I think, I don't have in mind other legal, risk, to be honest.

INTERVIEWER: Then let's jump to the next one. So it risk. What are you seeing there?

INTERVIEWEE: I'm translating. (10) Okay. From hacker. Okay. If we have attacks from from hacker, we can be in trouble because as as we, we, we have very, very sensitive information. You know, we have, the credit card, number. We have, the bank account number of the customer. We have very, very sensitive information. So if our it is not so well secured, I think it's a big, big risk.

INTERVIEWER: True, true. You also see some other risks. I mean, for example, when you talk to partners, sending data, harmonizing data, data quality. You also mentioned before for challenges, are there also other risks in that? Maybe also I mean, I can also tell you, for example, you would like to harmonize data and then you're maybe sending out a wrong sales recommender to a customer. Right. Could be also something like this, right. In that direction. Can you agree like this? I mean, about data quality or sending wrong sales signals. Yes, of course we can.

INTERVIEWEE: We can, we can, address, the offer to the wrong customer. And then we, we going to fail. So, of course, there are these kind of risks. That's why that's why it's very important to to make sure, of the, the meanings of the data. So the data quality is key, but the meaning of the data you use is key also. So and in the same way, because you are mentioning the sales, if I'm talking about risk, it's the same thing if, if I provide a loan to, to someone who is not, affordable, it's, it's not good for us. So there is, there is a question of, of profit, profitability of the company. If we are using wrongly data, I mean, in a bad way, we can be in trouble in terms of profitability. So. So, the use of data is very is very important, but the way we use the data is also very important. We we need to make sure that we understand, the, the open banking data. And then we're going to have the proper rules to, to, to, to propose to, to propose our servicing to the good customer.

INTERVIEWER: Sounds great. So we can move to the very last question. Do you know some other risk maybe that are not mentioned so far, maybe also to with partners, maybe reputation, maybe other risk, or maybe you know something. (..)

INTERVIEWEE: So far I don't see, but yeah, maybe sometime I feel that, you know, as I told you, because the customer, when he, he is asking for a loan, he doesn't pay attention to all these details, even if he provides the consent. You know, he clicks. Yes, yes, yes, yes, without really knowing what it is. Sometimes. Yeah, it can be a risk to us. And we have already faced this kind of issue when the customer is calling, our, recovery department and say that, okay, I will go to the police, because you use my, my, sensitive information and you don't have the. Right. So, I think the open banking, the open banking, ecosystem is not so, so well known by the population. It's like, you know, it's something quite new, but not so new, but it's quite new and that, the, the customer, main, main customers, they are even not aware about that, you know, and I think maybe there is something we could we should all improve. I mean, all, all companies who are doing, who are who are providing financial services, they should make more, you know, not not like a training, but, you know, just more explaining, in a, in an easy way. What is the open banking? What are we going to do with your data, why we are collecting your data, etc.? Because it's, it's it's really different from a traditional, way of granting a credit. It's completely different. But, in the, in the, in the bank side, we learn step by step this open banking ecosystem. You know, we are not so mature on that. We learn we we still learning. So if in the bank side we we still learning every day. What can we do about the customer? He knows nothing. Nothing about open banking. And in that way, because of that, sometimes I think it can be. It can be a risk and especially a risk of reputation. It's not. It's like, you know, if I give you an example in the, in the traditional, way of, granting a loan. So, you know, you go to the branch, you see your, your, how to say, the, the guy who is granting the loan so you will see a physically the guy. So you see it in, in the, in the desk of the branch. Okay, I need money. Okay? The the agent will explain you everything. Okay? If you take a loan, be aware that you will have fees that will be applied. So we'll have you will have to pay fees, for, for, for, granting the loan, you need to provide your identity, all the documentation that allows to prove that you have revenue, etc.. So when you have this kind of of, you know, let's say manual analysis, you know, it's really, physical, request. So the customer is going to the branch to ask for a loan.

Then the customer is really well informed and well, he has the, the, the good level of information at what he, signed. But in the new, in this new ecosystem where, we, we, we try to have, fast decision, full digital decision, 100% automated decision. Then there is no more relationship between the customer and the and the financial company. You know, there is no there is absolutely no interaction. So as there is no interaction, I feel there is a lack of information. Regarding the customer. You know, he doesn't know, in the same way, I mean, with the same level of information. What he's really saying, what he's really provide of information. And this is a risk. I think this is a risk because if the customer doesn't know, he can say, okay, I have been manipulated. I was not aware that I'm gonna provide, all my life because in my bank, bank account, there is all my life. I know everything, you know. So I think this kind of risk may be sometimes can, should be addressed by by us. Because, most of people, most of people doesn't know what is open banking.

INTERVIEWER: Understood. Very interesting. Especially so you're talking the bank has also to more clarify, make things easy and better communication that the customer is aware of what he's providing for the data. So providing data for what for which needs. Right. So that's very interesting. Thank you so much. So we are already at the end, so I give you only the last chance. Maybe you would like to mention something else, about what you said. So I give you a last, easy question. Do you would like to add something to or to mention something?

INTERVIEWEE: I think I talked a lot. There is not more to mention.

INTERVIEWER: Thank you so much. That sounds really well, perfect. A nice conclusion.

APPENDIX 11. Semi-Standardized Expert Interviews: Transcript from Expert 9

INTERVIEWER: I would say that let us really go ahead to the first, research question. I will tell you. So first one will be how can the combination of intra and inter institutional customer data matching improves the dimensioning and scaling of beyond banking ecosystems in the financial sector? And what impact does this have on data protection, integration and technological infrastructure? You have to answer this one. Therefore we have the all the sub questions. So go ahead with these. So let's start with the first one. So how do you see the revenue potential of beyond banking nowadays.

INTERVIEWEE: Yeah actually there's a huge revenue potential in beyond banking area because these days, especially digital customers, like they want to use their a lot of to dos via one app. So, because of the phone memories and, lack of the digital things. So they want to do their daily basis things via using one app. So nowadays everybody heard super app. So ... actually tried to be a super app in financial sector. So we are really keen on this topic these days. So, what ... and our company do doing is personal personal personalization solutions for our customers. So we read our data. We try to understand customer needs. So that's why first thing is occur occur potential revenue is personalization in financial services. This is my first point of view. And another one is actually the cross sales. So if beyond banking system or the financial provider give a lot of options to the customers. So, for, for one unique customer, they, they need to be aware of the other services. So, the company needs to communicate their potential customers or are already customers to engage within the full features, I think.

INTERVIEWER: Super. Yeah, sounds really great. Super many insights, especially this super app approach, to really figure out and the touch points of customer needs. And it's super good with the CRM system and with the data analytics approach, we can go ahead to the, we will see this later, and I will ask you some more questions later in the second research question. But a good hint it's really in the in the goes really in the right direction. Thank you for that. Let's go to the next one. So means what developments do you see in the area of Beyond Banking 2.0. So the interinstitutional customer matching approach by Non-banks, as I already said before, this B2C approach.

INTERVIEWEE: I have really good, examples for that. I don't know if it's 100% fit, but, in, in Turkish league, we have some, football teams like, Galatasaray. Fenerbahce. So this is a very big company, by the way, not the soccer team. Also, they have very good, customers behind that soccer team. So they are the fans, actually. So we had some deals with these, sorry, famous soccer teams like Besiktas, Trabzonspor, and, we create a soccer team debit card for them. So, also, we increase our customers loyalty into the app. So they are doing their market shopping via using their Fenerbahce Besiktas card or Trabzonspor card. So, I think this is the one of the good, deal with the non bankers deals with paparazzi. So we saw really good increase their transactions and their payments etc.. So, maybe I can give this, examples for that question.

INTERVIEWER: Good example. Thanks a lot. Especially this loyalty program is really facing somehow the beyond banking approach. Right to to to bind customer to also give them extra benefits on top. Not like also maybe like cashbacks or like discounts. Right. It goes in that direction especially for for shopping. Right. Or all directions are not typically typically banking services. So that's really good. Do we have other developments or examples or should we go ahead.

INTERVIEWEE: Yeah. I have more examples about this topic. So we have metal card in paper. So it's a very special card. Maybe you have seen it. Apple I think Apple or American Express have one of these these cards really heavy card and luxury card. So, we have plan to build a VIP, loyalty system for them. What's in it? People for for this stage. So we didn't. We haven't announced the loyalty program for Metal Card for. But I want to explain a little bit. A metal card users is high spender users. Like they spend. They go very expensive restaurants in Turkey and in Europe or America. They are. They are traveler. They are, spend their money in luxury brands. So we have a, first of all, special cashback, a program for them. If customer paid 1000 Turkish lira and get their metal card and then they automatically enter the their special cashback system. What is that cashback system? If you go to Bali and you can stay an already registered hotel in that loyalty system so you can get 10% cash back via using metal card and joining their loyalty system. So this is really a perfect working, system for our high segmented customer. And then we want to expand, this loyalty program. So we will create very different colors of this metal card. So in in the worldwide metal card means

look like gray metal. So so you can understand everybody understand via its name its color. But these days we saw through our data a human drive, this luxury a spendings. So we we need to develop a woman oriented so woman oriented product to get their attention. Like rose gold card. It's also heavy and look like a luxury and also very good cashback and special cashback system behind it for increase, increase volume of this, loyalty system. And also we will have gold cards for like these luxury spenders and also expand the cashback brands and hotels and like in in the USA we have agreement with Abercrombie and Fitch or Hilton hotels and blah, blah. So this is a very unique and useful loyalty system for our customers. So it's still developing.

INTERVIEWER: Super. Yeah. Interesting insights. Sam, thanks a lot for that. Let's go ahead to the next Subquestion to that. So you mentioned very nice examples and to that, what, or which added values, would be generated for these customers and banks by this ecosystem construct. (..)

INTERVIEWEE: Okay. So, I'm thinking so these days, for example, Saving money is a really big issue in this world economy. So, in Gen Z, we saw a lot of research, there escaping being a white collar worker. So they don't want to work. They, they want to invest some money, but small amount of money and they, they try to create their monthly budget by using the stock exchange or gold invest or platinum invest and these kind of things. So maybe crypto part. So I think this investment topic is really, really crucial. For beyond banking part.

INTERVIEWER: Super and other added values, maybe also some soft effects. Something like I mean, as long as you provide these, I would say additional services I would expect. Okay, you maybe you can bind customers more or longer to a bank. Maybe they're increasing also the satisfaction. Maybe. Recommendation, right. Reputation of the overall bank will be increased because now you, you give access to to additional services. That was not maybe happened years before. You can also confirm like this as like these added values or something like that.

INTERVIEWEE: I'm thinking like, actually the most added value is, the interfaces. I, I'm not sure the talking about interfaces, app or web interfaces at that point, but I saw the making difference and I saw how .. made the difference in the banking sector via via using their simple and fast and very understandable. Usage, make the biggest difference in that sector. So sector. So, today I saw some data,

actually. Really close, really close download numbers. When we compare compare to the traditional banks. So I think, app interface is really important added value for beyond banking.

INTERVIEWER: I guess. Yeah, exactly. Good. Thank you for that. Let's go ahead. I mean, you mentioned it before, but maybe, which other corporations are concluded and what offers are made to the customers? You already mentioned some. Do we have more corporations you made? With other, PR services or companies or what other offers you make. You are doing for customer.

INTERVIEWEE: Yeah. We are we are doing, for example, to become a financial super app. So we try to expand our service area. I'm going to give some examples. For example, if our customer wants to pay their bills so, they can pay their electricity, water and internet or their personal phone bills, etc.. They can pay via using PayPal app. So paper is not the provider. That is not the provider there, these kind of products. So we go for example, Vodafone, Turkcell, these are the biggest, Cotton telecom company in Turkey. So we we have some deals and then we have we, we, we did some development behind the app. So now these days, any Turkish customer can go directly to our app and pay their monthly or automatically give some rules to pay automatically their bills monthly via using PayPal app. Also another service is insurance. For example, last month, not last month, 15 days ago, I came to Germany. So I made my, travel insurance via using paper app. So we have, insurance domain and insurance features at PayPal app. So people if they are customer if they want to, Want to have a home insurance or scooter insurance? This is the first time in Turkey we have a scooter insurance. It's really popular nowadays in Turkey, so we have scooter insurance and this kind of pet insurance. If our customer want to buy a dog or cat, insurance, they can get through app. And also the, interesting part is we have had two insurance also, but this is a little bit different. Maybe you didn't hurt, you you just call doctor and they give your soft, things like, I have a headache, I have little flu, and, he or she gives, give you some directions to get healthier. So this kind of insurance we already have. So I can give this two features or two domains for this question.

INTERVIEWER: Super. Thanks a lot. It sounds really great. So I heard about you would like to get a super app and you expand in that way that you create more streamlines for every business or for customer business need. That could be interesting, right? Or in the daily life approach, what the customers really needed

besides this classical or traditional banking you're figuring out and you're developing this streamline end to end. So that means I can every everything I can find in paper, I go inside and I would like to really close my business to finish end to end. Yeah. And that's really interesting. So thank you. Thank you so much for these, really nice examples. Let's go ahead to the next question. So, have you already gained experience with a broader view at ecosystem level 3.0 with an intra institutional approach. As I said, this C2C business approach, right now, we are looking more like a market, marketplace operator and try to figure out how to connect customer A and B together. Right? So for the question only says, do you already have gained experience in that stage 3.0. Yes or not.

INTERVIEWEE: No. No no I don't have like marketplace experience in Beyond Banking or my previous.

INTERVIEWER: No in this level three point or yes. So maybe you don't get it in your, work experience, but or do you gather it somewhere else that it's maybe you see, or in other banks or somewhere that you see this level of ecosystem or not? No. Okay. Super. That's short and, understandable. So then you can. That's super. That's an insight. Yes or no? That's also important. It's nothing wrong. Everything is good. So that is fine. Means we go. We will directly jump to the question. If not, so we are there. So how does casa matching takes place? At the level of interinstitutional approach. So now we are going one level back. We are not at 3.0 we go back to 2.0. Can you somehow explain how this customer matching is working, how you connect the customer or the need? You know, which data or maybe data points? What are you exactly doing to match this customer with the need of their third party provider? (..)

INTERVIEWEE: So actually, as I mentioned before, like these services like insurance investment or the, soccer team deals, etc. so .. is not actually, owning that services. So .., buying that services to put into the, app ecosystem. So, we, we have more examples through the data because, first we collect data, as I mentioned, like to 20 million data. So we look through our database and we use a lot of, like, tools like amplitude to get more information, our users app usage and, create a lot of funnels, etc.. So, I'm thinking, for 2.0 for the other examples, I'm just thinking about what kind of examples that can I give, More. Okay, so, through social media, through TikTok, customers that we have really a huge amount of, Gen Z and young

customers, like 13 years between 13 years old and 25 years old. So we saw a lot of content, like, our customers try to, put some stickers on their cart because we have a lot of different, color of cards, debit cards. Actually, .. have no bank. Right. Not being a bank papers right now. So, that's why we only giving debit card to our customers. And then for this kind of insight, last year, we launched a new product The cold sketch my card product so customers can create their cards designs via app, and 1 or 2 weeks later they a they will have their card and using via their style. So the gamers lifestyle, ladies and gentlemen and the the parents and the students, they draw a lot of drawings into the card. Also they use already already implement already implemented emojis, etc.. So that was a really huge, product release for us. So also we gain a lot of customers through that, new product. So maybe I can give one example via using data that creating a new system for our customer. (..)

INTERVIEWER: Okay. My example I was not sure it was a question or a statement, so it was already a statement. Thank you. It was an answer. Super. So interesting. So I mean by providing these different style of the debit card to the person, also give you an understanding of which type the customers are. Right. You can categorize the customer or I'm a gamer, I have no I would like to style my card because of I don't know, I'm a gamer, so I have some games on that, provide on that car and that means. Okay. He's this his his this lifestyle means you can also provide this kind of customer specific offers for later or what else, right? Or can a bit like pushing the customer in some other more relevant services because you have this categorization approach. I guess it's working like this, right?

INTERVIEWEE: Yeah, yeah. Personal, personalized. So we try to get more information about our customers. So because of the data regulation it's really hard to collect data. And then these days we are not doing segmentation. We try to do personal, personas for our CRM communication. So when we get more info about their lifestyle, because if you if you are logging a banking system, also nobody knows you like pink. But if we know if we know you like pink, we can offer you a pink card. So in Turkey there's a huge Pink Lovers as an example. Or if he knew, if he knew you, you, you are choosing this or that soccer team so we can provide you, provide easily these kind of products to you. So, we are trying to collect more data, more insight data to, support our personas and expand our personas types.

INTERVIEWER: Interesting. Super. Yeah. Super interesting insight. Thank you. Let's go directly to the next question because I look a bit on our timeline, so you have to hurry up, but at least we have to go ahead.

INTERVIEWER: Let's go to the last question from this research question. So how do you see the acceptance of a scaled down banking ecosystem associated to this stages? Right. What we are talking about, you know, you already mentioned this 3.0. You don't have any experience, but maybe you can talk about what you already did about the 2.0. So on both sides. So what is your acceptance or what do you what is your feeling about the acceptance of these services on customer side and for you as a bank. So it's a huge acceptance less. What do you think? (...)

INTERVIEWEE: When when customers face personalized solutions for them within their cards or their, services. So they respond, easily to them because for I, maybe I'm repeating but beyond banking or non banking, customers are really, really fast. I'm just trying to, positioning my sentence so their churn rate is really high for company. So, we, we have to, we have to increase their retention through the product. So that's why, I gave guess we have a lot of KPIs through it. So, you usage of their cards. So in our active, users, I cannot give the percentage, but they are almost everybody using not everybody, but mostly using paper card. They have paper card into their pocket. So this is a very big, success for company because if they have cards so we can reach them easily, we can increase their spendings easily. So, this is the this is a really good, relation between company and customer. So we try to do everything simple, personalized, personalized, data driven. and, really focused on the user experience part. I can mention these five, I think.

INTERVIEWER: Super. Interesting. Very good. Maybe one a little side question to that. I mean, you really mentioned the acceptance and it's really good. And, but maybe one, additional thing, what organizational effect does this have or what new role concept does this create, for example? I mean, we are now going more away to the traditional banking. You have so many other services you will provide to the to your customers. What does it mean? Does it mean okay. You have also experts in your in your company that are more like not real bankers anymore. Right. Because you are more like e-commerce, right? You are providing services. So can you tell me about a bit? Are you more like e-commerce people? Are the sales guys also more like maybe. Yeah, like trained to, focus course digital e-commerce

products. So how you maybe it's a bit your shape of your company, right. Is it tell me a bit about it. Yes.

INTERVIEWEE: Yeah. The the shape of the company is really focusing on customer behaviors. Like what? What I'm trying to say is like, they try to, collect data via customer services, via, sales meetings and all B2B and B2C customers. The company always try to listen and collect data, insight through the, through their customers. So that's why this kind of data, really help to grow the company, grow, grow the product. So, I think it's really depends on the, mindset. Mindset of the decision makers. I really believe that.

INTERVIEWER: Interesting. So it's also a bit meaning for me that I guess for each different style or for each different service, what you are providing to a customer. I guess the company is going along by the hierarchy like this, right? So yeah. Okay. I have, for example, streamline these, VIP people loyalty program. So your customer or your company hierarchy is getting along like this, right? I guess this is my feeling, so. Or you have a pet insurance. So that's a team for pet insurance, right. So focusing on each streamline and that makes sense. That's really interesting. Right. So you are really somehow like really for me flat hierarchy or also like really focus on data driven as you said data driven business models. Yeah. Very very interesting. Perfect. And thank you. Super similar. Let's really go ahead. I mean, thank you so much for this first research question. Really so many insights. Let's go to the second one. So you already talked about CRM and the business sales signals. And that is the second one. So how can machine learning and data analytics methods be used to develop and implement effective beyond banking sales signals or sales impulses? However you would like to call and what specific use cases show how they impact sales performance in the financial sector. So again, we go ahead to the sub questions and we will start with a thesis or with a yeah something like a hypothesis. So there's I say there is a still or not I say I also say some experts say there is still there's still a lack of clear business models and the necessary skills to utilize the potential of beyond banking. Do you agree with that or not? And explain please.

INTERVIEWEE: Yeah, I 100% agree with this question because, for example, in Turkey, I'm sure in Europe also or USA also have the same struggles. For example, when a traditional banking offer, for example, discount for a customer, it's really complicated. It has a lot of rules behind it. So you apply the website and

then you, you have to, spend this and that amount money. After seven days, you will get your, discount, blah, blah. They are really complicated and really, decreased, customer's, motivation to use this kind of campaigns through, for traditional banks. So, there are a lot of potential there. Hi. It's still hiding, but make everything, make make everything easy. Make everything easy. Part of this plan. I'm trying to explain this, Sebastian. I'm sorry. Because of the Friday. So my brains. I'm thinking a lot of things right now to explain everything is good. Yeah, yeah. Everything is really complicated right now. So, in in this situation, company needs to make more easy way to collect customers within that. Like, not a lot of rules, not a lot of steps. So, customers needs to reach their discounts or the benefits in two clicks or a couple minutes. So this is really a big potential. So this is also papyrus growth example. So in Turkey the interfaces and the this kind of discounts is joining them really hard in banking banking sector. And then our decision makers saw a potential in there. So they create a cashback system that instantly customer paid back through their accounts. So this day they have we have 20 percentage of Turkish citizens already installed PayPal app. So, this kind of things makes the big difference.

INTERVIEWER: Wow. High number. Very interesting. And and good. Insights. What you are providing, what should be better, right. To understand the customer and, The from understanding to build up clear and, useful business cases. So really interesting. Thank you for that. Then let's directly jump to the sub question. You already mentioned some ideas. Corporations, use cases. Yeah. But if there are, according to the previous question, if there are use business cases, which ones you can name for this 2.0 approach, maybe you are also planning your brainstorming or you see in other banking environment or in your market, there are some developments happening or use cases. Can you tell something about it? (..)

INTERVIEWEE: Yeah. I saw the interesting example a couple of days ago. Pegasus, have a loyalty system for one of the, investment providers. So, it said, if you use, I forgot, provider's name, but they have. They had a really good collaboration between them. So, for example, you buy, like, a two grams of, gold via that investment platform. If you log in with the same email into Pegasus, you

will get a Pegasus point. Flying point into your, account. So, this kind of thing look very interesting for me. Maybe I can.

INTERVIEWER: Why not? Thank you. Perfect. Let's jump to the next one. So the same question. But now, according to level 3.0, I only would like to ask this again. Can you answer this question because you mentioned before that you cannot say something to a level 3.0. Is it still correct or should be? Should you would like to say something?

INTERVIEWEE: No, actually.

INTERVIEWER: Because you already mentioned. That's fine then. That makes also sense. And it's only only consistent, right? That other would be a bit surprised that, you know, you can start with telling me about business cases for three points. Yeah.

INTERVIEWEE: No, no. Interesting.

INTERVIEWER: So that is it's more like a confirmation. It's more like, asking you to confirm what you said before. No, everything is good. Thank you so much. So let's go ahead. Let's know with the focusing of the possibilities of of scaling these ecosystems. Yeah. So how do you assess the possibilities of the dimensionalization and scaling of beyond banking ecosystems? Do you have an idea for that? So I mean do you know it or. Yeah. Tell me.

INTERVIEWEE: Yeah. First we, we, we need to consider their personas like their spending personas. So their habits like like are they family or not or providing them like, machine learning solutions, for example. We have I, I'm not sure this is a, this is an answer for the, for the, for this question. But for example, we have a lot of machine learning projects in our, customer experience teams like. For example, X is a customer. I already reach for time to the, call to to the agent. And then when I. When I call again. Fifth time while I was calling to the agent. Agent show, my, previous calls and also system give to the agent. X will call because of this or that problem. Because the machine learning system also saw. Also see my, app. How can I explain? For example, I have a cart issue. I already called four times and also I tried to change my pin via using app and I couldn't. And then I try to reach again to the agent. So agent. So while customer customer calling to the to them and then opening the phone call within the, solution. So and then agent answered the phone and said, hello, Sam. I recognize you have some, you have some trouble via creating

your pin, blah, blah, whatever, or your about my account, etc. and then also, this machine learning, system appears some, messages. So some solutions, to the, to this screen. So it says you can offer this and that to your customers. You can say this and that to solve your customer's problem, etc.. So this kind of machine learning, and I'm sorry, AI system. This kind of AI system provides really good knowledge. And and then, I saw a lot of report that our call durations really decreased. So, we have really good team over there. So, this is very good example, nowadays that I saw and I want to mention I'm not sure this is the right time or not, but, this one is a good example for, scaling customer for me.

INTERVIEWER: Yes. Very good approach. Thank you so much. Especially these. Okay. I have an AI that is somehow, mirroring my process. and to ask you to recommend, hey, you can do it easier. You can do it in another way. So it may be interesting what you are saying or try to say is I guess, the my all my processes or especially the customer journeys should be covered by AI or mirrored and tracked by AI. So I can see or figure out something that a human being is not able to find, and can give you examples to make it better, and to scale these customer journeys to make even better, even for next requests. Right? So this is really good and important insight. Thank you so much. Thank you, thank you. The other sub questions I would have here, I mean, you already mentioned this and that's a good, I would say key indicator as it's also known to, to to other decision makers, or other people in your company like this.

INTERVIEWEE: Yeah. For our for example, our CTOs and our CEO also have these kind of visions like we have also other AI systems for, product background. For example, as I mentioned, app is really important for us like interfaces, app, apps, app apps should be fast, always, etc. to the customer. And so we have an AI system also in it part. So it determines the problems like one week before and said, look, you will have this kind of server issues or this kind of issues within, for example, six days. So you should solve this problem immediately. So also, our other decision makers and our leaders have the same visions also.

INTERVIEWER: Perfect. Perfectly explained. Thank you. Thanks a lot. Let's let's go ahead. So, now we go to the CRM sales signals approach. Yeah. So first easy question is only yes and no. Does your company or other banks use beyond banking sales signals? (...)

INTERVIEWEE: I'm not sure. My company. Yes. Yeah. Sorry. My company. Yes. But the other.

INTERVIEWER: So at least you can, you can confirm for your company. That is good. Yeah. And, and maybe for other banks. What are you tending to say? More. Not or more. Yes.

INTERVIEWEE: I think more not.

INTERVIEWER: More not. Thank you. So because you say your company can do. Are you fully utilizing the potential and how do you determine this?

INTERVIEWEE: I think I'm not fully utilizing the potential, but we determine, why I'm using, funnels and the really monitoring customer journeys. So, their cross actions, and their, starting to the onboarding, process until make them, using full of the features. So the key point is we are focusing on increasing customers ltv's with whole CRM and whole app design process, etc. so these are the, areas that we are getting a lot of potential through it.

INTERVIEWER: Super. Thank you. The next question. So your user like the potential and the determination, so are now beyond banking sales established in sales and are they used consistently? Do you know it I mean you are using it some more. You have it maybe in your system, but it's the sales or the sales department guys using it. (..)

INTERVIEWEE: Actually in ..., we don't have sales department, you know, we only. Yeah, we only have sales department in B2B part, For, for example. Yeah. Like a restaurant or a small business, have payment system like POC po pos system maybe, you know, or not. So we are just providing hardware and software to them, but, I'm not working within the sales team, so I'm not sure.

INTERVIEWER: Yes, but it's super inside, so means okay, because you already, you do the B2B and everything. What you're doing from B to C. Yeah, I heard about what you said before that it's going like in an automatic way. Yeah. So that the customer will be directly personalized and getting got offers of you of your company. So there's really no really sales implemented that is doing okay next to our automatic approach. We also need people who are doing this right or give. So the recommenders are based automatically on an automatic rate correctly right. Automatic recommender or data driven recommender way right. Okay. Perfect. And that that is super. And that's totally enough. So you're also directly answer the

next sub question. Thanks a lot. We finished the second research question. We can directly jump. And now we are also a bit yeah we're quite good in time because the next questions are a bit less. So let's jump to the third one. What are the most important influencing factors and evaluation criteria for the successful creation of a scalable, beyond banking ecosystem? And how can these factors be integrated into the technical design of the model? So now we would like to go a bit like designing concepts. Yeah. Ecosystems. See the technical point of view, maybe. Or creating frameworks for make work easier. So first Subquestion, are you aware of the use of a guideline, concept, or framework for the creation of a scalable, beyond banking ecosystem in the banking sector? (..)

INTERVIEWEE: Actually, we have, a guideline in I'm not sure at the banking system have, but in ... we have, some of, guideline, for example, for our brand reputation, we have brand guideline for our app design. We have design guideline for our CRM or social media or, whatever in interaction. We have to we have to customer. We have a lot of guidelines. So, yes I'm aware. Yeah, yeah.

INTERVIEWER: Okay. Thank you. Thank you. So let's jump to the other question because you you already confirmed that you are aware of it. That's good. So if so, to what extent and which concepts do you use? Which case studies and or framework models can you mention in this area. You mentioned already guidelines. Do you have more or do you know okay which case studies can be covered by that. Maybe other models. You can mention this area.

INTERVIEWEE: I'm thinking for the guidelines, like, (..) I'm not sure. How can I give example like giving a concept examples, but just one second. Which case studies or framework models? Can you mention this area? No, nothing came in my mind. Sebastian. Everything is good. Yeah, that's an answer.

INTERVIEWER: Everything is good. Maybe you mentioned some guidelines before. That is good. And maybe you say okay, but maybe you're not the right person. Or maybe you also say maybe there's something, but maybe you have to ask somebody else, right? In your company for that. And or maybe we can also let it open like this. Maybe it's also not existing. So we don't know. But at least you know about your aware about some guidelines. And this you mentioned already. That is fine right. Then let's jump to the next one. to the 3.2. Which key influencing

factors and criteria can determine the value of a successful beyond banking ecosystem systems?

INTERVIEWEE: Active customer number. This is my one and only answer. Because yeah. In banking ecosystem, it's really, hard to, remain high activated customers through our through their app. So, first one is, active, active customers and increase their numbers like, the ratio is really important. So, for example, in e-commerce, for example, trendyol or, You heard Randy. All right, Sebastian, I'm saying some Turkish brand, but. Okay. It's okay. So we have Zalando. I gave Zalando example and yeah this kind of e-commerce brands are really higher rate. Like when you said okay I have 10 million customers. But tell me what is your ratio for your active customers. So make it half or make it one divided by three, etc. these kind of things make them successful and also increase. Yeah, they should increase their baseline. Yes. Customer baseline. Yeah. Interesting. Thank you. Yeah, yeah.

INTERVIEWER: Okay. So active customers, or at least to reactivate, activate, or to keep an active for longer way and to increase the ratio. As you said, that is really the really key what you're focusing for the value of a successful beyond banking ecosystem, that is the the criteria that are really focusing to make it successful. And that is super. That makes sense, of course perfect. And with that you also answer research. Question three and we are good in time. And now we are going more to the really conclusion questions to the last questions. So we are facing really about possibilities development observations. And so what is possible with beyond banking. So now we would like to give a little a view of course on the challenging challenges and risk side. So for example what do you categorize the challenges of the ecosystem constructs 2.0. And if you like, 3.0. So what are the challenges nowadays? Before we go to the before before we go to the risk part.

INTERVIEWEE: I think the challenge challenges are changing the mindsets. Because most years like traditional banking is doing some credit cards and some credit accounts to the customers. So they are really used these kind of traditional services and, and make some deals to company and pay white collar workers their monthly fee. So it's really hard to change. I think the one of the biggest challenge is changing, decision makers, traditional mindsets.

INTERVIEWER: Interesting. Yeah. Further challenges. You would like to mention that those were really good one. Very important.

INTERVIEWEE: Regulation is another challenging point because, for fintechs, it's really, not really. It's a little bit easier than becoming a bank for regulatory part. So it has a lot of rules and the risk management, etc.. So, another point is I think, regulation part, and another thing is challenges. Challenge is data policy. I know in Europe GDPR and also we have Covid in Turkey. So it's it's have really, it's really challenge me as a growth digital growth person. So collecting data data, it's really hard to find the right tools, right analytics tools, AI tools to fit both regulations and data policies. So it's really important challenges I think.

INTERVIEWER: Yes. Good good good insights. Understood. We can directly jump to the next question, because you already start to mention means the legal risk. So you mentioned data, policy, regulation. Do you have a bit more about legal risks, legal risk.

INTERVIEWEE: No, I don't have.

INTERVIEWER: Perfect. You already mentioned. That's fine. Yeah. Only if you have more. Perfect. Then let's go to the IT risk. Do you see there something it as a technical point of view.

INTERVIEWEE: What do you currently. Yeah. Currently. Actually, we have some risks. We are facing this kind of it risk. For example, like, couple quarters ago, fintechs can use, some cloud, tools and systems, but nowadays we have to use on prem systems. So this is like a, important rule coming via regulations etc.. So we have to change our habits so we build more, space into our servers. And it takes a lot of, It's increase our spendings like marketing spendings etc.. So I think these are the, it risks. And also we don't have so much human resource for these kind of changes. We also have really good IT team. But these kind of changes needs to happen very, very quick way. So this kind of things occur. Some it risk, I guess.

INTERVIEWER: Yeah, exactly. Thanks a lot. Then I would let it go ahead to the last question means, maybe some further other risks you can mention here, like a placeholder here. Maybe give you a little idea. Maybe also from the role point of view. Right. So maybe let's see. We are now in the 3.0 approach and the bank acts as a market orchestrator. Is there something like or is there like connected with more risk if you maybe take the role as a market orchestrator or maybe also other? No, there shouldn't be. There's only one idea which are the risks you see, or especially to this role point of view. (...)

INTERVIEWEE: I'm sure there are more risks going around. But, the global economic situation, I think this is the first risk that came in my mind, because, economical situation of the, the people or companies, for example, in Turkey, in Europe, these economical changes and the wars, etc., these kind of things really affect to the banks and the, like non-banking area. So this one just came to my mind.

INTERVIEWER: So do you would like to add something else to what you said before overall, or did you already mention everything what you would like to do?

INTERVIEWEE: Yes, I already mentioned everything. Super. I hope so then.

INTERVIEWER: I hope so. And you did. I'm really happy about it. So we come to the conclusion. Thanks a lot.

APPENDIX 12. Semi-Standardized Expert Interviews: Transcript from Expert 10

INTERVIEWER: So I would say let's start with the first big research question. We are talking about three big research questions. But don't mind. We, we haven't to ask the big research question. We are more focusing on the sub question to somehow answer these questions. Yes. So, let's go ahead. I will give you an introduction. So the first one will be how can the combination of intra and insert institutional customer data matching improve the dimensioning and scaling of beyond banking ecosystems and the financial sector? And what impact does this have on data protection, integration and technological infrastructure? So and the first one would be how do you see the revenue potential of beyond banking?

INTERVIEWEE: Okay. Well, it's very obvious that, banks are now, facing, like, revenue generation, problems. Since, the market is very disrupted. I mean, it is very, I think similar with Europe and us, but it also applies to Turkey because, with the rise of the financial technology, companies like start ups and also, digital banks, like after, I mean, in previous two years, the bank's, revenue generation potential, squeezed, so much, That's why the competition is very high and the market is very disruptive. So it is not, right now, I mean, possible to create the revenue by only proposing banking products and services. That is why, lots of banks, lots of like, I mean, the banks in Turkey, like, conservative banks in Turkey, let's say, trying to open their, platforms like banking mobile platforms, to other third parties, partners, in order to, create more value for their customers, because they see it as a new revenue generation potential, for them. That is why they are, trying to create, like, ecosystem banking strategies nowadays in Turkey. And we offer as a bank, as a bank, see potential in terms of revenue generation and also customer engagement with the new services. And also like with the improved customer retention and cross-selling opportunities, since ecosystem banking gives us, new ways to get the data, like more expanded data of customers, give us the opportunity to know them better, know, how their life is going on. I mean, until this time, it was very limited since we can only see, limited data of themselves. It's only like, our banking data, but with the open banking and, like, new regulations, with the platform economies and so on, we are now able to understand them better and like, propose them new services which best fit with their, life events, let's say.

INTERVIEWER: Super. So many insights. Interesting from many perspectives, of up and cross-selling possibilities. Right. Very good. Thanks a lot. Let's move on to the next one. So, what developments do you see in the area of Beyond Banking 2.0? So what I mentioned before, this example for the interinstitutional customer matching by Non-banks.

INTERVIEWEE: Yeah. Well, in Turkey, most of the banks, started, build upon beyond banking, value propositions, and like, it's been two months at two years. Oh, sorry. And, we are also, entering this area, as a more structured, proposition, this year, hopefully. And, I mean, the banks are, opening their platform to third parties, with, like, APIs or different technologies and enable the third parties to, integrate their services into banking platforms. And, with this way, I mean, banks and those companies, like, sharing data, like personal, customer data in order to build upon, their, services, their value offerings. However, it is, it is limited, since, it is the customer data is in question, and the, the regulatory environment is, very limited for us to share the customer data with third parties. Since we are a bank, we need to protect their data. That is why we are very cautious about sharing data. And we are not sharing. If the if the customer doesn't give any consents and we are sharing only the information that the partner is, strictly needs, I mean, we are not, sharing. Nice to have data, but only, the data the partner, needs to give that service. So we are very, I mean, careful about that. Sharing, data. So the, I mean, it's still limited, and, I mean, in Turkey, customers trust in banks because we have a very regulatory environment since like 2000, since the, I mean, the regulatory the regulations are more very strict and they believe that, okay, bank can, I mean, protect my data. However, the beyond banking, facilities and services are very are still very limited. So they are, thinking of. Okay, why a bank? I mean, sell, travel tickets, on a banking app. So they are just getting used to it. That is why it will probably take some time. However, I mean, as a bank, we are developing our experiences, in a sense of, like MEPs, and we are not. We are trying not to frighten them, with, like, sharing their data with third parties we are and giving the idea, giving the confidence to them that we share only the needed data with the third parties. So yeah, it's developing. I mean, it's we are building upon it. However, we still need some time. I mean, for customers to use these kind of services within a banking application, let's say banking platform.

INTERVIEWER: Understood. Yeah. Very interesting. Especially the as you mentioned, this balancing between data protection. I'm trusting my bank. But why? Asking my bank about my data and offering new offer, new services that never did before. And as you said, they need a bit time also to get used to it. So it's really quite interesting to define the trust and sharing data and without of course no any consents and also to give some time for the customer to get used to it, that the banking ecosystem is getting bigger. So really interesting. Thanks a lot. Really fine for me, the question, you really perfectly answered it. We can directly jump to the new one or next one. So, concerning to that one, what added value is generated for customers and banks by this ecosystem construct?

INTERVIEWEE: Okay. Well, I mean, the customers, as I told in the previous question, customers, trust in banks, since like, banks, all regulated and, they are they need to care about the security, issues, the login, I mean, criterias, etcetera. So they, I mean, open their data to banks and I mean, by I mean, from the standpoint, let's say, We can use that trust in terms of, like, giving new value added services for our customers, by partnering with third parties and also governments, government platforms for, let's say, government services and production. So, I mean, for customers, I mean, for example, for, our mobile bank, the average, login, for a month is like 35, more or less. So it's a very, highly used, platform that I mean, they, for example, every day log in to the banking app. So it's a very, I mean, used, platform. So they are, they can use this platform and they can have more on that. I mean, with beyond banking facilities. So, Actually, once we, once we place the different services and products in our, platforms, it's, adds value for them in terms of their customer experience, for example. Once they, if they're going to travel, they can I mean by, like, how can I say they, they can buy different currencies of that, country that they are going to. But besides that, they can also like buy tickets or plan their trip or, I mean, they have the documents for the visa from the, e-government services. So, I mean, this, increases the customer experience, in terms of, like, more tailor tailored financial products. And this also increases the customer loyalty. for a bank. That's right. So it adds value with these services.

INTERVIEWER: Perfect. Yeah. I have really many values out of it. For example, this custom increasing customer experience. Also for the bank that you have a higher your average usage of the overall app. Right. So you're creating more

services and therefore you're getting more touch points, a higher frequency of using also your app and overall banking services. That's good. And also getting more. Yeah. Or higher connection right. Customer satisfaction connection. From the customer to the bank. Right. Perfect. Exactly.

INTERVIEWEE: And since we are I mean, getting their, data from here, I mean, we know them better, by them using these services, we can also offer new, products for them. We can use that data in expanding our offering for them. So it is very valuable for bank.

INTERVIEWER: Also are quite interesting. So you're mentioning here predictive analytics means you see what the customer would like to have right now or later. So you can also adjust your services for the future use. Right.

INTERVIEWEE: Exactly. We understand the inclinations and their needs, and building upon leveraging on this data. Exactly.

INTERVIEWER: Perfect. Sounds super great. Thank you for that. We can head to the next one. So, you talked about the added value. That is great. And you also already mentioned, for example, travel issues or maybe travel tickets. Maybe you can buy, maybe prospectively, but what other corporations are included and what offers are made to the customers, especially to beyond banking services. Yeah. What can you name?

INTERVIEWEE: Yeah. We, include the partnerships with financial technology firms. Like, I mean, we have, some spin off, spin off, because we have, like, a, innovation, program, in, in house, in our bank. And, we have lots of keynotes, which, I mean, graduated from this, program, let's say, and they, go beyond and, they, originate from new financial technology firms. And we are getting, partner with them and we are using their, innovative services within this ecosystem. Besides, we have, like, lots of, ecosystem partners that we are already, have connection in terms of, like, marketing campaigns and etc.. So we are building upon that ecosystem partners and we are trying to embed their services, within our platform. Also, from until this time, we are only like making, third campaigns with them. But we are building upon that. And the third party is the government in Turkey. We have like, government services, which are collected, collected in e-government platform. And we can also, give a login, and direct the customers to related contextual services, within e-government platform like, for example,

buying bus tickets or like checking if you have penalty etc. or like paying tax kind of services. So they are like fintechs the ecosystem partners and also the government services.

INTERVIEWER: Interesting. Yeah. So you're really, highly integrating your or the government services for your customers. That's really interesting because that's totally, divided up here in Germany, for example. It's not like this easy. But maybe let's see in the future, hopefully. But I heard of it that the Turkish, well, connected the bank with the government issues. For me, really cool. Very, quite useful cases for the customer.

INTERVIEWEE: Exactly. Because, customers are, do not know their passport for e-government services. And, we gave the opportunity for them to log in to e-government portal with only their banking passport. So it is a very, I mean, it is very easy to log in, by only logging in the banking app. We are just directing them to the related service without knowing the e-government passport. So it's a good case.

INTERVIEWER: It makes so sense to to connect it. Yeah. For sure. Cool. Thanks a lot. I would say let's jump to the next level of ecosystems. So I talked before about the level three. So a the next question is you can only answer in yes or no for the first sub question. So my question is have you already gained experience with a broader view at ecosystem level 3.0 with an intra institutional approach means this C to C business approach, right, with the banks function as the market orchestrator. Did you already experience something like this?

INTERVIEWEE: Actually, it's a very limited. And we haven't started like orchestrating the partners yet. But at the end of this year we are planning to launch our platform in our mobile app, which would create a platform that partners can, come and embed their services within, like, various verticals that are, that are applicable for customers life, like car management, home travel, health, transportation, etc.. So until this time, we have limited offerings in our platform and also like embedded services within different platforms for sure, but it was very limited with the like campaigns, like a marketplace, which is very limited with some products like technology products, let's say, within our app and also like, AI based insights, which are generated from the transactions of customers. So until this time we are developing, this kind of services since 2018. But now we are

shifting towards building our ecosystem, and it would be like, more holistic and it would integrate these kind of services within different, verticals, let's say.

INTERVIEWER: Understood. Yeah. So you're on the way for developing and. Exactly. Yeah. Widen your ecosystem. That is cool. Perfect. Then let's jump to the next one. So can you tell me something about how is this customer to customer matching happening? Right. Via data analytics and machine learning. Or which ML processes or function are used to it? Can you tell me something like this? What methodologies you are using for.

INTERVIEWEE: Yeah. Actually we have like in-house, analytical models, that use, customer data and like using by using this data, leveraging on, this data offering like products and services of, the bank. But we are not sharing this information with third parties right now. In order for them to use this data and like, propose their, solutions to our customers. So it is very limited right now. however, we have like an, we have partnered with the, financial technology firm that in 2019 and we are using their algorithm, in order to create financial insights like proactive AI based insights upon their, financial transactions. But it is only, only limited with our banking data. But right now, we are expanding that database with the open banking, aggregation and the aggregated data from, different banks also. And we will now, generate insights, in a more holistic way, with the different banking, banking, banks, data, if the customer has already linked, other bank accounts to us, However, in Turkey it is still very limited in terms of like the banking and platform services, because we can only see the only the account data of the customers in other banks, but not the credit cards. It's still, I mean, only the accounts, let's say at the end of this year or next year, the mid of next year, hopefully we are waiting for the regulatory sources, the regulatory authorities, to open the way, for the credit card data also. And in Turkey, the credit card data is, very important in terms of like understanding the, behavior of the customer because lots of people is using their credit cards, in terms of like shopping and like expenses, they are not using their accounts. So, we understand them in a very limited Perspective right now, but we are trying to expand it, let's say. But for the inter-institutional data sharing it is very limited. I mean, we can only share the data with our holding companies. For example, for insurance products, let's say, we are not I mean, issuing, insurance products, but we have a holding company, doing that. So we are sharing the

customer data with them in order them to, I mean, offer insurance products or like, wealth products, let's say. But it is limited again, I should say.

INTERVIEWER: Okay. Super. Yeah. Very interesting. Especially also to the data sharing, processes. And also looking forward, right. I mean, it's only a part of the picture of the holistic customer view, as you said, account or the banking account is only one part and it depends on the behavior of the customer. Some people are credit card orientated, some only use a current account. So it depends on the customer, but I understand. I understood you that, it's getting very interesting and or getting at least a bigger picture of the customer while integrating the credit card. So let's see. I'm interesting to see what the Turkish market is, or the regulatory is doing. So, let's have a look on that later. Yeah. Perfect. Exactly. Okay, then I would say let's jump to the last question of this first research question. So means how do you see the acceptance of a scale beyond banking ecosystem and the associated customer matching at this level? Two and three on the customer and provider side? And there's a second question. What organizational effects does this have and or what other new role concept does this create right. Also for you maybe for the x.

INTERVIEWEE: Yeah. Okay. That's a good question for me. Firstly, I should start with, the acceptance of, like, skills beyond banking ecosystems is like maturing. I mean, growing, let's say, in Turkey. Yeah. I mean, banks, has started, these kind of offerings, not only banks, by the way. Also like different, different sectors, like, travel, like fintechs, like e-commerce, etc.. They are trying to embed, like, financial solutions into their ecosystems also. So it's like a two sided way, in terms of banking, offering, so it's growing, and, I mean, banks, the traditional banks, like us, let's say we are not that traditional, but in terms of the sector, we are like a deposit bank at the end of the day. So, I mean, the idea of building ecosystems is growing. And also the, the executive, the upper management strategy is also going to that way, since they see that we need like new, value areas, new revenue generation models, etc., because they saw that it wouldn't be enough to only, serve, for only banking products and also services because lots of, other institutions are starting doing that. So, we are, I mean, not losing, but we are, in a threat of losing our competitive advantage in terms of banking products and services. So they understood the value, and, I mean, since we are a bank we are not able to offer like,

Other partner services. I mean, we cannot, directly generate revenue from, these services, like, I mean, having those, products in our, platforms, but we need to, create, generate revenues, indirectly, like, directing the customers to these kind of services. And also, like the, data that we collect from them in order them to use those services, because, for example, today, a customer doesn't need to enter a their car data. I mean, if they have a car, they don't have to, enter the car or save the car data, to a banking app. But with the new design, with the new ecosystem, perspective, we are asking them to enter their card data in order to use, for example, like parking, services of a partner or like, in order to show them, the maps of, the charging stations, to them, and so on, so on. So, this would, I mean, this this kind of, experiences would give us like, in order to create more, personalized services, services, and create new revenue streams for us. So, in our organization, in our bank also, it shifted, the it's quite a mind shift in terms of the organizational, roles. And my role is, I mean, in the example, let's say, of this mind shift because I mean, before like 3 or 4 months ago, we have an open banking, department under this, under our team, however, the open banking, department, merged with the ecosystem idea. So, I mean, in terms of, our bank, they also understood the value, in terms of, like beyond banking ecosystems. And, the management has changed, and I believe in a very short period of time, we are just, I mean, now designing, the ecosystem. And we are also like, define the revenue generation, items, let's say, revenue generation models, by us, however, probably in a very short period of time after we see that, okay, we get like new, revenues from, this, experience, I believe we would, create a more, Hi. How can I say more, independent, managerial organization in terms of ecosystems. Now it is very linked to like our mobile app and also the digital team. However, probably in a very, mid-run, or long, long term, we would create a more strategic positioning for this role. I mean, this, this area, let's say.

INTERVIEWER: Are very interesting, especially also to get more independent, right? That you maybe also can more start as a startup. I mean, maybe you already doing, but, as I hear out of it that you also be more, Yeah, independent because probably.

INTERVIEWEE: We would be very limited in terms of like revenue generation because probably after the regulatory Forces. The authorities see that, okay, banks are generating new revenues, from these kind of platforms. Probably

they would limit, and they would we have now lots of gray areas in terms of platform economies in Turkey. However, after like some time after some maturity, market, because also, as I said before, lots of banks are doing, trying to, build their ecosystems, in their platform. I mean, the regulatory authorities from some time after some time, like, forbids or limits, these kind of, offerings. So probably we will need we will need to find another way, in terms of, like having, these revenues from this kind of business model. Yes. And I think it would be, a different positioning in the bank.

INTERVIEWER: Very good. It's just my personal idea. Indeed, indeed. But quite comprehensible meaning of you. And I kind of sense what you are saying, so it makes sense from my side, what you're saying. So thanks a lot. And for this, we really finished the first research question, but also the biggest one also three. So we are good in time still. So thanks a lot. So far we go ahead to the next one. So let me introduce you. How can machine learning and data analytics methods be used to develop and implement effective beyond banking sales signals or sales impulses, and what specific use cases show how they impact sales performance in the financial sector? So and therefore we start with a hypothesis a hypothesis or it's a thesis like I'm saying. Or my expectations say there's still a lack of clear business models and the necessary skills to utilize the potential of beyond banking. Do you agree? Explain your.

INTERVIEWEE: Yeah, I actually agree with you. As I explained, I mean, in previous questions, there is an agreement that, we don't have, like, clear business models and skills we are still lacking in, like, fully, utilizing the, beyond banking potential. I mean, we are, like, having baby steps, on that right now in terms of, like, Turkish banks, since the regulation and since the environments, the markets, priorities, let's say. So, I mean, we are very limited on that.

INTERVIEWER: Okay. Super. That's a good statement. Thank you for that. Let's jump to the next two sub questions to that. So they say okay business case or use case very limited or no use. Just started baby steps and so on. And so what can you say about use business cases in the stage of level 2.0 from the third party to customer approach?

INTERVIEWEE: Yeah. For level two zero, the use case is more like the personalized like financial planning or insights, that we are also using in our bank

that I have explained before about like, AI based, financial insights and like, personal finance management services, products and also like, the loyalty programs or like campaigns. We have and we are using the data, the customer data in terms of that, But not more than that. For 2.0. Okay. And. And I mean, in order to in order to share the customer data in, I mean, we need to anonymize the customer data in order to share with a third party. So it's a very limited understood of offering.

INTERVIEWER: Perfect. Thank you. And then let's jump again to the stage three is what can you tell me about this about use business cases or maybe the planning business cases. You see more in the future.

INTERVIEWEE: Well we have talked about this but at the end of this year we will have a platform for three zero, use cases. We would offer like different services, in different verticals that, the customers have lots of financial transactions to tackle with, like car management, house management, wealth management, health management, etc.. So, these kind of verticals, we would, like to focus on, and within these verticals, we would like to have like partners for, contextual partners, contextual services that could fit these areas, and also partners which are like fintechs, which are like the, e-commerce, firms. Also the governments, as I said before, and these use cases would not only about like financial, transactions, but also, for example, like, finding car parking areas, Is a mobile app or, valuing your car that you already owned or valuing your, house, kind of things. And we would like, merge these services, which are banking products also. For example, if the customer, evaluates, I mean, values, his car from this area, we would also use that data and we would offer a car loan. If he wants to change his car in a very short period of time kind of things.

INTERVIEWER: Of course, that makes total sense to make this cross-selling there.

INTERVIEWER: Perfect. And I also hear a bit like, this parking situation or parking use case could be also or parking, I would say parking slash electronic charger stations. You can also do it perfectly in the 3.0 approach, where all customers in this ecosystem can say, okay, I'm you or I'm using or are blocking this car spot right now or not. I make it free so other customers can see. Cool. It's free or the charging station is free. I can use it for my own purposes and after this I use it. I can also say it's not blocked anymore. It's open for free. Maybe you can also

incentivize people like this. So it's also quite interesting to make this from this, this this whole park parking spot or chargers charger use case. You can super do it in the 3.0 approach. Yeah it's really nice for.

INTERVIEWEE: Some time I mean for some time after launch. I mean, since we want to make our customers to use this platform, probably these services would be free or very. I'm a very, small amounts of money. We will get, so probably I mean, the traffic would, would be very high, once we launched this, platform. So after they get used to it, maybe we can. I mean, maybe we can put a price, on these kind of services, like, finding a spot for parking, etc., and also, for example, for travel use cases. In Turkey, we see that, nobody is, offering services for travel in a more holistic way. For example, we would like to offer them like eSIM offerings, which most of our customers are not aware of. I mean, in Turkey, most of people are not aware of eSIM opportunities that they can use in, abroad, for example. So we also want to use innovative services under this ecosystem in order to justify them. Why would they use this area? Because they, they can also find these services in different platforms. But, we want to make them. Okay. This is a banking app. This is a secure app. And you are like, logging in this, app, like, every day, maybe. And we know you better. We know you very well. That's why you don't have to think about, the transactions, the payments, etc.. We are giving you the opportunity here to manage everything about your car or manage everything about your travel. And this place will be very smart. I mean, if you want to use. I mean, we don't say we want to use, but, what I'm after using this data of our customers that they can open to us. We would like to give more personalized offerings, more, value added reminders and insights to them, so that they would use this platform, actually.

INTERVIEWER: Yes, indeed. Totally. Fine. Understandable. Good insight. Thanks a lot. Let's move on. I would say to the next one. So means now we are focusing on the possibilities of dimensionalization and scaling of beyond banking ecosystems. So the question would be, first, how do you assess the possibility of dimensionalization and scaling of beyond banking ecosystems? Do you do you know, I mean you as a decision decision maker or maybe you know, other decision makers that you are aware of these possibilities of dimensionalization.

INTERVIEWEE: Well, actually not everyone is aware of the dimensional dimension in elevation of and scaling of the beyond banking ecosystems. It's more

like right now, test and learn environments here. Because, it's been a very short period of time that we see these kind of examples in the markets. I mean, in abroad, I mean, in global, we have lots of, good examples, like for platform economies or, like beyond banking ecosystems that builds like traditional banks. However, in Turkey it is very limited, as I explained in the previous questions. So, I mean, probably in, 1 or 2 years, when they understand that, okay, This kind of offerings, this new, verticals, this new dimensions would create new, revenue, for, bank. They would probably understand the, possibilities right now because they, I mean, for, for our, our bank, let's say they didn't see, a major, revenue from the two zero. It was very limited. But, I mean, after three years, zero, that we, we will build upon this year that they, probably they see, in a more concrete way and they, believe for I mean, they, they would okay for scaling this ecosystem.

INTERVIEWER: Super. So you say test and try and after testing and you see or your decision makers understand or will understand. okay, this domain or this branch we are tackling with our embedded offers are really successful. So we expand and also scale this domain. Right. So it depends on test and try and put future potential. Yeah. Matters right. So let's see. So thank you. That's also an interesting insight. So then let's go ahead to yeah. Beyond banking sales signals. So my question is does your company or other banks, you know, use beyond banking sales signals? (..)

INTERVIEWEE: Well, we actually we cannot use right now, since we don't have the, platform yet. But I mean, for other banks, I don't know, I don't have the idea, but probably they they use it because they are getting like they are, building up partnerships with different third parties, in terms of like offering their services in their banking platforms. So they are probably sharing signals and also sharing data. And we are also planning to do that. But right now we are not doing it in a full potential.

INTERVIEWER: Okay. So you see so what you're saying is that you have it in your focus. But let's see, with the later, environment you will create. So then you can maybe focus on your data driven recommenders. Right as a beyond banking sales signals. Or you can also forward it to maybe a sales team. I mean, it depends how you would like to do it right in a sales team. Or you say, come, we can also do it. Yeah. Data driven based. Right. So online automatic. So. Okay. That's that's fine. Good to know. I mean.

INTERVIEWEE: In order to, in order to expand that usage, I mean, in order to, I mean, after the test done. Because we need to trust that, third party platform if this, signal is, concrete, it is, I mean, constitutes a sales opportunity for the bank or it's like a fake, fake fake signal, let's say. So. The accuracy, the consistency, it is important. So probably it would take some time. But, we are trying to build upon, I mean, in, for the first day that we have started the, the strategy, the ecosystem beyond banking strategy, we are trying to, create infrastructures to get, right, signals from, third parties, platforms, etc.. Yeah.

INTERVIEWER: Super. I would say you really, finalize in a good way. The last question. So thanks a lot. We can head direct to the last research question. So we are more going now on. Yeah. Like criteria, factors of, of a successful or successful creation of a scalable banking ecosystem. So means let me introduce the last research question. What are the most important influencing factors and evaluation criteria for the successful creation of a scalable, beyond banking ecosystem? And how can these factors be integrated into the technical design of the model? So my first question will be, a yes or no answer. So are you aware of the use of a guideline concept, framework design or what else? Blueprint for the creation of a scalable, beyond banking ecosystem in the banking sector.

INTERVIEWEE: Yeah. Actually, we don't have a, a specific blueprint, to follow. However, we have a very wide range of, desktop research, before we start this project in terms of, like, global, examples, not only for, banks, but also like other other platforms, other sectors like Uber, Airbnb, kind of, platform economies, like, fintechs that are also, embracing this beyond banking strategy. That's also so it's a very wide range of, desktop research and strategy, work at our side. We are not get consultation for from different consultants. Performs it like it is like a in-house consultancy project. So we, get the, successful and successful examples, and also the failures, as well, and we tried to build upon a successful ecosystem strategy at our site. And at the end, we knew that, okay, it's like a different environment. It's a different, country and banking system. So not like all the recipes, would fit for us. So we knew that we need to. I mean, get into this area. We need to launch our first MVP or let's say, first scalable, Ecosystem. So we believe that it would be like a test and learn environment. That is why for the technical design model, we wanted to create an MVP with not like investing a lot with the like we I mean, we need to

integrate different parties, right? The third parties into our platform in our banking app. So we wanted to see if they are, if they would go, I mean, if they would be successful or not. So, we don't want our partners to develop the process as, like API because they need to, like, create investment for that, because they are not ready for like API. So they will be, for some, not, for all of the partners, but most of them would give us, the web views. So we would like, once a customer would like to use a partner service within our app, and if he clicks on, the related services, we direct them to a web view of, the partner, in the first phase, let's say. But after that, if we see that. Okay, it is like most of the customers are using it. So we needed to I mean, develop, I mean, build upon this experience. We would go with like APIs of the customers and we would like, embed their services with APIs. I mean, we would also design their UIs, etc.. Did I make myself clear?

INTERVIEWER: So we can move on, really to the last question of the, this research question so means so you talked about the strategy. That is good. And now let's go ahead to the key influencing factors and criteria. So means which key influencing factors and criteria can determine the value of a successful banking system. Do you know some or which key influencers are really important for you and the bank for example?

INTERVIEWEE: Yeah. Actually we firstly, we, try to understand what are, already acquired customers, once. So, in the last three years, like, 30% of our customers is newly acquired, with the digital onboarding, facilities, let's say, in Turkey. So we expanded our customer base in a very, like, exponential way. That is why we wanted, firstly, with this kind of, strategy with, with beyond banking strategy, we believe that firstly, our existing customers would, use this kind of solution because, I mean, in order, customers, in order for customers to use this kind of solutions. Mostly they would like, their main banks to offer these kind of services since their, major data, they are opening their day major data, let's say. Or they are frequently use their main banks. So, it is a very important to understand their behavior. The micro segments, let's say, that would fit, with this, with the new verticals that we want to offer. So, I mean, at first hand, we tried to understand the financial potential, both in the, in our existing customer and also, for the sector because, I mean, some other banks and some other institutions also doing this, but we wanted to be, more differentiated, in terms of like value proposition. So we

both, make, intra analysis and also like, the market analysis, the ultra analysis. Firstly, once we started this, strategic framework, let's say. (..)

INTERVIEWER: That's interesting. Maybe let me ask another question. If you would like to design a beyond ecosystem, I mean, you're already doing like this, right? You're already starting and figure out some business cases. What are the maybe the, I would say the attributes and which are the most important arguments for you for a successful design of such a beyond banking ecosystem? Just saying. Give you some examples. Maybe who which is the stakeholders, which are the, the third party providers? I mean, the, the, the quality of a third party provider, maybe the amount of the third party providers, maybe the performance of the, ecosystem outcome and so on. So, I mean, I give you some attributes, but you can also confirm these attributes that I mentioned, or maybe you have some others. What is really important for this ecosystem?

INTERVIEWEE: Yeah, actually, I do agree with you. I mean, I was also, would like to mention those, criteria that play, so if you start with the partners, I mean, it is very important to integrate the partner services that would fit with the agenda, the, strategy, with our company. Right. Because, I mean, it's kind of risky to open your platform to services because since the users would, I mean, use or buy these kind of services, starting from your platform, whether or not it's the WebView or you are telling that, okay, this is a partner service. It's not a service. You are, opening, I mean, you You are very open to risks. Since the customers are having this, services from your platform. So, I mean, after sales support, and also the trust, I mean, trustable partners, is like, a major issue in terms of building up an ecosystem. And I mean, as we know, the customers behavior in Turkey, maybe it is, I mean, similar with, other countries, maybe your country as well. However, it is very easy to like blame on, institutions, whether if they are not happy with the service they, buy. Because right now it is very easy to, talk upon with the social media and etc., you know, so, with, I mean, thinking about our brand image, I'm putting this kind of, partners here, would, would create a risk, for us. That's why, we evaluated these partners in a very, holistic way with the regulatory environment, with regulatory teams. Also the, like our communications teams, if they believe this kind of partner would fit with our strategy or not, etc.. So it was a major issue for us. And, I mean, we we need to stick on this because we're gonna

expand the platform. And, I mean, we should stick on this idea, I mean, while expanding with new verticals and new use cases, etc..

INTERVIEWER: So, I hear out also, it's important which, partner you would like to integrate in your ecosystem, is it fitting to your brand, to your agenda of, you know, also the the values of your bank, right. And, I also hear out, right. The technical. Technical. Yeah. Fit as well. Right. I mean, there's a partner who will come from external side, and there has also to somehow integrate in your IT, infrastructure. So there should be also harmonization right of of happening. Yeah. Yeah. So interesting.

INTERVIEWER: Yeah. So very interesting insights, reputation, technical integration and so on. Also and what you say about the what is the outcome, right, of our new acquired customers and our existing customers for the ecosystem to have like a yeah. What happened before and nowadays scenario. Right. What is a difference. Right. For the revenue outcome. That's very interesting. Super. So epic. I would say we really answered, for example, for especially you answered the three research questions in a really good way. I really love to listen to you. And so, so I would like to head to the really last question, like more like closing questions. We talked a lot about possibility chances. Opportunities. Right. But let's have a short eye on challenges, challenges and risk. You already mentioned one risk before about the potential partner, about the brand reputation. And what about when I buy in a partner that don't have good reputation or that I annoy my customer? That is not cool. But let's have a look on, first on the 4.1. How do you would like to categorize the challenges of the ecosystem? Construct 2.0 and 3.0.

INTERVIEWEE: Actually, we were very careful. And we are not, like, sharing the customer data with the partners. I mean, it was very limited with, like, campaigns and, with the like, as I said, like personal finance management kind of solutions, but they are, like, more anonymized. And the partners couldn't understand what the customer is looking like, what are their behaviors, their like, lifestyle, etc.. So it was very limited. And we, we weren't facing, like legal and it risks because we were like, taking consent From the customer and we are not like using the data. In terms of like our products and services, it was very limited in terms of like giving insights or like doing campaigns kind of solutions. But now with three zero, we are moving beyond banking. Actually, literally we are moving beyond and now the, the limits, the, how can I say the sector limits also, is,

becoming more transparent, let's say, because, I mean, we are a bank, but we are trying to sell, train tickets or like, solving, like gas stations, etc.. Okay. So it is going beyond And, we would face, different risks in terms of that. More like technical and legal, risks in terms of that. And also like after sales, risks. I mean, the customers could blame us, if they are not happy with the service that they get from here. Okay. So, it would also, create, risks on our brand image, as well. So we need to be careful, while building this building and expanding this, ecosystem approach.

INTERVIEWER: And I already hear you are heading to the next one. Right?

INTERVIEWEE: Extent. But yeah, I can move for the legal risk side. Yes. As we talked, in the previous questions, the legal authority is not, like, limiting or, They are not. They haven't created a platform approach yet. For banks. I mean, we have open banking, we have aggregation, we have, service banking, regulations. However, we still don't have platform banking, approach in, in a sense of, regulatory. Okay. So, we have lots of gray areas. We are just, like, copying each other or copying global examples. So, we we are trying to, I mean, understand our limits in terms of, like, banking, regulations. Not for, like, beyond banking regulations. Okay. So the regulation should be, like, more, how can I say more, understand the beyond banking areas, and beyond. Banking. (..) How can I say the possibilities, by the legal authorities and they should think of and they should, create a more concrete infrastructures. Now, it's not like that. That is why, for example, our legal team, is, limiting our thoughts in a very banking perspective. And from a banking standpoint. So we are we have a very limited area to play. Okay. And, I mean, it is it is, on the contrary, let's say, the regulatory is opening the digital banks, I mean, and also the, like the new digital players. But it's not the same issue for banks. They're just limiting us, okay? They're just, Are trying to create a more competitive environment and they're doing this. So, we also need, more concrete regulation in terms of this area. And I can move on, if you like, for the it risks as well. Thank you. Since, the partners that we want to, embed the solutions here, I mean, they are not mature as a bank's infrastructure, right? They are like more small companies, maybe fintechs, maybe, like, not not more technically matured or, and in a cybersecurity way matured. So, for example, while we integrate, we want to integrate this kind of, solutions. Our banks want to want them to apply, our standards. However, they are not ready for those standards. So, for

example, we would give them some period of time to, make them ready for these kinds of, standards. Or until that time we are not using their API, but we are just, directing the customer to their platform only. So, I mean, if you want to expand this, area, the it is also is a major issue, in terms of, in terms of, like, making more sustainable, service offering, platform. (..)

INTERVIEWER: Yeah. Sounds good. I'm thinking about other ideas, but yeah. Harmonization of of course both it systems is important and it's also important the cybersecurity what you're mentioning. And also especially, I would say, the regulatory issue. Right. I mean, now they are getting integrated in the banking ecosystem means it depends on the use or business case. But in the most cases, I would imagine that they also have to be more restrictive with the data and have to be more careful about the banking data. Right. So, even with their out, no, their experience or no previous experience of of having relationship with the banks, it can be that they also need more training. Right. For how they can implement such, banking, migration topics. There's also another case. So it's also some previous experts said to me, it's sometimes better to cooperate with a partner who is already experienced with banking. Otherwise you there's so much, or so many, are like expanses and work only to make the partner fit for the banking ecosystem, right? So, I guess, can you also confirm like this?

INTERVIEWEE: Yeah, exactly. And I mean, in that sense, maybe our IT teams or we as a business team, would need to consult the partners, if you want to. I mean, have their solutions in our platform. We need to consult them in order them to meet the criteria for our of our platform. So, yeah.

INTERVIEWER: Perfect. Okay, then I would only ask you the maybe the last, risk question. What other risk maybe are there outside here? I figured out an example that the bank is a market orchestrator in their specific role. Maybe you can mention like this bank as a market orchestrator is are there some risks? Or maybe you can also either mention some other risks as you want.

INTERVIEWEE: Actually the example is a good, topic that we can talk upon that, but maybe I can add some other stuff as well. I mean, if the banks would, orchestrate the market in terms of like, I mean, we as a bank or other, traditional banks, we have in sector the tier one banks, etc.. Since our main, area is not, like putting these kind of services in our platform, we don't have, like, know how, in terms of building ecosystems, for example, since I'm a digital, person and I am,

creating experiences for digital platforms for most of my career. Let's say it's not a big deal for me to design a process to design, a product or service or experience in terms of like digital for a digital platform. However, since, I mean, we have a traditional bank, for example, if I go to, law department and if I ask, I mean, this kind of, beyond banking, area questions, let's say, I mean, if I have questions while building this ecosystem and if I, want them to, talk upon this or, in order them to consult me in terms of the risks and stuff, they are very limited. They have a very limited knowledge in terms of, like, beyond banking, since it's not regulated or organized yet. And in terms of our bank, it is. It's still I mean, departments, the strategy is not, or it's it's not originated from beyond banking because our main, main business area is not beyond banking. Okay. It's like a complementary area, right? Area right now. So probably we need to become more flexible in terms of like, offering these services. Also our IT team, I mean, they have they have like, experience in terms of, integrating third party services in our platform. However, I mean, it would be the first time that would integrate a partner services, a standalone partner service, in our mobile app. So, I mean, again, I should say we are testing, and probably we have lots of learning. And if we, get a successful story from here, probably we need to think about our organizational structure. Again, I mean, reading redesign, revamp, let's say.

INTERVIEWER: Super. Sounds really good. Epic. Do we would like to add something there, or are you good?

INTERVIEWEE: And also, as a bank, since we are a very, a very big, very, very big organization. I mean, we are not like startups, so we are not quick like them. We are not born digital. We are, transforming to digital, as you can imagine. So we are not naturally digital, and our identity is not, that quick like them. So, for example, if I'm also the financial technology firms and like other platforms, Other sectors are also embedding financial services to their experiences. As we know. So we want to be quick. We have to be quick. But, I mean, as a natural character of, banks, traditional banks, we are not like that. Our systems are more, complex in order to integrate a new service or, I mean, if we want to integrate the service, we need to ask, like, hundreds of people in the bank, okay, if it's okay or not, if it's, like, applicable for the bank's strategy or not, etc.. So this decisions are I mean, not quick as the other firms. So, as I said before, we need to like, build fast track, models, for

this kind of business strategy because it's not like our, standard, like traditional banking products and services. This is a new, era. It is like, I mean, we need to, shift our mindset, that we are entering a new era and business model as a bank. Other than. I mean, if you don't do that, we cannot be successful because we have lots of, like, rivals, and they are very fast competition, right?

INTERVIEWER: Especially the speed I hear out of it that you have to be more transformed. Maybe not startup, but, somewhat at least, faster that you can, go along with, competitors. Of course. That makes sense. Yeah. Epic. Thanks a lot so far. I would like to give you a bit a space for the last overall question. It's not mentioned here, but is there anything you would like to add? Statements or some remarks, some recommendation, some other risk or opportunity something you would like to mention or are you fine?

INTERVIEWEE: Well, I can say I'm very excited, in terms of like, building this kind of an experience in banking environment, because I was like, as I said before, it's like coming to 15 years. I'm 12, 12 and 12 years in banking sector. So we are we are shifting towards, actually, it's not in a very, in a very fast way, because I remembered that, once I have started my, career in a bank in like 12 years ago, we were also like, we are talking about open banking, like financial technology firms like Beyond Banking, solutions, englobal etc.. So we are not very fast in terms of, having these, offerings in markets, in terms of maybe it's because of our country's regulatory environment and also maybe the conjecture of the economic, environment. However, it's not, going very fast. So, but besides, so I mean to say that we have, we are talking, about, the beyond Banking three zero, I think we are in a good position. In terms of my company, I can say, because I believe that, we can I mean, add value. Both for the bank and for the customers. And it's a very exciting area, for our customers. So I believe that we would create a great journey, great experience in our platform, let's say. But we we should be aware of, our risks, and we should, like, take precautions in order not to fail, in this, in this environment, let's say super.

INTERVIEWER: And thank you so much for your last words.

APPENDIX 13. Bank Customer Survey: Questionnaire**I. Welcome page:**

" Dear participant,

As part of my studies, I am conducting a survey to investigate the customer's acceptance of Beyond-Banking services, i.e., to what extent customers are prepared to accept non-banking offers. The survey takes a maximum of 5 minutes.

Your opinion is invaluable to my research, and I would be very grateful if you would take the time to participate in this survey. The survey is anonymous and your responses will be treated in the strictest confidence. Please answer the questions as honestly as possible to help me understand the uptake of Beyond Banking services.

Thank you for your participation in this survey. If you have any questions or concerns, please do not hesitate to contact me.

Kind regards,

Sebastian Voigt"

II. General questions:

No.	Question	Response scale
I	What is your nationality?	List of countries in alphabetical order
II	How old are you?	Free text input
III	What is your highest educational qualification?	Basic school qualification, Secondary school leaving certificate, A-levels, Completed vocational training, Completed Bachelor's degree, Completed Master's degree, Completed doctorate
IV	Which gender do you feel you belong to?	Female/male/not specified
V	Marital status	Single, Married
VI	Number of children	Drop down list (number)
VII	What is your monthly net disposable household income in EUR (or USD)? Disposable income is the money that is available from an individual's salary after he/she pays local, state, and federal taxes	Input field, then split into quintiles for evaluation if necessary.
VIII	Do you prefer to live in the countryside or in the city?	Country/rather country/rather city/city
IX	How digitally savvy would you rate yourself?	Not at all (0) ----- Very (10)
X	Which bank are you a customer of?	Private bank (e.g. Deutsche Bank, Commerzbank, Postbank, etc.) Co-operative bank (Volksbank, Sparda Bank, etc.) Public-law bank (e.g., savings bank, Country bank, etc.) Direct bank (ING Diba, Comdirect, DKB Bank, etc.) Neobank (e.g. N26, Openbank, Revolut, Tomorrow, etc.) (multiple selection is possible)

III. Situation 1:

Imagine your bank offers Beyond Banking Services. These services go beyond the traditional banking business and are usually offered via a third-party provider.

Examples: A bonus program that rewards purchases at various (online) shops with discounts or cash refunds to your account. You can also book holidays or hotels at a discount directly through your bank.

No.	Question	Response scale	Notes	Scala type
1	How important are such offers to you in principle?	Not important - Rather not important - Neutral - Rather important - Important		Likert
2	If you receive benefits from these offers (e.g. discounts, cashback, wider choice of offers, availability, etc.), are you considering using or purchasing these offers?	No - Rather no - Neutral - Rather yes - Yes		Likert
3	What advantages are most important to you?	Discounts and refunds Broader range of products Sustainability Save time Price-performance ratio Quality Longevity Brand trust Prestige Innovative features User friendliness Design Availability Customer service Guarantees and warranties Other: Free text		Multiple selection possible
4	Which offers from the following areas would interest you?	Electronics Clothing and fashion Health and beauty House and garden Food and beverages Leisure and entertainment Sport and fitness Car and motorbike Office supplies Pet supplies Other: Free text		Multiple selection possible

5	Would you share your personal data with the bank (and, if applicable, the third-party provider) so that you can receive these offers in return?	No - Rather no - Neutral - Rather yes - Yes	If no or rather no, skip to question 8	Likert
6	What data would you be willing to share?	Personal information, Contact information, Demographic information (e.g. ethnicity, nationality, education level, occupation, income level, etc.), Online activities, Health information, Preferences and interests, Financial information, Professional information, Technological information (e.g. device usage, software and applications used, internet service provider, etc.), Other (e.g. membership in organisations, voluntary work, political affiliation, religious beliefs, etc.).		Multiple selection possible
7	By analyzing your data in greater depth, banks can send you more suitable offers tailored to your	No - Rather no - Neutral - Rather yes - Yes	If no, rather no or neutral, skip to question 8.	Likert

8	How much EUR (or USD) would it be worth to send your data to the bank?	Cash bonus: Controller from 1 to 1000 EUR (USD) or Other arguments are more important to me	If you decide to favor the "cash bonus", skip to question 10; if "Other arguments are more important to me", skip to question 9. (not possible to mirror these filters in the questionnaire → this question is not mandatory)	Numerical/decision
9	What else would your bank have to do for you to be willing to transfer your data?	More favourable products Access to exclusive financial products Good service More social and ecological commitment Other: Free text		Decision

IV. Situation 2:

Imagine that you, as a customer, can interact with other customers of your bank and conclude purchases or sales of services (analogous to the first situation), something that has long been possible on social media platforms such as Facebook, Instagram, and Co. The bank acts as a marketplace operator to bring suppliers and buyers together.

Example: You own an apartment or house and need tradesman services. You find a suitable, cheaper, and available tradesman through the bank.

No.	Question	Response scale	Notes	Scala type
10	How important are such offers to you in principle?	Not important - Rather not important - Neutral - Rather important - Important		Likert
11	If you receive benefits from these offers (e.g., discounts, cashback, a wider choice of offers, availability, etc.), are you considering using or purchasing these offers?	No - Rather no - Neutral - Rather yes - Yes		Likert
12	What advantages are most important to you?	Discounts and cash refunds Broader range of products Sustainability Save time Price-performance ratio Quality Longevity Brand trust Prestige Innovative features User-friendliness Design Availability Customer service Guarantees and warranties Other: Free text		Multiple selection possible
13	Which offers from the following areas would interest you?	Electronics Clothing and fashion Health and beauty House and garden Food and beverages Leisure and entertainment Sport and fitness Car and motorbike Office supplies Pet supplies Other: Free text		Multiple selection possible

14	Would you share your personal data with the bank (and, if applicable, the third-party provider) so that you can receive these offers in return?	No - Rather no - Neutral - Rather yes - Yes	If no or rather no, skip to question 17	Likert
15	What data would you be willing to share?	Personal information, Contact information, Demographic information (e.g. ethnicity, nationality, education level, occupation, income level, etc.), Online activities, Health information, Preferences and interests, Financial information, Professional information, Technological information (e.g. device usage, software and applications used, internet service provider, etc.), Other (e.g. membership in organisations, voluntary work, political affiliation, religious beliefs, etc.).		Multiple selection possible

16	By analyzing your data in greater depth, banks and providers can send you even more suitable offers tailored to your needs. Is this interesting to you? Example: In the example mentioned above, you request tradesman services. Now, another market participant can offer you suitable tools or furniture besides the tradesman as a provider.	No - Rather no - Neutral - Rather yes - Yes	If no, rather no or neutral, skip to question 17. If rather yes and yes, then skip questions 17 and 18.	Likert
17	How much EUR (or USD) would it be worth to send your data to the bank?	Cash bonus: Controller from 1 to 1000 EUR (USD) or Other arguments are more important to me	If you decide in favour of the "cash bonus", skip to question 19, if "Other arguments are more important to me", skip to question 18 (not possible to mirror these filters in the questionnaire → this question is not mandatory)	Numerical/decision
18	What else would your bank have to do for you to be willing to transfer your data?	More favourable products Access to exclusive financial products Good customer service More social and ecological commitment Other: Free text		Decision

19	If you were a business owner, can you imagine placing your offers on your bank's marketplace? This would allow you to reach other customers and partners and gain access to additional networks.	No - Rather no - Neutral - Rather yes - Yes	If no or rather no, skip question 20	Likert
20	What offers would you then place on this marketplace?	Electronics Clothing and fashion Health and beauty House and garden Food and beverages Leisure and entertainment Sport and fitness Car and motorbike Office supplies Pet supplies Other: Free text		Multiple selection possible

V. Closing questions:

No.	Question	Response scale	Notes	Scala type
21	Would you share or link the data from your bank accounts with other banks, insurance companies, and financial service providers so that you can receive the best possible personalized offers?	No - Rather no - Neutral - Rather yes - Yes		Likert
22	Would the expansion of such offers increase your satisfaction with your bank?	No - Rather no - Neutral - Rather yes - Yes		Likert
23	If your bank offered such services, how likely would you be to recommend the bank to others?	NPS		Numerical

24	With regard to your bank's digital platform, are there any other services you would like to see? (For example, having your tax return prepared digitally.)	Free text		Qualitative

VI. Final page:

“Thank you for taking part in this survey!

Your answers have been saved.”

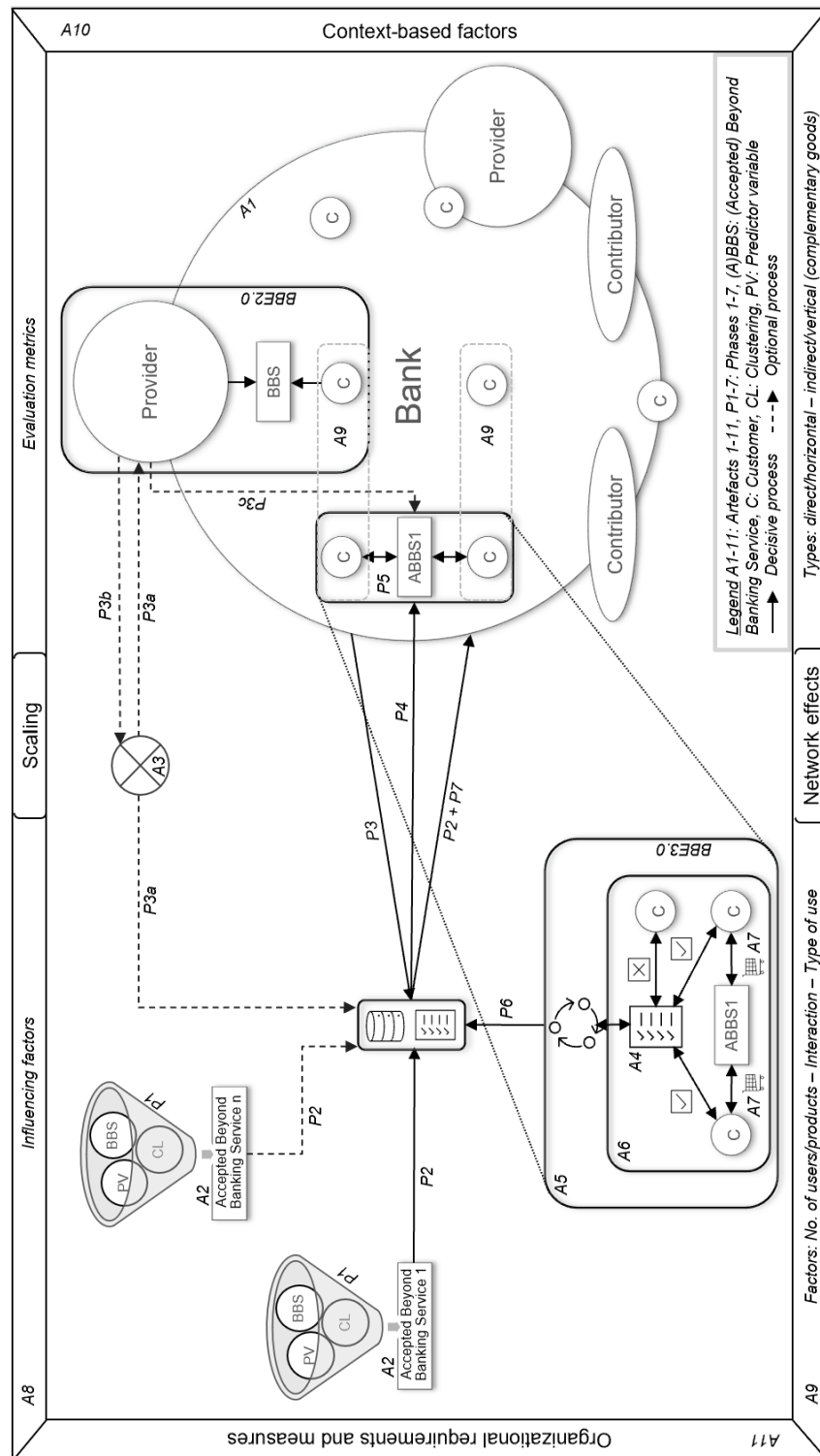
APPENDIX 14. Bank Customer Survey: Raw Data Results

Due to the file size with 584 entries from completed survey participants, the exported Excel file, hereinafter referred to as “survey_data_beyondbanking_2024.xlsx,” will be attached to the thesis submission process.



survey_data_beyond
banking_2024.xlsx

APPENDIX 15. DSR – Eval 1: Design M1



APPENDIX 16. DSR – Eval 2: Expert Interviews – Questionnaire

Semi-standardized expert interview with XXX (position/role)

Interview date: XXX

Type of information provided: Video call

Research topic: Conceptualizing and Designing Scalable Beyond Banking Ecosystems Using Machine Learning and Data Analytics Methodologies

- I. Introduction:
 - a. Thank you for participating
 - b. Introduce yourself and the purpose of the interview.
 - c. Explain the research questions and their significance in the context of banks, platform ecosystems, especially beyond banking, and the phenomena of inter- (2.0) and intra-institutional customer matching approaches (3.0).
 - d. Procedure: Conversation approx. 60 minutes, narratives important, no wrong answers
 - e. Confidentiality and data protection: Recording of the video call, confidential treatment of all data, all personal data will be pseudonymized, transcription, obtain consent
 - f. Questions from the interviewer
- II. Background:
 - a. Ask the interviewee to give a brief overview of their role and expertise in the field of banking and platform ecosystems.
 - b. Explore the interviewee's knowledge and experience with Beyond Banking, Ecosystems, Machine Learning, and Data Analytics.
- III. Evaluation of design specifications
 1. How do you evaluate the artefacts (A1-12) of the design?
 2. How do you evaluate the processes/phases (P1-7) of the design?

3. How do you evaluate the use of specific design tools and methods?
4. How do you evaluate the framework factors surrounding the design?
How do you see the positioning of these factors as framing artefacts of the overall design? Please pay particular attention to and take into account the scaling concept for ecosystems.

IV. Review of the research hypotheses on the design objectives

1. To what extent can you validate the following research hypotheses as design objectives among the artefacts and phases used in the overall design?
 - a. H3.1: An exemplary, conceptual implementation design can be used as a blueprint for banks to strategically align scalable Beyond Banking Ecosystems.
 - b. H3.3: This design approach offers considerable added value for banks and customers.
 - c. H3.4: The scalability of BBEs (Beyond Banking Ecosystems) is given despite banks' technical and infrastructural challenges.
 - d. H3.5: Decisive influencing factors and evaluation criteria can determine the value of a successful BBE.

V. Additional evaluation criteria for the overall design

1. Feasibility
2. Accessibility
3. Comprehensibility/meaningfulness
4. Clarity
5. Simplicity
6. Elegance
7. Completeness
8. Level of detail
9. Internal consistency/correctness
10. Applicability

11. Operationality

VI. Conclusion

- Thanks for providing information and participating
- Possible question about further interview partners
- Information about evaluation of results
- Approval

APPENDIX 17. DSR – Eval 2: Expert Interviews – Transcript from Expert 11

INTERVIEWER: So let's start with artefacts 1 through 11. Do you understand them, or is there anything missing? How would you rate the artefacts at this point?

INTERVIEWEE: Okay, so A1 is understandable, that's the bank itself. That's understandable here too. Really? The one that a bank, as mentioned in the comment before, the one we're still talking about in this discussion, so we're talking to a bank. That's my basic assumption.

INTERVIEWER: Exactly, we are always just one bank, which, um, so we are only talking about a banking ecosystem that includes various providers, as you can see, or other contributors who can be included here. Or it could be the customers who are represented here in this banking cosmos.

INTERVIEWEE: Exactly, exactly. And that also means that it largely excludes cooperation with other banks. So that means that the ecosystem, now the ecosystem of Deutsche Bank with Commerzbank, Sparkassen, etc., in this model, there are no external connections to other financial service providers, or would that be the case?

INTERVIEWER: That's a good question. Honestly, it's a good thought. I've completely forgotten about that. I had actually forgotten that, or maybe I never considered it in the first place. Looking at it now, it's a good idea, because my later consideration is also... I mean, what others? What other dimensions can I take into account? So, an ecosystem can consist of various participants, as you rightly say, not only providers, but also other banks. That's why I think we already have the first area for improvement here. I would also like to add another bubble here, because another bank is a possibility. Maybe I would also like to acquire new customers through another bank or match them with each other. Yes, or maybe a bank can offer a special service that I myself cannot yet provide. And then there was another cooperation. So all of that is conceivable. I've limited myself a bit to this bank, but on further consideration, it's entirely conceivable. That's why I think it's good that we're talking about this now. Even the first suggestion for improvement. I would create another bubble here, not just from a potential perspective, but to see exactly what else could happen. Yes, exactly.

INTERVIEWEE: And me? I actually don't know to what extent the banks cooperate with each other, because, well, if you look at it very broadly, yes, I can

very well imagine that a provider, Company A, is represented by several banks at the same time. And the KYC processes, i.e., new customer processes, are very similar. However, I can imagine that onboarding at Bank A does not necessarily lead to onboarding at Bank B. Also, that the clients are simply separated from each other. So the two banks would be opaque to each other and would not necessarily be interchangeable. So that would be a model under certain circumstances. (..) Jump out of this system, so to speak, and something like that. Okay, so you're talking about Bank B's Beyond Banking System, and they're not really as well connected as hoped. So the focus there is actually on banking services, i.e., financial services, and not primarily on this connection business. So here, where I'm very tough, too tough. Where I'm really just acting as a pure intermediary, but exactly. Is there a possibility? Okay. (4) Good.

INTERVIEWER: Exactly. So what do you say, for example, A3 is already moving in the direction of, oh, now here at the top, sorry, this is the merging of the matching criteria of the provider and the bank. I'm asking about service and also your company requirements. Are they compatible with us? Yes, that will then be merged here. That's artefact three. (..)

INTERVIEWEE: That's understandable. Exactly.

INTERVIEWER: Exactly. I'll take another look, where are we now? Let me take another look myself. Four That then goes towards A5 Matching Engine, which is then selected again here, i.e., microservice, and in this Microsoft A6, this data matching itself is included. (..)

INTERVIEWEE: So, if I understand A6 correctly, that means that we are actually acting as an intermediary, with the bank merely serving as an intermediary between Company A and Company B.

INTERVIEWER: B Exactly, so customer A, customer B. Exactly.

INTERVIEWEE: No, no, I think that's right. The presentation is actually a bit complicated. Also because of this poputeilchen a3, a6, a4, which then transitions into this box ABB bb**INTERVIEWER.** That's it. (..) Maybe it could be presented a little differently. Because I get the impression that the whole thing happens outside the bank. What actually happens? It doesn't have to be that everything happens within the same bank.

INTERVIEWER: Yes, that means you see this data hub. (..) Within the bank, right?

INTERVIEWEE: Exactly. I see it, or at least I understand that it should be located within the bank. Unless the bank is not in a position to provide this service. Or it still uses some third-party provider for it. Otherwise, I would. This whole box is framed by the bank. The bank is this Petri dish. Petri dish for the further development of these services.

INTERVIEWER: Great point, that's why I left everything open for now to see what you say. Perfect. I've made a note of it. Good point. You see it within the bank. Yes. Perfect. (..) Exactly. Moving on to the phases.

INTERVIEWEE: Exactly. I think it all fits. I don't see any conclusion to the phases. Both in terms of the very last phase, P7. (..)

INTERVIEWER: Exactly. P7 is the last phase. Right?

INTERVIEWEE: Exactly. And what happens again in P7? A derivation from P6.

INTERVIEWER: Okay, matching takes place. Feedback loop. I have new insights, the model is better trained, and then, using this same stream, where P2 is also evaluated at the beginning, this aebe and banking service within the bank, I would say, is a song. In general, this same strand is then used later to say, okay, I now have new insights here, and then, let's say, new customer matchings can happen. That means you would probably see it again, right? Okay, P7 now points to the bank, to the icon, but what happens? So that maybe a new matching happens together, where I say, let's say, new matching takes place, because A9, for example, is described here, is such a classic network effect that I say, okay, with these new insights from P7, I now get a new constellation, because now this key with this customer can suddenly connect from the model. Maybe it makes sense to feed this arrow into this new constellation, where you say, okay, that's happening now too. So I think that works now. I think it's going in the direction you said. Yes, exactly, exactly. That might be better.

INTERVIEWER: So what happens with P7? It's just a matter of presenting the result better.

INTERVIEWEE: Exactly, what happens with P7 and what is the end result? So where does this journey end? Is it simply with matching? So here, like lead

generation in principle. Or you could say that your model only ends when the contract is concluded, so to speak. You could also think that. (4)

INTERVIEWER: Good point. I'll make a note of everything. (...) Yes. Thank you. Perfect. (4)

INTERVIEWER: Just a moment. I have one more question. That's why. Perfect. Good that you're paying attention. I'll ask it right now. Very good. Ah, yes. Perfect. Yes, great. Then jump right in, because I'm running a little short on time. (...) So, I have various things here. (...) I'll call them designs, i.e., tools and methodologies, in other words, just objects that I have designed. (...) How I used them. Is that okay, or would you say no, that's a circle now, I see a different shape or different methodology behind it. For example, I also mentioned data matching, , microservices. (...) Are the processes presented as well as they are in the clarification? Or would you say no, something is missing or needs to be different? (...)

INTERVIEWEE: I would be careful with the term microservices because, for me as a techie, it has a direct connection with technical microservices, so that there is actually a process behind it at some point. That doesn't quite fit in the presentation because here you are referring more to the various actors and processes, and IT is of secondary importance to me, at least. That's why I would perhaps rename it.

INTERVIEWER: Otherwise, what exactly should I rename? What do you mean? Microservices? So really the term microservices?

INTERVIEWEE: Exactly.

INTERVIEWER: So, should I refer to this as a model data matching engine or what? What would you prefer to see here, for example?

INTERVIEWEE: Um. Maybe just matching matching process or something? Or an IT-controlled process. (...) Which could possibly be a microservice. (7)

INTERVIEWER: Okay. Perfect.

INTERVIEWEE: And then there are these bubbles, Contributor Provider, even twice, Provider. That's not explained at all on this slide. What are these terms and why did you put them very marginally in the bank and then next to Provider right in the middle as a subset, so that it might need to be clarified, okay.

INTERVIEWER: Yes. (..)

INTERVIEWEE: Because for me, I currently see this as an expression of what the bank can be, i.e., the bank as a contributor, the bank as a provider. But what is good? The customer? (...) Yes, they are located in different phases or areas of the bank. That's also a bit unclear.

INTERVIEWER: First, let's talk about the framework factors. Exactly, the ones you described earlier, or rather hinted at. Outside. I've come up with a few, I'd say several. I also have different designs. (...) I've experimented a bit, experimented. I haven't presented them uniformly, so that I can ask you which one you prefer. So you see factors in all directions that naturally influence, let's say, the scaling factor, and fundamentally influence this design. Yes, of course, there are scaling factors at the top, context-based factors under contextual banking network effects, which are also driven by potential in this ecosystem, and also a little bit on the left. Okay, there are also some preconditions for the organization. Is the bank culturally set up to build this in the first place? What other prerequisites are there for a bank to be able to build something like this? For now, just in general, what do you say? Is that understandable for now, or what do you say about the framework factors? (..)

INTERVIEWEE: I think that's very cleverly put in German, because you've outlined the framework conditions and you've drawn up a framework. I think that's really, really well done. (..) When naming or describing, for example, influencing factors, for me these are all influencing factors. So network effect is an influencing factor, right? That's why it's a little difficult to understand here. Are these all individual influencing factors? Evaluation, matrix, content-based factors? Or is any of this an umbrella term, for example, skilling network effects?

INTERVIEWER: Well, that's basically why I've presented it here in different stages of development. The central term is really in the middle, and then on the left and right are the explanatory factors, so to speak. Or let me say how you can distinguish between them. Scaling There are influencing factors that contribute to this. Of course, there are also metrics to measure this. So it's all about making a banking ecosystem measurable. How can I scale something like that? That's why I've differentiated between left and right here. At the bottom, I've differentiated the network network effects a little more, let's say, in more detail. That's why I've just left the left and right sides with, let's say, the umbrella term. Mhm, you say okay,

left, right, I like that. I don't want anything more than that, because the rest is self-explanatory. Or would you prefer to have more context at the top, north or south? Or do you think that might be too much? So that's my question. That's why I left it open. What would you prefer?

INTERVIEWEE: Hmm, I would do that. I would actually do it in two parts. So, if you have this model in the middle, then I would put the influencing factors separately and in more detail on the second slide, on the second page. Then you would also have these two levels of presentation directly in the model itself. And then again, which factors influence the success of your model or the success of the Beyond Banking approach.

INTERVIEWER: So you simply don't want this framework to be shown here, but rather it should be included separately and not taken into account here.

INTERVIEWEE: I would present it separately, i.e., leave the framework as an image, give more space and more context for the individual factors, but simplify this model considerably. So that you really have a few short arrows in the middle, so that you don't have to because the problem I had at the beginning was that I tried to understand how these framework elements interact with the model itself. I thought maybe it's influencing factors. (...) Only on the left-related elements. Apply or also evaluation matrix only on the right.

INTERVIEWER: It was a bit misleading. Understood?

INTERVIEWEE: Exactly. Exactly.

INTERVIEWER: Yes, okay, that means talking about the good things. So you would say here that my personal opinion is simply that the model is already relatively detailed and very well put together, and therefore, to embed it even more with labels would, in my view, overload it. But you would say okay, you'll leave the model as it is and put the framework factors on a second page and then in a simplified model where you can integrate it directly. That's how I see it. Okay, understood. A good point. Yes. That means you would present two different design models in two models. Simply in this more complex one, but then with few labels or without the framework, and in the second one, a simplified process and then the embedding of the factors.

INTERVIEWER: So now I want to take my design objects, and as I explained, I want to represent a banking system for Intra C2CMatching, and those were my

four research hypotheses, which, let's say, contribute to that. Yes, to this design, that's okay, I want to create an implementation or a design that serves as a template for such a banking system, which I can use strategically. The second would be okay, it really provides more value for the bank and the customer. Yes. Mhm. And how does this scaling idea come into it? Yes, especially with these frameworks, with these frameworks, factors. How is that evaluated? And yes, there are decisive influence factors evaluation also within the framework of the, or in, let's say, taking into account the framework criteria. That's exactly why I'm here now with all the construct relationships. How does it now relate to the individual hypotheses? The hypothesis for hypothesis is actually based on the four. How would you evaluate that? Yes, so let's go to hypothesis 3:04. Would you use this design? (...) Does it provide a strategic template for banks? How does that fit in? I'd like to jump back over there. (...)

INTERVIEWEE: So, a concept like this: Conceptual design can be used as a blueprint for banks to a line scalable beyond banking. Ecosystem. Strategic value. (5) Exactly. So here. I think I'm getting a little lost myself. Because you say yes, for banks, that's meant in the plural. And then scalable beyond banking ecosystems. But for me, this Beyond Banking Ecosystem. (..) Singular. And in a specific bank. And then I can, I can definitely say. Well, I can already use this Beyond Banking Ecosystem Singular as a blueprint. I know exactly where I can say, "Well, with this I can bring my customers together or extend my services to my customers." Yes, I buy that.

INTERVIEWER: Okay, understood. So, from the bank's point of view, it's wonderful when viewed in the singular. Let's move on to three six. Yes, this approach delivers. This design delivers value for the bank and the customer.

INTERVIEWEE: Yes, yes, definitely. And what perhaps strikes me is that the framework of the work, but I would also be interested in a little excursion into evaluation criteria. So, the matching of customer to customer. Perhaps as a little food for thought for the continuation of the work or further work of this kind. Work of this kind, because I believe there is a lot of potential there. The fact is, the man has an enormous number of customers, and the bank knows its customers, but in some cases only fragmentarily. And if you imagine now that I have a corporate customer advisor, I know my customers, I may not know those of my colleagues

across the, um, yes, northern Germany works, if I'm in southern Germany, that's why this matching would interest me more.

INTERVIEWER: Wonderful. Good point. Very much so. Yes, sounds good. Then to three. Seven. (..)

INTERVIEWEE: Credibility is given scalability. (...) In context, given that we have a bank, a bank like this and its customers, I do see somewhat limited scalability. So it's limited by the number of customers and by the bank itself. What I would like to see is, when will we have this breakout to the outside world? Because right now, for me, it's all in the hands of one bank. (..) Technically and infrastructurally, I don't really see any problems, because you can either build such a solution yourself or have it built and also commission it. So this framework could also be developed outside the bank and then simply used as a product. But currently, in this model, I don't really see any connection to other banks because of that. It's all limited by the customers. For me, everyone is.

INTERVIEWER: As mentioned before, you have to include this bubble of other banks, saying, "Hey, I want to include other participants, including banks, in order to do justice to this idea of scaling or to potentially expand it." Yes.

INTERVIEWEE: Exactly, exactly. Or how? How do you deal with non-customers? Does there always have to be a conversion to customer? And what about customers who we... (..) Maybe those who have potential, but who we don't currently authorize as bank customers, or are not allowed or willing to accept as bank customers?

INTERVIEWER: Good point. Yes, I've already thought about that. But apparently it wasn't presented that way. Yes, so that's a good point. Yes, thank you. Perfect. Let's move on to three. Eight. Um. Back to the influencing factors. Evaluation criteria that a yes offers. Can determine the banking ecosystem. (5)

INTERVIEWEE: Exactly, exactly. I thought it was also presented quite well visually in the design. On one page, you have these pipelines, checkboxes, and lists, which also generates added value. And which factors influence the whole thing? And can you control the factors yourself? I would also find that an important point. What? What would be the critical influencing factors? So what are hygiene factors?

INTERVIEWER: Good point. Yes, yes, the distinction is also interesting. I certainly have influencing factors in the (...) In my research, I also describe, explore,

and evaluate them. The question is, of course, to what extent can you package such a design so that you... Design always has a certain size that I can use. Otherwise, it becomes too much. You can't take everything into account in the model. But yes. Good point. Perhaps a distinction as well. Maybe you can incorporate it exactly as you said. Hey, then I'll make a second model, simplified again, and try to present it in a more detailed and distinguishable way. Yes, okay, great. Thank you very much for incorporating the hypotheses. So far, because they are also in this first evaluation stage. So this is my first draft. You are the first to see it. That means it can only get better. And again, more precise, so great. We'll move on to the second block, and here you can see 4811 evaluation criteria for the entire design. Let's just go through it again, point by point, to see whether it meets these criteria or not, or what you would say needs improvement, let's say feasibility. So visibility. Um, how would you rate the overall design? (..)

INTERVIEWEE: This one. (..) Currently, I would almost say that there is a lot of potential if you don't know your banks as intermediaries. When I imagine myself as an individual customer, I always think that I am alone and that the bank is there for me. Why should I care about others? But in reality, customers often have problems that could be solved quite easily with help or advice from another customer. (...) That's why I believe that a mindset change would certainly be necessary for some customers, but many would be open to it. You basically have a treasure trove of verified companies here. The bank knows its customers and so on. You could also consider exclusion criteria and say, "No, this connection or match would not be effective, so we don't offer it!" You also have to provide some kind of control. On the other hand, I also see that some customers naturally want to remain anonymous and not get too involved in the banking relationship. So I would also have an opt-out option, which I would like to provide. (...)

INTERVIEWER: Opt out. Would you also want to see this process? As a final thought, so to speak. Now I've agreed to it once, I've signed up for the service as a contract. Would you also want to have the option to opt out later?

INTERVIEWEE: Yes, yes, I think that would be better.

INTERVIEWER: Okay. Great.

INTERVIEWEE: Hm. (..) I would. Off the top of my head, I would say that accessibility is pretty good because we have a lot of data on our customers. And

even more so for entrepreneurs, customers, and corporate customers. That means that since this experience, this kind of knowledge, is already there as a basis, you could say that you could round it off with further information, perhaps a deeper look into the services or the needs of the customers. But all of that can be easily added to the model, where the subsequent delivery of data is still done by the customers. So it's a given.

INTERVIEWER: Wonderful clarity, the meaningfulness of the entire model. (...)

INTERVIEWEE: I think the model makes sense to me too. At first, it wasn't entirely clear to me, because when I think of an ecosystem in general, I see several players, so really an end-to-end relationship. In this case, I first had to define for myself what I meant by ecosystem, but only in the context of a bank and its customers. And for me, that's almost too little for an ecosystem, I feel. I feel and as. (...) The resulting problem, I think. It could lead to every bank building its own ecosystem. (...) For its customers, i.e., bank plus customers, where the customers then mix internally. I almost said that such an ecosystem should take place without banks, but how to do that is then more complicated. (...)

INTERVIEWER: Let's simplify things, because it's a complicated issue. First of all, for clarity's sake, let's talk about the model. (...)

INTERVIEWEE: If I understand the above, then, then, then everything is clear in principle. So it's about the relationships between customers, where the bank acts as an intermediary. So that's not a problem at all.

INTERVIEWER: Okay, perfect. Let's get straight to simplicity. You just mentioned complexity, but it's complicated. How do you see simplicity in the model? (..)

INTERVIEWEE: I think that's kind of the rule of the game. The first time it's explained, it's not quite so simple, but the second time around, you understand everything. (..)

INTERVIEWER: Okay, especially with the phases I mean artefacts, which I've explained here. I mean, you could of course add a sentence to each one, but then the question is, how overloaded would such a model look? (..) I mean, a model is basically a fundamental thing, right? An illustration always has to be described per se, and any work, that is, an image should always raise the question of how to

classify it; it is a model, or very much so. I once tried to represent a complex model in a simple model. (..) A more complex phenomenon into a simple model is, of course, always the challenge of making it understandable at first glance and not overloading it with information. But because illustrations usually always have to be explained, described again. Textually, that's fine. But you mean that it still has to be understood at second glance?

INTERVIEWEE: Exactly, exactly. I think so too. I'm always torn between wanting to show all use cases and possibilities in a model, or saying we'll take an example of customers A and B, no external factors, no other processes, and run through that as an example. Maybe that would also be an approach. Or using examples, for example. (..)

INTERVIEWER: Okay. Thank you very much. Now let's move on to elegance. Now it was very simple. Is it elegant enough? Do you see that? Or is it exactly the right match to say? Does it fit? (..)

INTERVIEWEE: I think there's still room for improvement. I think if we sleep on it for a few nights and really look at where we can go with it? Um. Um. Delete everything that doesn't fit, then it will be a little more elegant. A little simpler.

INTERVIEWER: So, elegant direction. It needs to be presented more simply, more plainly.

INTERVIEWEE: Exactly. Simpler.

INTERVIEWER: Simpler. Okay. Thank you. Completeness. (5)

INTERVIEWEE: For the situation. (..) Um. Yes, good. But here we are again. Completeness versus elegance. And Simplicissimus. Um. Other banks have deliberately not been included in the presentation, nor have the authorities themselves or other controls, for example. I think that's all summarized in these. (..) influencing factors. That's why I think you can say that everything that isn't shown can be seen in this context. So it fits perfectly for me.

INTERVIEWER: Thank you. In terms of the level of detail. I mean, you notice a bit of the double-edged sword that is simplicity in terms of the level of detail, but maybe try to address that again. Is it detailed enough, or how do you see it? (..)

INTERVIEWEE: So actually for that. For readability. (...) You can still leave it as it is, but for readability I would even say that you should add more detail to the model and perhaps work with values or colors. So that you don't always have

to go down to the key. So that's perhaps. You could perhaps make two representations. So, one is this complete scientific work and the second is an application example where you work with signatures. For example, P1, P2, what does that stand for, so that you can recognize it right away from the arrow? (..) So, using a model means that I always have to go to this key and there are a lot of abbreviations that I don't understand right away.

INTERVIEWER: That means I had even described some of it beforehand, that I really used keywords or short sentences to describe this process directly on the arrow instead of using P, P1, etc. Would that also be your opinion? Or would you say I could do that? I mean. I notice that you do a little bit. It would have an explanatory approach and also help to understand this model better. So would you say that I should probably embed small labels or explanations in this model?

INTERVIEWEE: Yes, yes, for example, by using verbs or nouns. So what happens with the process or data evaluation, classification, storage, or something along those lines?

INTERVIEWER: Okay, wonderful, thank you. Let's move on to internal consistency. Correctness. (..)

INTERVIEWEE: It was consistent, consistent, and correct.

INTERVIEWER: Perfect. Short and sweet. Applicability. (..)

INTERVIEWEE: Applicability. (...) I have. So now I have a bit of a feeling when it comes to customer relationships. You use this model to represent something, let's say relatively complex, but you turn it into such a complex process. But it could be reduced to the fact that, hey, we have customer A and customer B talking to each other and so on, talking to each other and looking. (...) How you create added value there. That you. That the bank really only sees itself as a contact initiator or a bit of a mediator in this case. (4) And then there's the suggestion. Okay, can't we do this with AI support or something? Or with IT support to do this evaluation? But if you don't look at it that way, then it's so simple. Customer A talks to customer B and identifies the business opportunities. (..)

INTERVIEWER: Okay, perfect. Move on to the last point. Whether it's operational.

INTERVIEWEE: Feasibility. Yes. (...) Very feasible, in fact. If you were to take the MVP approach. It's really as simple as, hey, we have our customers here, they have a specific need, and that need could be matched to the capabilities of other customers. So it's, um, it's very, very feasible in itself. (..) Very, very easy to visualize. And of course, with the number of customers, other IT considerations immediately come to mind. But basically, it's such a people business and you just have to understand the customers really well, which is what we do.

INTERVIEWER: That sounds great. To conclude the second blog. Thank you. That's why I would say, let's move on to the third one. And that too. Especially because I've said it here and now I have it in front of me, I'd like to go back to the technical criteria again. Especially the idea of scaling, i.e., an ecosystem platform business. We live off scaling, off the network effect. (..) Exactly. And that's why I have two more points here. I haven't elaborated on them yet, but here are two thoughts. How do you see it again? I would say that the properties assets in this model are moving towards modularity and, well, contacts. Availability is through APIs, which I haven't shown technically yet, but how would you classify it now? I'll say this sentence in this model for further elaboration. Or do I perhaps not have to? So this modularity? Or is that just okay? The design is presented like this and that's enough? I mean, in the end, the API is just a technical implementation and the arrows reflect that. How would you want it integrated? Or maybe you don't want it at all, or would you actually take the design into account, so to speak?

INTERVIEWEE: I would actually leave that out. In my opinion, that makes the model more elegant, because you have to have connectors to other systems for evaluation purposes. That's just the way it is! Modularity could also be taken into account in the second, third, or fourth step and you could say, okay, as a customer, do you only want access to certain modules or do you only want to provide certain parts of your data and not others? That would be a great fit. You could say that you only work with the data available internally to create an evaluation and connection. Or you could add any other system. All of this requires something to happen technically in the background. But if you just focus on the essence, you interrupt customers who have nothing, and they are fulfilled with the help of other customer offers. You don't need IT for that, because it's really just a personnel matter. I would even put forward the thesis that it would be a kind of business conference. All our customers and everyone throws a piece of paper into the room and says, "Here, I

have a song," and the others raise their hands and say, "Oh, I have something for you, that wouldn't be for you either." An example of the implementation of this model. (...) So that the customers sort themselves and the space is provided by the bank, so to speak. (...)

INTERVIEWER: Okay, so that means you don't see this reference to modularity and connectivity here yet, because that gets too technical and the design should first represent, let's say, an understanding or at least a technical design. Where you say, okay, modularity and connectivity should be presented as a given or seen later in the implementation. Yes.

INTERVIEWEE: Exactly. Exactly. And where it can be really interesting, and I really don't think it's trivial. In what form is this information, this news, provided so that it really adds value for the end user? (...) Just slap the keyword AI on it somewhere. Yes, but how do you recognize the news from the customers? Especially the things you might not even see at first glance.

INTERVIEWER: Exactly. Perfect. Sounds good. I have a second thought. Point. But I realize now that it actually already ties in with the previous sentence on modularity. But I'll just mention it again briefly, for the sake of completeness. Maybe you remember that in the workshops we also talked about trends in architecture. I don't know if you were there, but I want to briefly mention next-generation banking, where infrastructure models are moving towards composable. One direction. So I would say power principle towards modular, headless APIs. And what else was there, I'm thinking about it myself. Ah, cloud native. Exactly. So the direction of composable architecture is actually modularity. That's exactly what I described in the previous sentence, and we'll see it in this context as well, or the idea makes sense at or makes sense to pursue in principle, but should not be represented in the design. How do you see it?

INTERVIEWEE: I would actually only mention it in a subordinate clause, that the whole model is already in the cloud and modular and this and that. (...) Simply because that is the future of banking. And the capabilities in banks are increasingly modularized, be it teams or IT systems connecting to others. (...) Based on my experience, I would also add one more sentence: what about the data? We've been talking about the actors and the processes the whole time. Does the collected

and shared data still have to have certain qualities that enable and facilitate this exchange, etc.?

INTERVIEWER: Yes, okay, sounds good. So you would also see that in the design? (..)

INTERVIEWEE: As a framework condition or as a framework.

INTERVIEWER: Very good. So you could just include that as influencing factors or determining factors in the overall context, as you saw it in this framework, this framework construct, perhaps as an additional point. Data preparation, cleansing, properties. So you would see that as an additional point? Yes, good idea. Yes.

INTERVIEWEE: That's right, yes.

INTERVIEWER: Perfect. (..) We're done. Thank you very much.

APPENDIX 18. DSR – Eval 2: Expert Interviews – Transcript from Expert 12

INTERVIEWER: So, I'm going to ask a few questions that touch on a few sub-points. Um, and I'd like to ask you first, um, I've now presented the artefacts, i.e., 1 to 12. First of all, regarding the artefacts that are in this entire design, do you have any questions about any of the artefacts? Is that correct? Is anything missing? Just the artefacts for now.

INTERVIEWEE: Well, of course I can't remember them all by heart, but in the narrative they all made logical contextual sense.

INTERVIEWER: Perfect. Thank you very much. Then let's move on to the processes, such as the phases. So everything that has been presented from P1 to seven, I have now explained in this way. It's also comprehensible. Is anything missing? What do you say?

INTERVIEWEE: In the overview you gave, they make sense in terms of sequence and logic.

INTERVIEWER: Okay, wonderful. Then, um, I used certain design tools and methodologies, so to speak. Be it these constructs or any circles. It's simply a matter of the design. Here are a few filter logics. Um, does that work for you too? So, does the choice of design tools I used here make sense?

INTERVIEWEE: Well, I... I understood right away what you wanted to show me. Um, man, the... The question arises for me when I want to have it on a banking platform. There are three participants, that's three participants. (..) I might want to color-code them. Customer one offers a service through a matching process that can be given to customer two on the banking platform. Otherwise, yes, that's great. Visually, it would make it easier for me to understand why they are interacting with each other and why. Why are they interacting with the bank and why aren't they interacting directly with each other? Or why? Why do they prefer the bank as a platform for interacting with each other? Why? Why should an Autoscout seller not choose Autoscout with the buyer, but rather do it via the banking platform?

INTERVIEWER: Yes, I understand. That means you would, let's say, zoom out again and highlight the customers, the players, in color. That's how I understood you.

INTERVIEWEE: Well, I always think about why I'm saying this. I always think from the end customer's perspective and try to understand their motivation and benefit, why they would do that. And that's why I would always want to use a customer-centric approach to explain why everyone makes decisions based on their motivation. Doing business with each other and why they prefer to do business with each other using the banking platform and not with any other. What are the motives? What is the use? What is the benefit? What is the hypothesis of the benefit? Why would they do business with each other and why would they do it on the banking platform? It may be that I have a different reason. Yes, both actually want to exchange a service with each other. I'm looking for a craftsman. Yes, do it with me. But why don't you go to myhammer.de, but instead go to your banking platform? Those are two questions that need to be answered. (..)

INTERVIEWER: All right. Great. Then let's go back to the framework factors. So, I briefly explained the four cardinal directions you see here earlier. I have them in... Well, there are three different representations. The left and right are shown in the same way, the top is a little more detailed, and the bottom. Let me explain in more detail. First of all, do you understand the framework factors as being well chosen in terms of their integration, or would you place them differently? And then the second question about the information content: which side would you prefer? Yes, I'll leave that open for now. (..)

INTERVIEWEE: In depth, I can best understand network effects, because every platform, every artificial digital platform, thrives on network effects. Among other things, this means that the right people come together. Not, not. Not that I only have consumers and no providers. Then the platform dies relatively quickly. I believe that one of the success factors for such platforms is always the network effect.

INTERVIEWER: That means you would also want the same information for the other three directions. So, if you scaled up and to the left and right, would you want to see even more information, or would you understand it right away or understand it sufficiently?

INTERVIEWEE: What I'm missing is the definition.

INTERVIEWEE: What is actually meant by that and what kind of influencing factors they have when I look at the inner image. When I look at the inner image, I

want to evaluate it from different dimensions. I assume that these four sides are four dimensions, and I don't understand these four dimensions in depth from this diagram alone, so I can't say that they are important for evaluating the diagram in some way. I am familiar with network effects, so I can say more than just that it is a dimension. If you make it measurable well, i.e., with all dimensions, you can make a good statement about the overall picture of what you are planning to do. I am not familiar with all the other context-based factors. Scaling, influencing, evaluation, matrix. Yes, I can imagine what they mean. , organization requirements, measures. Hmm, I don't really have any idea right now what could actually be behind this as a dimension and how it would help me understand this system.

INTERVIEWER: Understood. Then I would like to ask another question from the previous interview. It became clear that these framework factors that you see there should be better embedded in the overall model. But it also became clear that it would be too much because of that. I would say that the model is already relatively packed with information, but the experts had pointed out to me that a second, i.e., a second design should be created. This would not be as detailed as the interior, but rather very superficial, but it would integrate and embed the framework factors that you see on the outside and explain them in this model so that it would be more visual and easier for everyone to imagine. That was their argument. Would you agree with that? Should I perhaps also put a second design next to it? Simplified, but then with the framework factors embedded. (..)

INTERVIEWEE: I wouldn't go along with that. Why not? No. My first basic idea is that you have to understand. Customer-centric. Who benefits from doing this B2C? Who benefits and why? And what is it? What is the hypothesis? What is it actually? What is it? What is the customer benefit? Hypothesis, why would people do that? You can show that in the first diagram. And then the question arises, okay, how do I prove this hypothesis and what does this hypothesis depend on? That's where these four factors, these four sides, I believe, come into play. Um, assumptions about network effects, assumptions about scaling, assumptions about measurements. It's more divided into two parts. So why should people do it? And then? I put forward the hypothesis as to why people would do it. And then I have to justify the hypothesis somehow. Measure, um, evaluate, uh, establish indicators. And I would see that more as something else. So I wouldn't mix it up. (..)

INTERVIEWER: Thank you very much. Very good, good insight. We can move on from there. (..) I'll go now. I'll jump over to the next slide. And that brings us to a couple of hypotheses. You already have. You've always advocated hypotheses and already mentioned them. Maybe not all of them, but a few of them are part of my overall research hypothesis construct. And these four contribute a little bit, or rather a lot, to my design. So let's go through them again. And I'd just like to ask whether you see them as validated, falsified, or only partially answered. Such an exemplary conceptual implementation design can now be used as a blueprint or used for banks so that they can then strategically use scalable beer and banking ecosystems. Do you see it that way? So we have to go back to this construct. Always keeping C2C matching in mind. Not just in principle now. Yes.

INTERVIEWEE: So, if I were a bank and I decided that the bank should actually compete with all the other digital marketplaces that exist out there . Like Ebay Kleinanzeigen, like Check24, like Autoscout, like Mobile and, uh, mein Handwerker. Where, where, where, where? Where customers already offer services and other customers can accept those services. So where I already have an explicit C2C market that has been established for years with various platforms, I ask myself as a bank, why should I also get involved in this competition? What? What makes me different as a banking platform? These are the colleagues or Cito matchings that take place at my bank. And why should I, as a bank, invest so much money to create a marketplace? Just so that they trade with me, even though I'm actually late to this competitive arena. That would be for me as a bank. As a bank manager, I ask why I should invest money in an IT infrastructure to make it happen when it has actually been on the market for 101520 years, that I, as a bank, as a bank, ask you.

INTERVIEWER: Exactly. That means you would rather pose the hypothesis with a counter-question and leave it open, or even falsify it and say, "No, it would still be questionable for me at this point and involve high costs."

INTERVIEWEE: Yes. Yes, so the benefit really comes from the bank's question: What benefit does the bank have if it gets involved in such a business? Because these are not new, they are rather very, very late to the market. What explicit benefit does the bank promise if it enters into this business, if it becomes a platform to enable it? And that would be the second benefit hypothesis for me. Why should I, as a customer, log into the bank to perhaps get a suggestion from them

about another bank member who offers me a service? I wouldn't expect that from the bank these days. Instead, I now know digital marketplaces by heart where I would look for something like that. So always the benefits from both sides. Why should the bank offer this? And why should the customer? What is the explicit benefit for the customer, that they actually allow other customers to offer them services via the bank platform? I know this isn't necessarily your hypothesis, but that's the question for me. Which customer-centric thinking is always the fundamental question: why should they come together at all?

INTERVIEWER: Exactly, there are no wrong answers. So everything you say is correct. That's why you ask yourself the questions, and that's a good thing! So I have to ask myself those questions and question exactly that. The ones in my model. That's why we have to work together iteratively. Um, thank you. And I can see that you already have. I've provided input for H3 six. So, back to this design. This design approach delivers value for the customer and the bank. I'll go back again.

INTERVIEWEE: Okay. Oh, this design. Yes, that's right. Yes. That has to be proven. It has to be. That's why I thought. Around it. These factors. That's exactly what I would expect. I. I. I'm currently thinking in terms of the classic Epic Lean Safe Process. I have an idea of how I can do business. And I have to evaluate it very quickly first. Before I invest a lot of money. I have to evaluate very quickly whether this. Whether the business idea I have and the benefit hypothesis formulated from it can be proven quickly. Proven means minimal cost to see if the desired customers are even interested in it. As opposed to first implementing it for five years, donating and investing 5 billion, only to find out after five years, when I'm done, that no one is interested in it. So I want the ones that are right.

INTERVIEWER: But that's exactly what I've taken into account here. (..)

INTERVIEWEE: So yes, phase one is actually to offer the Accepted Beyond Services as quickly as possible in a minimalist form. You know the term MVP, offering something minimalist. Whether it will even appeal to customers and make them say, "Wow, cool, where can I buy that?" And if there is appeal, i.e., so-called leading indicators, i.e., recognizing trends very early on, and you have no return on investment, which can only be calculated after years. So if you can use very fast indicators here that point to a fast trend, then you can say, look at these 100

Accepted beyond Banking Services or Beyond Banking Services. Of the 100, I have the top three where the trend indicators immediately swing. We could select those first. In the bank, then via ABBs. So they are accepted and then they run into your database and the database says here, based on the leading indicators, we already have the needle pointing to the first three and we could actually start implementing them in the bank right away because we know there is interest. So we go and we can also start in the bank, as quickly as possible, to build some quick prototypes or build acceptance platforms where customers can come together immediately. (...)

INTERVIEWER: Now let's return to this idea of scalability. This ability to scale is given the banks' technical infrastructure challenges. (..) Is this taken into account here?

INTERVIEWEE: Yes. It's in there. Yes. So, if you suddenly identify 90 out of 100 years of banking services. So 90% are accepted, then it's a win that the bank, if it wants to do business, should also provide stability. Of course, the cost of scalability must always be considered in relation to the potential profit you can make from it.

INTERVIEWER: Understood. Very good. Let's jump to influence factors in determining the value of a successful beyond banking ecosystem. (5)

INTERVIEWEE: I would even risk using too many indicators, because even with indicators, there is the assumption that they show me something, and suddenly these indicators don't work and don't tell the truth. That's why I'd rather have fewer, but good indicators that I know can show me an early trend, giving me more room for interpretation. That doesn't mean more is more, but it's a good principle. So I wouldn't just do it on scaling, but would want to apply it to all four edges.

INTERVIEWER: Okay, good, then we're done with the hypotheses for now. Now let's move on to my last blog. I have a few more evaluations or further evaluation criteria where we want to revisit the design. Yes, um, these are just a few key points that I'm throwing out there, and you say yes, no, or maybe, I'm asking you now. So now let's look at the overall design again. Now let's move on to visibility, i.e., feasibility. Do you see that as a given with this design?

INTERVIEWEE: Yes. So, the feasibility. It is feasible, technically speaking, for me to bring the customers together. But the feasibility also depends on whether

I want to do it. And the decisive factor is whether, even if I build the platform, the customers will come and accept it. So it's not just technical feasibility, it's also business feasibility. Will it also be a business?

INTERVIEWER: So I'm hearing a bit of acceptance there. Very good on the customer side. Accessibility. (5)

INTERVIEWEE: I just remembered that Deutsche Bank actually had something like that and started to implement it. A platform where I think external insurance providers could have gone directly to customers. (..) Accessibility beyond acceptance? Accessibility, yes, but the question will be, do I log in to the bank every day to get service? (..) Then I would have to force changes in user behavior to increase accessibility, because when I think about the last time I logged into the bank, it was ages ago, so I wouldn't expect to be able to log in often to get services offered to me there. That would actually be a customer benefit behavior that would have to be explicitly brought about somehow. Either through influence factors or I don't know. So accessibility? Yes, frequency of accessibility low.

INTERVIEWER: Understood. Thank you. Comprehensibility. Meaningfulness of the design. How would you rate that?

INTERVIEWEE: Well, I understood it right away. So I didn't have any problems. I hope. I hope I understood it correctly.

INTERVIEWER: I'm sure you did. I'm very sure of that. Let's move straight on to clarity. Is the model clear? How so? How I described it, what you see there?

INTERVIEWEE: The diagram is clear to me. Yes, of course I need your contextual background to explain it to me. I wouldn't be able to interpret the diagram on my own. And of course I need explanatory words behind it, i.e., a business background. The idea behind it is necessary. It cannot be interpreted on its own, not on its own.

INTERVIEWEE: I'm more of a fan of written context. So I'd rather read. What's the idea behind it? What's the benefit for the bank? What's the benefit hypothesis? What's the benefit hypothesis for the customers, why should they come together? That means I'd need a diagram, for example, to understand why these people should do business with each other in the first place. This diagram shows me how they would communicate with each other and what the introductory phase would be like to find that out. But the basic business

relationship you want to enter into is a bit hidden behind that. So I would have liked to see a pure diagram. Why and with what motivation should we enter into this business relationship? The second is the phase of finding out whether they want to enter into a business relationship at all. And the third would be how do I measure the acceptance of the business? So how do I measure according to the motto of hypotheses? What hypotheses do I make that this business relationship should be entered into at all? How do I measure that? (...)

INTERVIEWER: That's how it looks. (..) Great. Let's move on to elegance. How elegant is the design for you? Created.

INTERVIEWEE: Yes. (...) I would actually be strict and give it a 3 or 4. (...) A grade of three out of six.

INTERVIEWER: Okay. It means it has potential for improvement. In terms of aesthetics. Elegance. Okay. Yes, perfect.

INTERVIEWEE: Well, if I think about it, if you were to show a slide like this to a bank board member or senior management, for example, they would walk out on you within 30 seconds.

INTERVIEWER: Mhm. (..) Yes. Good point. Good. Of course, it has to be said that there is scientific work behind it. But nevertheless, I'm asking about the evaluation criteria. That means, if you say yes, you could say, I can keep that, but then I'll come up with another design that will be more attractive to decision-makers, so to speak.

INTERVIEWEE: As I understand it. Your dissertation is going in that direction. Um, to measure acceptance within the basis or on the platform of a bank. That has to be done, but somehow it also has to be monetized. I would say, monetizing the side effect. I also have to be able to pitch it. Should I pitch it, even if I want to pitch it? (..)

INTERVIEWER: Very good. I'm happy to take it all in. Sounds very good. And I already have a few new ideas that I can add. Very good. That helps. Wonderful. That's how it should be. Completeness. Is the design complete for you? Is anything missing? (...)

INTERVIEWEE: Um. Fundamental business relationships that need to be established. Cytosina's balance is understood. I would now ask myself, what are the incentives? What is the matter? Where is the bank's profit potential? Why? What

is the profit potential for customers? Why are they going together? So everything is based on the benefit. Fundamental questions are: Why again? Why should these business partners, customers, and banks come together at all? Because I would argue that it also incurs costs for customers to withdraw from existing platforms and switch to the bank. So, as I said, why should I close my account with myhammer.de if I can also get scaffolding rental services through the bank? You have. You also have costs for the customer per se that you have to overcome in order for them to come to the bank in the first place, which I would miss, for example. So the benefit must be so great for the customer that they are willing to accept costs, leave other platforms, and come to the bank.

INTERVIEWER: Very good. Next point. Level of detail. (..) How will that be introduced?

INTERVIEWEE: Yes, for the introduction. Yes. So, looking at the interview here, for the introduction and for a contextual, um, semantic discussion. Good. (...) Okay, so. So as. As. As an invitation card. Let's talk about it.

INTERVIEWER: Great, good classification. Thank you. Then let's move on to internal consistency, to the correctness of the model. (...)

INTERVIEWEE: Yes. So, as I said, if I see this as an invitation card, or let's talk about a topic, this is sufficient for my understanding at the moment.

INTERVIEWER: Wonderful. Let's move on to applicability. (...) Of the model? (...)

INTERVIEWEE: Um, okay. You'd probably have to clarify the question for me a little bit. Where is it applicable? Who applies it?

INTERVIEWEE: So I'm referring back to the word again. If I present this as a single-topic teaser snippet, can I go into a bank with the initial introduction and say, "Is this applicable for you?" The question that arises for you, for the bank, is always, "Why should I do that?" Why should I invest money in it? So it's applicable for a substantive strategic discussion at the bank about why they should or shouldn't do it.

INTERVIEWER: Perfect. Then let's move on to the last point. Then we're done. Operability. So now we're at implementation. How would you reconcile that with the design? (..)

INTERVIEWEE: There it is. There. You know, I have a strong background in IT and implementation. Yes, after seeing the diagram, I now have a very good and strong idea of how this can be implemented technically. (..)

INTERVIEWER: Perfect. Then I'd say we can wrap it up. Thank you very much.

APPENDIX 19. DSR – Eval 2: Expert Interviews – Transcript from Expert 13

INTERVIEWER: So, first of all, let's focus on the artefacts, i.e., everything labeled AS, i.e., artefacts from A 1 to 12. I still need to change the twelve here. I see that now. But I'll do that later. (..) Are all the artefacts I explained clear to you? Is there an artefact missing, or would you see it differently? First, just feedback on the artefacts. (..)

INTERVIEWEE: It's complete for me at the moment. Because my focus is not on method. I don't think the method is decisive. I believe that the creativity of the idealists is decisive for the strategy and for the customers of the respective company. Or something like that. I'm really not very good at talking about methods, but that seems fine to me. Vista Complete. (..)

INTERVIEWER: Understood. Perfect. Then let's briefly discuss the PS. I explained the phases like this. No, especially from left to right and in the cycle. Is that completely understandable to you? As I explained it, you were missing something. (5)

INTERVIEWEE: That's understandable. The feeling that the devil is in the details, right? So when you select a provider, the classic criteria of a procurement evaluation are applied. I can't judge that because, in terms of content, it's crucial whether the provider will still be around tomorrow or not. What capabilities it has. What kind of test of your capabilities? Because in the end, you need it where you yourself have no capabilities. In the end, what I see here is simply a meta-model. (...)

INTERVIEWER: So, so, that's how it should be. Exactly. So, I would like to give an overview of my research to date, i.e., which elements and artefacts are important in order to initially represent such a goal matching. That's why I have this filter logic on the left. This is based on previous research. I asked customers, "What beyond banking services do you want? Yes, um, what target groups, what classes does that result in? And then I want to combine this market experience with where our own bank customers are receptive to it. And then the whole further phase model comes through custom matching, which is actually still a sure-fire success because it's important. Of course, there is acceptance outside and also inside. And can I evaluate that somehow? No, and me too. I want that too. Do I want the right thing? The right service. For my bank. Exactly.

INTERVIEWEE: I feel like it's extremely difficult when you ask them what they want. Ultimately, you have to understand their jobs. And they can't articulate their latent needs, right? Nobody wanted to find them. Nobody wanted a smartphone, and that's why there's always the problem. When you're in a hotel, two or three on the road, the customer can't really articulate innovation. And that's why the jobs are interesting. But knowing that behind this metamodel there are artefacts that operationalize what you really want, it seems so coherent to me, right? But in the end, it's not in the hotel, but in the area that they then do there, I have to, if I. (..)

INTERVIEWER: Correctly understood. Very good. Then let's move on to the next point. I have used a wide variety of specific design tools here, including the visualization representation I mentioned earlier. Did you mention that a little earlier? Exactly. (..) Is the use of my visual representations appropriate from your point of view? You presented the ecosystem, i.e., a canvas, earlier. Then I explained why I think it's better from my point of view, as I explained. Does that also fit visually, or would you see something else there?

INTERVIEWEE: Well, you know, visualizations depend on the target audience. Yes, and to be honest, what you're sharing right now is mainly interesting for a technical audience, but unsuitable for management training. Yes, I agree. So the question is, as always, who are you addressing and what do you need to achieve your objectives? The question is how complex a model is. That ultimately determines how you have to visualize it. The question is also whether the people in the target audience know what you're talking about here, or whether it's more of an uninformed audience. And in the end, there's always the question of whether you want to inform or inspire, or both. Yes, that's why I always say it depends on the context. But what I see here at first glance is presented in a rather technical way for my role. I would probably prefer a different level of detail for the target group I represent.

INTERVIEWER: That's totally understandable. That's why. It's good that we're talking. Then I have a feeling. Okay, listen. From your point of view. Um. Who is the addressee? Did you describe it correctly? Exactly. From that point of view. That's exactly what can be thrown in. That's wonderful. Let's move on to the next one. As you can see, I already mentioned it earlier. The framework factors in every direction. (...) How would you understand them? First, in terms of values.

And then? What kind of presentation would you prefer? Because, as you can see, I've presented them differently in every direction. On the left and right, just the main keywords, with a little more context at the top. Yes. And under Network Effects, I've even described it in more detail. That means, first of all, you understand these framework constructs, these influencing factors that are supposed to affect the design or this model. And in the second step, which representation do you prefer? (..)

INTERVIEWEE: Holistically? For me, it's about customer value in the end and, as a second priority, company value. And in a third dimension, it's about cost-benefit. And how quickly we can get it back on the ground. And that's why I feel that what you're visualizing here is more of a business analyst's world. But I don't want to disparage that. It's just that for me, those aren't necessarily the decisive criteria, right? We often use a framework for new business models where we have desirability. That's actually the whole right side of the canvas. The customer benefits the customer. Yes, and then we have the whole ability- -dimension. Yes, that's about questions like how is it in business? The case is the launch strategy and so on. And then we also have an ability dimension that we look at, right? With the capabilities, we need partners to make it happen. Do you even click on the floor? Yes, that kind of question is always the question in the end. (...) Who operates with a framework and what do you want to achieve with it? Or for me? For me? I don't want to badmouth it. For me, it's too technical and for me, the most important point is actually the customer. Because I. (..)

INTERVIEWER: Great, thanks for the feedback. So the focus is also quite scientific and technical. But the idea is still from this framework, from this design. At least you're not the only one; another interviewer also said, um, it could be presented as a simplified model from a management perspective. Of course, that would be presented in a more elegant way, where, as you said, perhaps these customers would be shown to better advantage. But you're right, here it's scientific and technical. That's probably why it looks the way it does. The customer value is actually already achieved with the pre-filtered, accepted banking service through market analyses that I know exactly, but. (..)

INTERVIEWEE: Yes, exactly. So, good answer, and now I understand perfectly. So, for me, it's just a language you're using here. I don't want to

badmouth it, but that's business. Analysts spoke. As you correctly say, we've actually already found the business model. We've found the value propositions, we know who, how, where, and what, and then it's a matter of detailing and transitioning towards Meteore, then we typically need models like the ones you understand?

INTERVIEWER: Very good. Then I would say let's move on to point or block 2/3. Now we have, let's say, discussed the essential elements of the design. Now let's move on! I have four more hypotheses. I'll read them out and then you can tell me how they fit into the design. Yes, so first I have a hypothesis that says there is one or with this conceptual implementation design. So it's already moving in the direction of implementation design, which is why it's also technically scientific with this implementation. Design can be used as a blueprint for banks, for banks to be able to strategically use, let's say, Beyond Banking Ecosystem. How would you contribute to this hypothesis? (...)

INTERVIEWER: So no. Not from a strategic point of view. It's too technical for that. Scientific. Perfect. I think you've already revealed your reasoning before. But here you've summed it up again. So no. That's why. Wonderful. Give me direct feedback on how I've already justified it. I could turn it into a second design so that it deserves strategic relevance. Yes, exactly. Um. (...)

INTERVIEWEE: So, in our current strategy, we have areas of impact. And you have to use an initiative to show how you are contributing to an area of impact that you are prioritizing. You typically contribute to different areas of impact, and you can think of the areas of impact as a virtual update of the corporate strategy. So, areas of impact are derived directly from the corporate strategy, such as customer satisfaction, number, transaction, and so on. Yes, and? And you really have to show directly how you view and also thresholds, whether you are relevant by contributing, or we would typically operationalize whether it is a fetish and whether you can get it. (...) Yes, and each area of impact then has certain resources available, derived from the corporate strategy. For example, if you are pursuing a fixed basics strategy, you will have fewer resources available in the disruptive area of impact. Logically, it's more about customer satisfaction and number of transactions. Then it's about killers and things like that. Yes, if you have a different strategy, it can look completely different. But that's how we operationalize whether an initiative is relevant and how much it's worth investing in. And in the end, you

have to achieve an impact with your initiative or your project. And impact means paying for that impact. That means we have to want it down there. They have to be willing to pay for it. The best summary is the questions that concern us, whether we do something or not. And then the question is, which segments are you focusing on? For example, if you focus on customers, you will send different things than if you focus on private customers. Which ones have the potential to become stars in one segment or another? So you see the focus on segments or customer groups. Which ones? To put it bluntly, it also depends on how much you invest and so on. None of this is subsumed in this matrix. (4)

INTERVIEWER: Understood. Great feedback. Let's move on to the next hypothesis. This design approach that you see here delivers value for banks and customers. (8)

INTERVIEWEE: What role? (...) For the business analyst? Yes. Management. No. How and with which keepers do we want to do things? But that's not what primarily concerns me in my role. So the question is probably at what altitude and for what role with what goal you use a framework. And for me, it's very clear that a framework is used when you already know why you're doing something. (4)

INTERVIEWER: Very well presented. Thank you very much. Yes, sounds really good. Um, we can conclude with that. The next hypothesis is that scaling. This scaling approach from Beyond and Ecosystem is given here with regard to banks of banks' technical and infrastructural challenges. Do you see this scaling idea given here? (13)

INTERVIEWEE: Of course it isn't. How do you want to map the scaling potential? These are always theories. So you would have to explain to me where you are going to scale. For me, this matrix does not in any way reflect whether customers will adapt it and whether you can then scale it and install it in different industries. But you would have to prove me wrong.

INTERVIEWER: If you mean that this framework goes back to these framework factors. I mean, when you hear that scaling through, let's say, through... Yes, for example. Or " " through network effects, which you see down there, for example, by increasing the services of the participants. Um, also this effect that the more participants join the service, the more the system feeds itself. Um, so again, based on these framework factors, how would it work? Or are they too weakly

represented? Do they need to be represented differently so that they contribute to this idea of scaling?

INTERVIEWEE: No, look, it's genetic. It's genetic because it depends extremely on a person whether they adapt something or not. And in the sun, there are still many human individuals who, in turn, have different ideas about whether to accept it. So, you know the altitude here too. If you want to say, on a super coarse granular level, okay, the potential to scale, then I say okay, Jack Grey. But in the end, people are very individual, and individual perception is then decisive in whether they see value or not. And that, in turn, is related to design elements and how you communicate the benefits as marketing-relevant. But these are also expectations that correlate with the interaction model, what exactly do you expect or not? So from that point of view. Yes, again, publicly understood in detail.

INTERVIEWER: Thank you very much. That brings us to the last hypothesis before we move on to the last block of the survey. Um, you can see the Influencing Factors Evaluation Criteria above. Can they determine the value of a Beyond Banking Ecosystem with this design? (..) Or no longer, or statement? My hypothesis says. (..) Exactly. Uh, say it like that, please. That's exactly what it's about.

INTERVIEWEE: So, same answer as before. Same answer as before. Really? As I said, I believe that the altitude determines whether you achieve value or not. In relation to these questions. (...) I can help you find an apartment. In relation to these points? (...) Yes, but that's very rough. Granular. (...)

INTERVIEWER: Yes, but that's exactly the point. Yes, that's exactly right. Exactly. You see it from that perspective, and that's exactly right. And that gives me food for thought again about how I can present it differently or change it. Yes. Or I say, let's leave it as it is, but then it stays at this level. Yes, granular. And I have to create a different design for a different target group at a different altitude.

INTERVIEWEE: In my opinion, you'll never be able to create with a model because people are very individual. You can only get things done if you somehow go into rapid prototyping models, do live prototyping, and really get feedback from people and animals. But you'll never get that into a model. What I can say is whether it will ultimately reach the layer where it finally hits the ground, whether it will arrive or not. You have to deploy it, you have to throw it into beta version

and... (...) The prototypes are your trash, otherwise you'll get me. (...) Yes, it's completely presumptuous to expect that you can pack a model.

INTERVIEWER: Yes, it only works, let's say, with a higher-level model, as you said, a meta-level, to get a feel for how customer matching can take place. What phases does it go through? Of course, you have to address services individually and respond to individual customers. Evaluating all of that is also... That's not possible, I would never be able to do that in a model. I don't think anyone could do that in a model, or perhaps only partially in a sub-construct and then zoom in on it to go into more detail. You're absolutely right. There really needs to be an overarching idea. Yes, okay, how can such C2C matching be achieved by filtering a bi and banking service? How can acceptance be achieved there?

INTERVIEWEE: Help the customer side? Exactly. Exactly. And it's not a model that can be used to assess scalability. It's not a model that can be used to assess customer acceptance. It's a model that serves to make a transaction between strategy and purpose. Yes, and ultimately the process and IT and everyone. For me, it's somewhere in the hub between business and IT, translating what business wants, you know? It's about conveying what business wants, implementing it for people, and tackling it with specific partners. That would be the positioning I would choose for the model, but I wouldn't claim that it can do that. It assesses whether something is scalable, whether customers use it. That's a claim the model can't fulfill.

INTERVIEWER: Exactly. I think that was still the thing with these influencing factors that we talked about. But you answered that in exactly the same way with these scaling factors. That was exactly the hypothesis. Perfect. And I can see that it's still picking up speed. Okay, good, so even though I was out, it's still going strong here. That's good. Yes, then let's move on to the last block. Eleven keywords or keywords are simply evaluation criteria. I'll give you this word and you say okay, how does it become a value in this design and. So look at the whole design again and I'll say feasibility. Would you connect feasibility with the design or how would you connect it? Is it a given?

INTERVIEWEE: I would say it is a given if the business requirements data. (...)

INTERVIEWER: Understood. (..) Accessibility? (4)

INTERVIEWEE: Yes, depending on the target groups.

INTERVIEWER: Hm. Understood. Then towards comprehensibility. Meaningfulness of the entire design. (..)

INTERVIEWEE: IT professionals as the target group.

INTERVIEWER: Mhm. Perfect. Then clarity. (...)

INTERVIEWEE: Here too. (..) It stands or falls with the eye of the beholder. (..)

INTERVIEWER: Mhm. Then simplicity. (6) Elegance. How elegant is the design? Selective? (...) Yes. Theme. Completeness. (5)

INTERVIEWEE: Even if I'm boring you, but because it's understandable, a model must be modeled to the extent that it is useful. And that, in turn, depends on the target group. Yes. (..)

INTERVIEWER: Okay, then the level of detail of the model. (10)

INTERVIEWEE: Yes, yes.

INTERVIEWER: How do you view the internal consistency or correctness of the design I explained?

INTERVIEWEE: Given.

INTERVIEWER: Perfect. Briefly, how applicable is it? (4)

INTERVIEWEE: Yes. Knowing that this is probably a business analyst, I would say. But it also fits depending on the context.

INTERVIEWER: And the last point. The operability. In other words, the implementation. (4)

INTERVIEWEE: That is not determined by the model, but by the capabilities, the velocity, and the capabilities. (..) Okay.

INTERVIEWER: Would you like to add anything else? (..)

INTERVIEWEE: Yes, uh. (4) There are actually a lot of cool models that you as a bank could implement in this area. And I've already thought about what those models could be. Yes and yes. Maybe bring that up in conclusion. Is there a marketplace with banking? (...) In itself, a digital marketplace for local offers. So maybe islands. Services where the bank takes on the primary role of verifying payment balances. It's striking that such a (..) function. If the user then knows how to justify the rental of items, a rescue system based on the price of the profile or

payment processing with an escrow function, then somewhere, always in the role of identity provider, with infrastructure and yes. (...) Insurance or logistics could also draw on its talent for micro-services and private individuals, for example. (...) Stories such as similar profiles with money and expected value material could enable full integration, which may capture the perceived emergency situation and potentially also contribute to integration. You could make reliability or you could make local peerfounding and neighborhood assistance such stories into contracts. Integration with social score All group networks where you offer bank support may be tax-privileged. You will be in a fiduciary role that may also be goals or social goals that you could start with. An example would also be peer-to-peer learning mentoring stories, such as mentoring matching, for example, with bank accounts as an expert in medication elements that could still be incorporated. Unlike bank products, it can even be ecosystem-specific PPC. (4) I can't find it. After some thought. (...)

INTERVIEWER: First of all, I would like to say thank you very much, because I would now like to end the recording.

APPENDIX 20. DSR – Eval 2: Expert Interviews – Transcript from Expert 14

INTERVIEWER: So, the first question is, how do you evaluate the artefacts? A1 to a12. So, all the ASs I described to you earlier, the artefacts. How do you evaluate them? Does that make sense here? Are they presented in full? Are there any questions or difficulties in understanding? How do you see the artefacts presented in this design?

INTERVIEWEE: I was wondering where you get the data from. For A2, i.e. for these P1, a2. Service and Service One, i.e. the first ones. You do that exclusively manually in your, uh, in your construct. I was actually missing that, i.e. that touchpoint. You go to the customer and talk to them. No, that's right. Well, I can only report on corporate customer business, but in private customer business you also have personal contacts. And these personal contacts flow, and they are the ones who are closest. So from these personal contacts you get one-to-one information, so to speak, which you would otherwise filter out from a lot of data. You said that too. I really miss this area. How do I use this mass of information that I get in customer conversations? Um, banks can't do that at all today. Well, that's an issue that always bothered me when I was a consultant myself. Um, how do we actually manage to record conversations in a structured way so that we can draw conclusions from them? In other words, so that you can have an Except Beyond Banking Service process in the first place. I completely miss that. That way of looking at things. (...) Because that's also a source you can use to compare which services you want to offer your customers. Today, we do that based on gut feeling. Let's say I have ten customer conversations and six of those customers tell me they have a massive cybersecurity issue, then it's clear to me that I need a cybersecurity solution. No, that's what I mean. And you pick up on that in these personal conversations, you don't pick up on it with your model. (4) And if you think about it, you can multiply that. We have 60 corporate clients, consultants, and each corporate client consultant. Let's say they have five conversations per week. That's 300 conversations per week. You can obviously extrapolate how much information you can get from that. And that's first-hand information. So I see it as a very important source that we shouldn't ignore.

INTERVIEWER: Definitely. Sounds very good. Thanks for the feedback. That's about the AS, the artefacts. Anything else where you say, okay, or is that okay with you?

INTERVIEWEE: That's completely fine with me. So that you have a specific target group or a specific... Well, you can probably refer to the target group, but you... So the whole A2 area was the big question of where do I get my information from? Where do I get the data for it?

INTERVIEWER: Mhm. Okay, understood. Very good. Then I would say let's move on to the next question. Now let's look at the PS. So, how do you rate the processes? Or I mentioned the phases. 1 to 7 of the design. Have they been explained sufficiently? Are they consistent? Are any missing, or how do you see the PS?

INTERVIEWEE: What you have done in your model is understandable, and it is what we have intuitively done in practice. We initially focused heavily on the customer side. What we have noticed in practice is that the partner side is actually much more interesting, because as you have now outlined, it is classic sales. Just like me. I look for products that are a good fit for my customers, then I offer them to the customer, and then they should buy them, and then we get revenue for that. That's classic bank sales. What we're seeing in practice right now is... Let me give you an example. We have. We regularly hold so-called rethinking workshops. These are events where we invite customers to discuss a specific topic. For example, in March we had automation through AI. Then you have entrepreneurs as participants and we invite experts on the topic. And then there's a panel discussion where customers get ideas. What experiences are there, what solutions already exist? What do you need to pay attention to? So, you already have a dialogue, and then we go with the customers into working sessions, in groups, working groups with the experts. Each expert is then distributed among these groups, and the customers develop initial ideas for their companies in exchange with the other companies. This means that they learn from each other and develop initial basic ideas for themselves and their companies. During this time, the experts have the opportunity to network with the customers and generate business. At the event in March, for example, we had the phenomenon that two referrals, two concrete projects, were referred to the partners directly at the event or as a result of the event. And then the partner said, "How cool is that? I come here, there are 50 customers sitting here, I can present my thing to 50 customers at the same time and also get an order out of it at the same time. And then the customer said to me, and this is

something I've been thinking about for a long time, the customer, the partner said to me, I would be willing to pay you a fee for that. Not a commission, but something like an annual fee. So that I can provide such inspiration at your events from time to time. And then I thought, you have to look at this whole topic of beyond banking from a completely different angle. Namely, from the angle of what assets do we as a bank actually have for all of these (...) participants in this ecosystem? Our assets are our high customer loyalty and our interface with a huge number of customers. And we're not monetizing that correctly, not even in your model, by the way. Namely, to say what do I actually have for what's happening in the market? So I'm going to turn that around, your model, right? What do I actually have in the market, what's moving in the market, and which customers do I have that this affects? (...) So I have my customer data in the bank. I know exactly, let's take corporate banking as an example. I know exactly what industry you're in. I know exactly how big you are. Ideally, if I've granted a loan, I have all the information from about you. I have a lot of information from payment transactions. Which countries do you ship to? And so on and so forth. And then to say, hey, a customer who has shipped to Russia. Let's take the example of the war in Ukraine. No, he has been delivering to Russia for years, and I know that because I know his business model. I may have also processed some of the payment transactions. We don't always see everything, because there are other banks where the transactions are processed. But you can extract it from the balance sheet in some way. With AI, it's possible to extract it relatively quickly, so that you can use your customers, um, your customer data, i.e., what you know about your customers, to see, um, what's happening in the market right now, what the providers are delivering to you. (..) Which customers does this actually affect? Or do I even have customers who are affected by this? Because when you ask your customers, or when you think from the customer's point of view and you conduct market research, you also ask customers. You also said that when you survey customers, they often don't know what their problem is or what they need. But on the other hand, it's the providers who, thanks to their expertise, know the problems before the customer even knows them. (...) This is particularly significant when it comes to cybersecurity. We currently have a situation where most customers feel completely safe if they have insurance and have worked through this checklist for the insurance company. And we are working with a provider who, as a test, is going into the darknet with customers to raise awareness

and see if their passwords are on the darknet. And almost every company has passwords on the darknet, and they're all falling over backwards. That means the customer wouldn't give you the answer you need to offer the right service. You actually have to think about it from the, uh, partner's perspective, but then also put a monetization model on top of it and say, okay, we're the ones who can provide you with this. So we have the customers with the problems, and you have the solution. And in most cases, it's the provider who has no sales department or a poor sales department, so customers are basically brought to them by sales partners. And we are a sales partner, but we also give them the opportunity to reach good, qualified customers, because we already know which customers are receptive to this. And in the example of cyber security, for example, it's like this: the customers we refer from the conversations we've had with customers. This results in a 50% order for the provider. So every second customer actually does business with the provider, and that's the asset we have. (...)

INTERVIEWER: Understood? Yes, very interesting. It's also interesting to take these impulses or customer needs from the provider's perspective rather than the customer's. (..) Thank you very much. Let's move on to the next step. You see different design elements, tools, and methodologies everywhere. So I have presented them visually as they are, the individual elements. How would you rate it? Correctly chosen or as I explained it? Or would you say I would imagine it differently? Based on the design alone? Mhm.

INTERVIEWEE: Mhm. Well, I think I looked at it beforehand, right? And without your explanation, I would have found it difficult. Um, I, uh. Uh. Now, of course, you're working in a scientific environment at . And I'm just a DAU, so to speak, a dumbest assumed user. And so, of course, it's possible that someone who reads your work, reads your paper, will understand it. So what you explained to me makes sense. I understand it. Um, as I said, I would perhaps add a note to this selected box to indicate that it is the P5 box. Um, yes, what also makes total sense to me is the process? No, I can understand that, but as I said, only with explanations. Perhaps you need to explain this a little more in your thesis. Maybe you could also... I don't know if that's feasible in a doctoral thesis. I don't know enough about the requirements for that. But maybe you could emphasize the ecosystem a little bit. So that the bank with its individual... (..) With its individual

stakeholders. (...) And the topic A9. So that I then get other customers or new customers from the matchings, that's ultimately... Um. So you're starting from market research here. I need to think this through again briefly. You start from market research, then the data comes in, then you compare it with what you already have in the bank. Then you consider the system. Do I have customers for this in the bank, i.e., what do I have as a provider? Do my customers fit in there? If it matches, then you go back and feed it back into the machine, say okay, what was the conversion rate? It fits, it doesn't fit. (...) And then these dotted lines at A9, they're not entirely clear to me. You actually wanted to show that through this learning, through this learning effect, new constellations are constantly emerging. So that you also reach other customers that you may not have reached in the first step of your matching. No, because you learn. Aha, okay, the customers are receptive to it, the others are not. So we look for those with the same characteristics as the receptive customers. That's the system behind it. Well, maybe you can take another look and see if you can present it a little differently, so that you can show that you start with customer zero, then customer one, so customer zero, one match, the other not, and then the match multiplies, or something like that, so that you can present it that way. Otherwise, as I said, I would highlight the ecosystem a little and show that on the one hand there is the ecosystem and on the other hand the market, so to speak, because then except it beyond banking service, which is market research, you can present it in exactly the same way. So for me, a provider would be, in my case, the cyber security provider. That's the one who provides the service for my customer, whom I refer to. And the contributor would be either our subsidiary, which would actually host the network, so to speak, or would it be the one who provides me with IT that enables me to mediate between my customer and the provider? Is that correct? Have I understood that correctly?

INTERVIEWER: But I can see that you have questions here. I had them myself before I explained it. I wasn't entirely sure what the contributor actually does. That's exactly the kind of feedback that's important. That's what's becoming clear to me now. I didn't describe it well enough here.

INTERVIEWEE: Maybe you can explain the contributor, because they are, so to speak, the supporter, i.e. you. You put the provider on the same level as the contributor, but the provider is basically your service provider and the contributor

is the supporter. Maybe you can do that. Maybe you need to present it a little differently.

INTERVIEWER: Yes, I understand. That's a good point. I'll have to present it differently. Perfect, in any case. Very good. I've already taken note of many points that I can improve. Let's move on to the next question. You can see the frame around it. Around the design, you can see four cardinal directions with factors that have been described there. First, scaling factors to the north and east, context-based factors, and everything that has been presented as network effect factors. (...) And also on the left. I would call them conditions or requirements. Everything that's okay, culture fit. Does my bank even want this? Am I, as a bank, geared towards this, etc., i.e., the preconditions for developing all of this. First, my question is: how do you evaluate the framework factors? So, all of them first? Or do you understand them? How are they chosen?

INTERVIEWEE: So, according to your explanation, you told me that these A2s. Uh, yes, market research is the observation of the market under organizational requirements and measures. I would, I would probably understand it differently from a practical perspective, but also because I'm not a scientist, I would probably understand it differently, namely, what do I actually need as a bank, uh, to be able to set up such a construct in the first place? So which ones? What technological or intellectual requirements do I actually have? (...) Maybe you could say, um, that one is the needs, so that you're leaning more towards demand and needs. One is the need that you're querying and measuring here. (...) Um, so on the west side, so to speak. So organizational requirements. With influence and factors, it's clear that this fits for me. And down there would be factors, number of users, products, interaction, type of use. (...) The number of users. (4) Hm. (...) I don't think that's entirely clear. I'm not quite sure what you actually wanted to achieve with that. With the label, I mean. Um, you probably wanted to say. On the one hand, I see the ecosystem and on the other hand, I see the demand, so to speak. No, somehow. And how? And then you show how network effects lead to scaling. That's actually what you want to show, right? And evaluation, evaluation, matrix, those are actually the ones you have at the front, right? So you do the evaluation at the front in your model. Now here. (...) At the bottom on the left side under A2, you evaluate what you need. (...)

INTERVIEWEE: So the question would really be where you start with your perspective. So probably the bank is the focus, the bank is the focus. (...) And starting from there. Um. (...) Yes, that. So. Oh God. We. Wait a minute! Yes. With regard to time. Um. So, actually, the question is. Do I have to. Maybe you need to think about the question again for a moment. I don't know how much time you have left, but, um. The thing is, in your model, as you described it to me, the bank does the following. What our production companies do, for example, is they say, "Hmm, what kind of cool product can I develop?" And then they go and look, "Ah, okay, what could the demand be?" And then they develop a product, and then things like showers with five shower heads come out. Um, and then they go to the market and look, who needs showers with five shower heads? (...) And we actually have to translate that and say, okay, the bank needs a ping. (...) When things change in the market, because we have a VUCA world. We are. Things are changing rapidly, markets are changing, geopolitical situations, tariffs, etc., and the bank doesn't really have time to look at what products it can develop, but rather it has to get the ping from the market and say, these are the requirements our customers currently have. Dear bank, make sure you have this service and make it available to your customers. And if you don't have this service yet, then we recommend that you look for someone who can do this and that and the other. (4)

INTERVIEWER: Let's move on to the next question. We'll stay with these framework factors that you see around it. As you can see, I've described various details. At the bottom, for example, you can see the most detailed level I've presented. Sometimes factors, i.e., with sub-points and then also points for the sub-factors. At the top, under "Scaling," you see only the two sub-points, and on the left and right, you see only the main, let's say, the overarching term. What would you do? Which would you prefer? Which level of detail would you prefer so that you can understand it better or so that it remains clear? So what would you prefer? Which one? Which article? Which one? Which level of detail? (...)

INTERVIEWEE: I find the question difficult, to be honest.

INTERVIEWER: The one I mean. The question is, would you prefer to have more, uh, more detail in order to understand these factors as well, so that it describes what it should be, because there's too little. Maybe I described it wrong or not enough? Or are keywords enough? Exactly. Just be honest. What? What would you rather see?

INTERVIEWEE: Well, to be honest, you asked me. I didn't pay any attention to it. My focus was entirely on yours. On your model. It was only when you asked me that I looked at it, looked at these external aspects, and didn't see them as essential to the explanation at all. That's probably why I find the question so difficult, because I understood the model. For me, it was fine, and I don't know if additional explanations are really necessary, but if so, I would keep them short and concise, as above.

INTERVIEWER: Perfect, that's a very good answer. One more question on that. If you've positioned it as a framework, as a framework painting, then the question is about the design here. I've already asked the other experts this question. Do you think it's as cleverly chosen as the positioning? Are the elements around it, or should they perhaps be removed to present it differently? You've already answered that a little bit. How do you see it?

INTERVIEWEE: So visually, it looks good, but functionally... (4) My gut feeling tells me that it's not really necessary if the model is well described and it's clear what you want to show, then you don't need these other things. Um... (..) So I'm kind of emotionless about that.

INTERVIEWER: Perfect. Perfect. Everything is correct. What you're saying, the only thing I would ask is a follow-up question. Another expert said, for example, hey, that would be too many of these surrounding factors. I would rather see these in a second design, where the whole model is presented again in a much simplified form, but then includes the factors that they explain in the design, because they are too much here and are actually superfluous, but a second, simpler model could integrate them. Would you see it that way too?

INTERVIEWEE: Yes, yes, good idea. Yes, I would see it that way too.

INTERVIEWER: Let's move on to the second block. The next ones will also go faster now. So that's it for now. You've given us a lot of information. Very, very good. I'll jump over to my side here. So, you see hypotheses here and we'll take a quick look at them, we'll just do a maximum of one minute for each. So that it goes a little faster and you say, "Is that correct or not correct or different?" Or can you explain a little? So, one example is conceptual implementation design can be used as a blueprint for banks to alliance bionic strategy. So this design that you're seeing

right now helps banks to implement this strategically. So does this blueprint, this metamodel here, help? (...)

INTERVIEWEE: Yes.

INTERVIEWER: So this design approach that you see here. Yes. Delivers value for banks and customers. (5)

INTERVIEWEE: Hm, yes and no. At the moment, only for the bank, because it is very much designed from the bank's perspective and the partner side is completely missing. So this partner issue is always very much neglected in all the considerations, but it is an essential issue. Without good partner management, you don't have good customers and vice versa. So it's just how a platform works, right?

INTERVIEWER: Understood. Very good. (..) The scalability of such a system is a given. Also, or how do you say it, despite technical infrastructure challenges. So, despite the technical and infrastructural challenges, scalability is a given here. Perhaps also due to the factors I described earlier. Or would you say no, that's less of an issue now. Or how would you see it? (...)

INTERVIEWEE: If it's done well, I believe in it. Yes. The implementation? Yes, definitely in the banking context, because I know how banks work today and how rigid and outdated their systems are, as you also know, so I dare to doubt it. But in principle, in theory, it is feasible in this form. Yes.

INTERVIEWER: Perfect. Then let's move on to the last hypothesis. Yes, decisive influencing factors and evaluation criteria can determine the value of a successful Beyond Banking Ecosystem. (..)

INTERVIEWEE: Yes, yes, definitely. Yes. By considering the challenges our customers face. Customer-centric thinking. Absolutely. Yes.

INTERVIEWER: Perfect. Thank you very much. So let's say that we've covered the hypotheses, or at least this iteration of them. I'll do some more evaluations and hopefully they'll do justice to the hypotheses and contribute to them, and then we'll have finished block two. Now let's move on to block three, and I'll tell you what it's about. It's about further evaluation criteria for this design. And I'll just tell you, um, I have to jump over here. In my view, I'm here. Ah, here. Exactly. I'll give you a few keywords. So, evaluation criteria as a keyword. And you say yes. So, is it given or not? Or again, deviating with an explanation, as you wish.

Yes. So. (..) Look at the design and I'll say feasibility. How is that with this design?
(4)

INTERVIEWEE: I do. In practice, I see this in IT. All the components are already in place today. Nothing new needs to be developed. But putting them together in such a way that they make sense for a bank is certainly a big task. So I believe so. It can be implemented in practice. So. (...) In technology, I see challenges due to various data protection issues, such as banking secrecy, interfaces to the core banking system, and so on. But yes, theoretically it is feasible.

INTERVIEWER: Understood. Accessibility. (..)

INTERVIEWEE: Yes. Yes.

INTERVIEWER: Perfect. The design. Comprehensibility. Meaningfulness.
(...)

INTERVIEWEE: Is understandable and meaningful.

INTERVIEWER: Perfect. Clarity. (5)

INTERVIEWEE: It's clear. Yes. (..) I was just thinking. If I understand it, others will understand it too. Especially board members. Yes, I think so. I think it's clear. Yes.

INTERVIEWER: Okay. Great. Simplicity. (7)

INTERVIEWEE: That depends! (...) It's very subjective, of course. The answer. For me, it's simple, but that's also because I experience it in practice, so it's easy for me. But for someone who has never had anything to do with it, who is primarily focused on the return, I don't think it's easy. From the perspective of a board member, that is.

INTERVIEWER: So it's less suitable for management, but as an expert from an analyst's perspective, or perhaps also from an IT perspective, it's already scientific, technical, scientific, technical. That's true. But that means that at the management level, it's not yet seen as a template. No, exactly.

INTERVIEWEE: So you would simply have to provide more input on where the added value comes from. For the buyer, so to speak, i.e. for the board of directors. What are the advantages for the bank? Um, how does it make money from it? And those are the questions I have to answer all the time.

INTERVIEWER: That brings us to elegance. And maybe you can connect that to your statement from just now. If we look at the topic of elegance. (4)

INTERVIEWEE: Understood. That's right.

INTERVIEWEE: It has to, it has to become simpler. Definitely. As I said, that was my very first thought when I saw the slide for the first time. And I read that you wanted to create a kind of business model. It has to be easy to understand for everyone who works with it and provide a common thread, so to speak, for implementing Beyond Banking. And that means at all levels of the bank. So it would have to be structured more like a checklist, right? Um, did you do that? Check. Then the next thing is this. What does your machine tell you about the data? Okay. Look, what are the providers doing? Because all of these, um, criteria that you have there. Or all of these touchpoints that you have in the model are always dependent on the market. And this market is constantly changing. And that's why you always need a common thread, so you don't lose sight of the focus in all this complexity. What do I actually want to work on now?

INTERVIEWER: Very good. (..) Good insight in any case. Move on to the next completeness. (..)

INTERVIEWEE: Yes, as I said, I just don't see that perspective. The whole human touchpoint, i.e., the advisor and the information we gather from the conversations. I think you're definitely hitting a nerve with management, because that's an issue that everyone has. That advisors don't record their conversations well enough, simply because the technical possibilities aren't that good. But I think that's a separate field of research. But that would be one point that I still feel is missing. And the other point is actually more about the bank as a platform. On the one hand, there are the customers, and on the other, the providers. In between are the contributors. Um, that would be it. That would be complete for me, because here, only one side is represented, namely the customer side. But the partner is also a customer in this context. Beyond banking.

INTERVIEWER: Let's move on to the level of detail. (...) How do you assess that in this design?

INTERVIEWEE: Yes, we already mentioned that earlier. It is now presented here in a very detailed and comprehensive manner. Um. By breaking it down into two, uh, two models, i.e., two graphics, it will probably become a little clearer. (..)

INTERVIEWER: Then internal consistency. Correctness is the model as I explained it. Logically comprehensible.

INTERVIEWEE: Uh, yes, except for this contributor story and the CC, i.e., CC, i.e., the A9, um, it was clearly comprehensible to me. Hm. Exactly. And what you said earlier. P3 Ah, that's ultimately the whole partner business. Um, so if you don't want to overturn all that, then you probably have to say in your work that this is only, um, the side of the, um, the customer. In other words, the one who chose the provider based on customer needs. What is not considered is the side. How do you actually choose the sponsors, the providers? Because that's something else again. One goes by need, the other goes by qualitative factors. (...) So depending on how you. How extensive your work is. (..)

INTERVIEWER: Certainly to record a lot, to write it down in any case. The question is, of course, how can everything be represented in one model? But as you say, maybe a second model will be added. Simplified. Maybe the factors can be described differently. That's exactly what I'm thinking. Maybe there will be a second model for management, maybe there will be a third model, maybe, as you said, from a different perspective, or maybe the other one will take on a different weight in terms of maintenance. There are many different approaches, and that's really good. And that also coincides a bit with the other interviews. So that's good. Perfect. That's exactly what it's about. But do we want to discuss this so that we can improve it iteratively? Exactly. This is not the final version. Exactly. Yes, very good. We're almost done. Just two last points. Applicability. (...)

INTERVIEWEE: As it is now. (...) Is it, um, conditionally applicable? Once you understand it, you can apply it. Um, as a working instrument. As a tool. Um, I would, I think, make it a little more manageable. So, if you use it as a management tool or for product developers or whatever. (...)

INTERVIEWER: It probably comes across as a bit technical and scientific. We've already talked about that two or three times. Yes, if I were to present it to someone who works in IT, for example, with the phase artefacts, I think that might be more of a target audience for him. That's what I'm hearing.

INTERVIEWEE: Yes, you usually say that you want to sell the model to management. And there are rarely IT people on the board; there are usually salespeople or mathematicians or other types of people. That's why I really believe

that. I think that no matter which target group you're addressing, the simpler, the better. Because our world is so complex and it cries out for simplicity, no matter at what level. And I think you're more likely to reach someone who can understand and grasp things quickly. Because then they'll ask you the right questions and you can perhaps add to that. So maybe you can add a simple model, leave that, because I think technically, someone who is an IT or software specialist, i.e., an IT service provider or software developer, understands that a board of directors probably doesn't. (..)

INTERVIEWER: Perfect. Good insight, yes. (..) Last point: operability, i.e., the feasibility of the project you see here.

INTERVIEWEE: Um. (...) If that's an essential part of your, um, your work, then you should take another look at what resources need to be made available for it. So what does it take and who is needed to implement this system? That's something we've realized ourselves here. I was hired as a salesperson and was supposed to do 100% sales. But I can only sell something that's on the shelf. And I had nothing on the shelf. No Beyond Banking offering, and now I'm a business developer. I'm a salesperson, I'm an implementer, I'm a process manager, I'm a product manager, and that needs to be made very clear to every board member who is thinking about Beyond Banking in their company. It requires partner management, it requires implementers, it requires process and product managers. And it requires salespeople. Above all, it requires a mindset and a mindset change. Because what you are doing here goes far beyond the classic mindset of advising corporate clients. And I think you have to make that clear in every discussion with management, because they believe, of course, that they see the quick win. I'll implement a system and then the business will run itself. No, that's not how it works. (...) And then the gap between expectations and reality is so wide that you no longer feel like pursuing Beyond Banking. (...)

INTERVIEWER: Yes. (...) I would say that's it. First of all, I would like to express my sincere thanks. Really great. Fantastic. I would like to end our recording for now.

APPENDIX 22. DSR – Eval 3: Focus Group Interview – Questionnaire

Semi-standardised focus group interview with XXX (position/role)

Interview date: XX/XX/XXXX

Type of information provided: Video call

Research topic: Conceptualising and Designing Scalable Beyond Banking Ecosystems Using Machine Learning and Data Analytics Methodologies

I. Introduction

- a. Thank you for your willingness to participate
- b. Please introduce yourself and the purpose of the interview.
- c. In this focus group, iteration M1.2 of the scientific and technical design and the newly developed simplified model aimed at (bank) management will be evaluated.
- d. Procedure: Conversation approx. 60 minutes, narratives important, no wrong answers. There is no order in which the experts answer. Not every expert has to comment on every point if it has already been answered. Please only add additional information here. If there is a disagreement or an expert has a different point of view, this can be discussed in the group (as long as there is sufficient time).
- e. Confidentiality and data protection: Recording of the video call, confidential treatment of all data, all personal data will be pseudonymised, transcription, consent to be obtained.
- f. Questions from focus group participants

II. Evaluation of the design M1.21 (scientific/technical)

1. How do you evaluate the adjustments to the artefacts (A0-9) of the design?
 - a. Add the new bubble "Provider Bank" and labels for the providers

- b. Point of contact (omnichannel) added → Initial contact taking into account data sources (A0). To this end, phase P0 was added, where the extraction of data is forwarded to the filter model P1.
2. How do you evaluate the adjustments to the processes/phases (P0-8) of the design?
- a. The note "Detailed view" has been added to the dotted zoom-out line of the display.
 - b. The process "P5" has also been added to the detailed view.
 - c. Establishment of optional process P7a/n so that after P7, a new data matching process with a new constellation of customers can be created in ABBS1 (A9). ("a" for another matching constellation and then process end, "n" for potentially infinite new matching constellations)
 - d. The upper dashed rectangle for visualising a new data matching process (A9) has been deleted for clarity.
 - e. Strengthening the partner side with additional optional processes:
 - i. Placing the new P0a before P1 to run through market research
 - ii. Extension of P2a so that BBS is made available directly to the data hub.
3. How do you rate the adjustments to the design tools and methods?
- a. Details of the contributors and a contributor (orchestrator-oriented) have been added.
 - b. Colour coding of participants and highlighting of interactions with green (provider, contributors and the orchestrator (bank)), (A)BBS with orange, the supplier with purple and the buyer with light blue (matching constellation)
 - c. Colour explanations added to the legend.
 - d. To clarify the function of the framed dotted line in A9, the text "New matching" has been added to make new matching constellations easier to identify.

4. How do you rate the adjustments to the framework factors around the design?
 - a. Deletion of the framework factors in this scientific, technical design and addition to the new, simple design aimed at management.

III. Further evaluation criteria for design M1.21 (scientific/technical)

1. Adjustments to feasibility
 - a. Addition of opt-out process through newly created optional process P8.
 - b. Revocation can also be sent to the provider (P8a).
2. Adjustments to the level of detail
 - a. Add explanations of abbreviations BBE2.0 and 3.0 in the legend.
 - b. Addition of comprehensive explanations of all artefacts (A) and phases (P) in the legend.
3. Additional adjustments
 - a. Due to the fact that the numerical sequence of the artefacts is no longer logical and the framework factors (A8-11) have been removed from this model, the central data hub in A8 is now changed to follow the BBSS artefacts (A7).

IV. Evaluation of the design M1.2 (management)

1. How would you rate the first slide as an introduction to BBE 3.0 and its success factors?
2. How would you rate the second slide as a simple visualisation of the implementation of BBE 3.0?
3. How would you rate the third slide as an overview of measuring BBS using KPIs?

V. Evaluation criteria for design M1.2 (management)

1. Feasibility

2. Accessibility
3. Comprehensibility/meaningfulness
4. Clarity
5. Simplicity
6. Elegance
7. Completeness
8. Level of detail
9. Internal consistency/accuracy
10. Applicability
11. Operationality

VI. Validated artefact instance in an artificial setting (proof of applicability) - Instantiations of artefacts ("constructed" artefacts) that are to be evaluated in terms of their applicability (=prototyping). Both designs M1.2 (scientific/technical) and (management + slides) are to be evaluated as a whole.

Constructed artefact (BBE) for the "craft services" marketplace: In a BBE 3.0 (C2C), customer A, who is looking for a craft service, should be brought together with customer B, who is offering a craft service. The customer journey can be divided into seven phases:

Phase	Customer A (demander)	Platform / Beyond-Banking Service	Customer B (supplier)
1. Awareness	Aware via push notification or newsletter that tradespeople are available in the banking app	Sends personalised messages (e.g. "Looking to renovate?") based on payment history and profile	–
2. Onboarding	Opens the marketplace section in the app, enters service details (location, time, service)	Guides A through a short consent form and explains the matching process	–
3. Matching	Confirms general conditions (e.g. budget, time frame)	Uses matching engine (C2C) and suggests suitable B profiles	Receives notification with request and can signal interest
4. Offer & negotiation	Selects a suitable tradesperson from 2–3 suggestions and sends a request	Provides a chat interface and displays ratings, availability and prices	Checks the request, sends a counterproposal or accepts
5. Booking & payment	Accept final proposal, pay via integrated payment escrow	Manages escrow account, books appointment and reserves payment release	Views booking, appointment and payment status in dashboard
6. Service provision	Receive the tradesman's service on the booked date	Sends reminders, rates service immediately after completion	Provides service, receives feedback reminder

Phase	Customer A (demander)	Platform / Beyond-Banking Service	Customer B (supplier)
7. Feedback & cross-selling	Provides final rating (CSAT/NPS) and sees suitable additional services (e.g. material delivery)	Generates cross-selling offers (e.g. renovation package, insurance add-on)	Sees upsell suggestions (e.g. follow-up order, premium listing)

1. The "realities" to be observed (El Sawy et al., 1992) result in a subset of:
 - a. "real tasks"
 - b. "real systems"
 - c. "real users"
2. Assessment of the artefacts' ability to
 - a. purpose and
 - b. scope/area of application

VII. Conclusion

- Thanks for your information and participation
- Request for support with the final iteration (survey)
- Information about the evaluation of the results
- Farewell

APPENDIX 23. DSR – Eval 3: Focus Group Interview – Transcript

INTERVIEWER: Now we will go through the individual points that we have changed over time. That means we will reevaluate artefacts A0 to nine. Here we have added a provider as a bank, which was missing. That became a battle for one expert. The information on High. We can also potentially work with other banks, in addition to other third-party providers. I added that. A point of contact was also added, i.e., the initial contact taking into account data sources A0. That means that wasn't there before. How do I contact customers? Through various channels. That was also added. (..) Then that was added for the time being. Sorry, regarding the artefacts, if anyone else thinks that's okay so far. Or if I want to add anything else, or if I don't like the changes, I don't want to just jump in. (7)

EXPERT 12: You have a complex matching process between what is offered and who it is offered to. That means I couldn't look in the marketplace myself to see what services the bank offers me through third-party providers, but I am specifically targeted. What's that called, Facebook Target Target Something? That means I'm actually passive and something is brought to me. I can't look for services myself.

INTERVIEWER: That's right. Let's take a look at the example I brought with me. That's a bit of a customer journey approach. Here, trial banking services are first explained in a loop or presented in a maturity model or customer lifecycle model. Potentially others that can then complement each other. But I'll show you another example in a moment. I think that will make it even clearer. I'll be happy to explain. Thanks. Good point. (...) Otherwise, I'll jump over to the adjustments to phase processes P 0 to 8. I've also done this. That was missing. A detailed view, because it was criticized. Why is this data matching? Why does it take place outside the bank? It doesn't. It does. Is it the same as here? It's just supposed to be a zoom out so you can see the details here a little bit. What? What happens in it. That's why it's called Detailed View. That was added. For understanding. Then process P5, which is here, was also mentioned here so that you know, okay, this is consistent. We're talking about the same thing. That was missing. Then there was the last process. White was also criticized. Where? Where is the end of the process? Is there even a process? The entire presentation is a good point. I have illustrated that here with this P7afläch, which then comes out as product A9. That means I have played through the whole thing once. Beyond Banking Service was trained, the model, etc.,

and these loops can either end. Yes, that means once evaluated and saying okay, now we have matched the customer base or the training. Another training cycle takes place. That means you then find p7ah. A new customer matching constellation comes about, as here. I also added NN for as far as possible, okay, it can also go on endlessly. So it depends on the model, on the acceptance rate, on the customer, that the same Beyond Banking Service can continue to be trained and developed. That's right. But it can also end as early as possible. That's why this process is shown. Otherwise, I still have the dotted line above. You can see that here with the others. You have it. I've added two here, you can see it here. I have that here. I deleted this in the new integrations. That led to confusion. One is enough for the exemplary representation; that's another match. And then the last point about the processes is, yes, that's exactly what's up here. It was added, I would say, that the provider does not only provide a Beyond Banking service to the banking sector and customers as a provider's revenue. It may also be that the provider, without market analysis based on successful business models or valid studies on its part, provides this Beyond Banking service directly via P0A and P2A. That means we do this beforehand, not this market research, and we take directly and accept the Beyond Banking from the provider, which we then feed into the banking ecosystem. Or we say yes, it's great that there is a provider, but they should go through our market research again and our filter criteria, target group criteria, etc. They should go back into P0a in P1 and then into central data and then into the banking ecosystem. So both are possible, and that's why these optional processes have been added. (..) Questions, comments, improvements regarding the processes and changes here. (12)

EXPERT 12: Ultimately, this means that when a third-party bank comes in with its own services, it will be recategorized by the bank and a match with its own customers may be redefined.

INTERVIEWER: Exactly. So you can decide either way. As I said here, you can say again, okay, let's assume that, but we may not trust your studies that much, or you don't have any valid studies. We'll take it. You've already built it. That's good. But it still needs to go through our market research again. We want to evaluate your Beyond Banking Service for the customer again. Or we say, "Hey, you've already sent us valid studies. Your business model is so successfully

accepted and established in the market. Then we jump straight to P2. In our food, we go into our central Data Brain, which is made available to our banking ecosystem. Exactly. You can go either way. It depends on what you want. As a bank? Yes. (5) Then let's move on. That means it's fine so far. Thank you very much. Let's go back to the design tools and methods. The contributors here were a bit meaningless at first. That's why I added what kind of contributors are participating. And I have the contributor orchestrator. (..) Added according to Burkhalter 2020, based on his ecosystem model. That means these contributors can, let's say, provide support to make a Beyond Banking service available. They are not like a provider, they make themselves available, but they can provide support here. They can also perhaps offer the constellation or the matching process. This means that you can participate in everything that serves the successful implementation. That is why you are mentioned here, but you do not have any primary tasks at . This can be anything supportive that you can imagine. And that is why we have this distribution of roles, where you can also see which direction you can go in. I have a color distinction. You can now see a few colors, I hope you can recognize them. I can zoom in a little more. All providers in an ecosystem are shown in green. All of these. This banking service is in yellow, and you can see this matching constellation here as a customer, as a supplier, and as Bayer, which I have shown in purple and blue. These are the color distinctions that you can also see in the legend. I have added this here. (...) And what else is there? (..) I deleted it here under the headline. I added this new matching after all. Yes, so that you know, this text note, okay, here is a new process, another new matching constellation, an optional one. It's possible that some of the participants still have questions or comments about the design and tools, the color coding, and perhaps additions. (12) Okay, then let's jump to the last point, the change. These are the framework factors. Do you still remember them? Those who were there. They were here on the sides, or let's say, at the cardinal points and corners. These framework factors, which I emphasize, should somehow influence or enrich the ecosystem, yes, support it. And here, the benefits were not emphasized so strongly, or were not recognized at all. Yes, why are they actually there? And that's why I, or rather many experts, said, take that out of this model and put it into another model where it can be explained again. Yes, especially how objectives, measurements, and all that fit in there, which isn't very well at first. That's why we took it out again here. What again later? You'll see. In another model,

we can address questions about the framework factors. (8) Okay, then let's move on to the next point, the other evaluation criteria, the design on the left. This will go a little faster. Not much has been implemented or criticized. Adjustments for feasibility An opt-out, an opt-out process, was not taken into account, and I added it here under P8. This means that if a customer no longer wants to agree to the DPB and banking service and wants to unsubscribe, they can do so. Here is the content management A4, and then this is mirrored in a central data. And, of course, the information is sent back to the customer. If the provider is involved, they also receive information that the data must be deleted, of course. That's why P8AA. This has been completely added. So this opt-out process. Questions about the opt-out processes. (7) And comments. (5) Okay, great. So, as I said, if you don't have any questions, then that's fine. Then that's fine for you. That's understandable for you. Now let's move on to the level of detail. This BB and Banking 2:00 zero, 3:00 zero was added. Of course, for some people who may not immediately recognize or see what BB is, or may not know what we are talking about, I have added Beyond Banking to the legend here. And I have also added a very comprehensive legend, where all the artefacts and phases are briefly explained. This means that those who may not have had it explained to them at first, as is the case right now, can read through it again at their leisure. Okay, what do the individual artefacts mean, what do the processes mean, what does that mean overall? In this model? That's why there are also questions here. About the legend in particular. Exactly.

EXPERT 13: Yes, yes, I heard you. (...) You already mentioned omni-channel at the beginning. That means that the customer is basically using all possible touchpoints and then the framework comes into play. Yes. My question would be, if new technologies come along that can actually change the customer journey very significantly, or even the value chain, for example, where a natural person typically no longer interacts with a website, but rather an agent on behalf of a natural person. And the website is the backend of the authentic system. Just thinking out loud. As an example. Would you be able to handle that with your framework, or would you have a problem right from the start? Or is it not even within the scope of your framework that new technologies can have a major impact on the value chain?

INTERVIEWER: Let me put it this way, I would say that's out of scope for now. Yes, right, exactly. But it's a good point. That means you could take this

approach as further research, as a side project, as a possible research team. New technology is emerging. To what extent will the model now be changed? Or what challenges will then arise? Is this out of scope? Because, first of all, I would say that the technical expertise is in the background here. However, implementing the model and checking it for relevance is a good point, because one or two technologies have also been mentioned in the past, but I'll gladly take that on board. That will certainly be mentioned. Expert 13 Good point, um. What can be defined as a distinction, but also as a potential further research stream.

EXPERT 13: Precisely because I think it's important to understand. I also told you that, for me, it's extremely detailed. In my role, I'm used to other artefacts, but it's actually a blueprint. Yes, and a blueprint presupposes a lot of things, because you can't just take the model, jump into your bank and say, here I am and banking ecosystem, but it's a blueprint that implies a lot of rocket science and everything else. Correct?

INTERVIEWER: Right.

EXPERT 13: Okay, understood. Then. Then the most important question, which you might want to answer at the end, would be: What do you think is the greatest benefit of this blueprint?

INTERVIEWER: Yes, can I come back to that later?

EXPERT 13: Yes, maybe I'm being very trivial here. But for me?

INTERVIEWER: No.

EXPERT 13: The ones that make the difference.

INTERVIEWER: You're absolutely right. I'm also looking at it from different perspectives. That's why it's so valuable to talk to this group now and gather different impressions, but also to draw boundaries and say, okay, this could potentially be further research, because I have to draw the line somewhere. That's true, but a good one. Good perspective. I'll gladly take Expert 13 with me and will definitely take it into consideration. Yes, not implemented. But the solution.

EXPERT 2: For that, think about a smart API-first strategy, in which you offer all your processes to the agents in a smart way, so that they can then perhaps complete the content.

INTERVIEWER: Yes, another good point.

EXPERT 2: And so on and so forth. That's a very good approach.

EXPERT 13: Yes.

EXPERT 13: Yes, thank you for closing the loop. Yes, and then? Maybe you can take best practices like X-Bank, which already has some experience in this area? Yes, open and close. Exactly.

INTERVIEWER: Sounds good. Good arc, API. And. (..) Exactly. That sounds good. Oh, I got sidetracked for a moment. Sorry. I should still share. Thanks. I'll go back to the last point. To additional adjustments. That means that due to the framework factors that have now been removed, the logical order of the artefacts has of course changed. That means that 8 to 11 have been removed. The central data was from A12. You can see that here at the top, for example, a12 in the previous iteration. That's why I've now taken A8 as a seamless addition. And so we come to A, let's say seven, to the data recommendations over to A8 and A9. That's why I've made another change here, and that's also the last change. So, once again, any questions or comments? Sure. (...) For me. (7) Great, then let's move on to something new. Something that none of you know about yet, or maybe one of you has already looked at it because I provided you with the link earlier. Yes, as I mentioned at the beginning, what happened on the left, what we came up with and developed, is very scientific. Technically good, you might have to do that in the context of a scientific paper. That's also important. But above all, I hear Expert 13 there, but also Expert 12, and also Expert 11. Because we conducted these individual interviews beforehand and said, "Hmm, it's all very scientific. What about management? They first need to be informed and inspired about the project. What exactly is Beyond Banking? Ecosystem 3.0? Yes, that means I have developed a new model, which is divided into three, let's say, slides. The first is an introduction, to get management on board. What is it about? The second is a greatly simplified model, but also presented again in simple phases and fewer phases, showing how such data matching can take place in a 3.0 model. And the last one was also very important, asked by many experts: How can you measure something like this? Yes, how can I evaluate and measure my goals? What KPIs are there? And those are the three parts we want to discuss. So I'll briefly recap before we move on to the question, just a quick introduction. (...) This is the introductory slide for management. That means I'll start by explaining, okay, what is Beyondbanking 3.0? Yes, that's explained here

on the left. Okay, that's this growth driver. Yes, I want to set up this market and smart marketplace within a bank, where I can bring customer A and customer B together for the first time within a network and, ideally, as a bank, act as an intermediary and earn money for the transaction by brokering deals that go beyond traditional banking. I've presented a little history here, and you can also see, okay, what does number three actually mean? Where does it come from? (...) So you started here on the left. Before digitalization even existed, etc., there were all kinds of parties who acted as tipsters, through a provider, perhaps a broker. Here's the customer, my customer needs a house. And when the deal is closed, I also get a share of the business, and later there's something that's also very common today, which is B2B B2C. I have a third-party partner in the bank who now offers Beyond Banking Services to the customer. So you are now integrated into this ecosystem? Yes, and with this Beyond Banking 3.0, I am actually moving away from the provider, who still plays a supporting role here. That's why it's up here. But now I want my customers to be networked together and for a provider or a bank to offer this Beyond Banking service in the middle, which serves as a network. This is briefly illustrated again on the left-hand side. And then I want to come back to the success factors. Why are we doing all this? Yes, because there are studies, including my own scientific work. Asia in particular is a pioneer in this network effect. There is Tencent, there is Alibaba, there is also Ant Financial, and America too. There are these large ecosystems where exactly that is already happening, where this B2C matching is taking place, and where they are now even earning more money with it than with the actual banking business. So I have to keep that in mind too. Individual German regional banks are already doing this. I'm looking at Expert 6, for example. Yes, there are already the first regional ecosystems where this is already happening. Yes, and it's not just the banks that are doing this, but above all it's also... How is customer acceptance? There is. I have. I have developed a large, representative survey where German and international customers, i.e., from different countries, have been compared. And acceptance is very high among both. Even 4/5, slightly higher internationally, roughly the average. You want to use these and these four 4/5 Are you ready to purchase such Beyond Banking Services? Yes, so the acceptance is there too. Then again, briefly mentioned here, okay, there is. (...) Why is that so interesting? Because you can do cross-selling here. There are indirect revenue models. I can increase customer loyalty penetration, maybe even

get new customers. Lead generation that is forwarded to my core banking products, i.e., also generate conversions that are forwarded to my traditional banking business. So all these things. Advantages that exist. And how can you ask questions?

INTERVIEWER: If banks need support, then I or the company or whoever will offer these services, where we can evaluate potential together, design business cases, address data governance, etc. That's it in a nutshell, and that's why I'm asking my question. Now, how would you rate the first slide as an introduction to Beyond Banking 3.0 and its success factors? Please answer.

EXPERT 12: Yes, my hand was taken away because Expert 2 is standing. That's number one. But if Expert 2 allows more.

EXPERT 13: Yes.

EXPERT 12: Good. I saw that suddenly gone. Yes, that actually answers it. (4) Platform. Marketplace. Google Store or Apple Store or eBay. No matter which marketplace you find on the internet. I go in. I look for a service. Or I look for one. A nanny. Or I look for another craftsman. No matter which platform I go to, I go there. I look for someone and I immediately find offers. This leads to my first question: Why does the bank now have to do endless matching to give me the right service? Just let me search. You don't need to do any matching for me, that's the first question. Second question: I'm not with Bank X right now. That's hypothetical. You don't know that. Hypothetical. I'm pretty sure that if any customer offers a service through the bank and I don't get it. I'm pretty sure they offer the service elsewhere too. Why should I go through the bank? So far, in all the business models. As a bank manager with these two questions, I would give you €0.00 to implement this platform, because there are enough platforms on the market that offer me a service. Why do I have to go through the bank? I would still have to be afraid. The bank sees what I buy. I don't want that. Ever heard of a loss of trust? Or do I even want the bank to see that? Maybe I'm hiring a tradesperson. Under the table. Hello? None of your business? And thirdly, why am I being offered a target service? I want to search for myself. You don't need to search for me. Me. I'm old enough. I don't need to search for anything. So, those are my three critical questions, where I don't see Beyond Banking three zero taking off at all. 0.0. Now you say there are studies that confirm that it's a huge success and that they're even making more money with

it than in the original banking business. I don't know if you want to go into that, because I understand everything. In my mind, it doesn't fly. 0.0. As a customer, I would never go shopping there, especially not. And I certainly wouldn't offer my services there. Especially not when I know that I have to go through a selection process with you before my services even reach the customer. I wonder why? Why don't you offer me? What's the point? (..) And if you say there are studies that prove it's going great, then I would just expect it in the doctoral thesis. Why is it a success at all? (..) There is no prospect of success for Beyond Banking 3.0. And why have these regional banks committed themselves to it in the first place? Do they expect something from it, or from overtaking the big players? Well, that would be my first time. My way of thinking predicted customer benefits. As a customer, I don't see any direct customer benefits. Even as a service provider, I don't see any customer benefits. Why? I can offer it elsewhere and I won't be preselected. Or maybe even kicked out. I'm done. (...)

INTERVIEWER: Lots of questions. I think so. I'm looking over from that direction too. I'd be happy to say something about that. Especially about the regional banks. Lots of questions. I'll try to address one or two of them. So, I even see acceptance in the survey. Even German and foreign colleagues are willing to opt in, in the majority of cases, to receive this service, because they recognize the added value, as long as the added value is there and matches the value, then German banks and German customers are also willing to opt in. That's true, even if the bank offers it, because some people have a differentiated view. Some say okay, especially a bank, they may already have my data. Some say no, I don't want to do that after all. It's differentiated, but acceptance is already there, and the other thing is the direction abroad. Of course, the rate is already very high there because the mindset is also different, including the acceptance of such services. That's also true, and German regional banks are already taking their first steps, which means I would also like to refer to Expert 6. Maybe you would like to add something to that. (..)

EXPERT 6: For me, the thing is that I believe banks can score points in this area primarily through trust. When I see what's currently happening on eBay classifieds, etc., no matter where I look with vacation rentals, there are an incredible number of cases of fraud everywhere. So I think that this is definitely something where banks could score points if they do it cleverly, and where users would also

be willing to do it through their bank, because trust in banks is generally very high, that they will handle it properly, that they can do something. And I, I definitely see what you're saying, Expert 12. If I am clear about what I want, if I say I am looking for a babysitter for XY, then I can search for it in a very targeted way. I believe that the added value in this ecosystem comes from the fact that I can achieve exactly what we have always talked about, namely that I can recognize what the customer is looking for next before they even know it themselves. Or I recognize solutions for them that they haven't considered because I know that Susi next door is also looking for a side job, which they don't know, and I can bring people together and provide information that they probably wouldn't have found on this platform. But I also believe that this is the next level. We're not there yet. So that's something that would be desirable to achieve in the future, but it's not what we're currently experiencing in the digital world.

EXPERT 12: Okay, thank you, Expert 6. That painfully reminded me of my own experience. I was actually looking for an apartment, looking for a villa, and then I contacted the colleague and we continued the communication outside of booking.com and then told Booking.com, "Yes, communication took place outside of booking.com." Your insurance is hereby void. Just like that, I was left standing there. So if the bank can give me credibility because it's the bank and it says, if something goes wrong, we'll even reimburse the costs or something like that. Then okay. (..)

INTERVIEWER: Then perhaps also here, in addition to Expert 12. Of course, there are also studies on acceptance. In the end, it is of course important to test it in practice. Then I also look over to Expert 13, because he has often told me in the individual interviews, and I think many others have too. There's no other way than live and rapid prototyping. We have to create an MVP first. Provided, of course, that the business case acceptance and everything else has been validated. If it works, okay. We want to develop it. But we also want to get quick feedback. Is the business viable at all? Yes, maybe you'd like to add something, Expert 13. But I think that was also your approach, to say that you can be eccentric, but also quick to pull the ripcord if it doesn't work out.

EXPERT 13: Yes, I think that's very important. What I would add is that you can't transfer Asian systems one-to-one to Germany or Europe. I think there are

completely different sensitivities there. And I also believe that the acceptance of super apps and monopolistic data collection is completely different there, in some cases also forcibly different, and I believe that we simply need a different twist. You have to try out exactly these kinds of things, because I believe that what a dancer is now doing with the lathe, or there are also other examples from India with Pay TM, which also have marketplaces there, so to speak. That doesn't work one-to-one here, and certainly not in Germany. In my opinion. I think that regional things are still very important here, and the whole topic is certainly something that should be tested. And the whole thing would probably have to be modeled differently in terms of governance and very strongly in terms of value proposition. Basically, it needs to be regionally anchored and appealing. So it doesn't work to just copy and paste, but only if there is a locally cultivated space of trust somewhere. Yes. (..)

EXPERT 2: Exactly. I would like to jump in again, because I have to leave soon. And I also had quite a few questions. We've already discussed a few of them in the meantime, but a few are still open. Let's start at the beginning. You mentioned Beyond Banking Ecosystems. That's a combination of Beyond Banking and Ecosystems, so to speak. For me, there's a bit of a problem there. Essentially, you're saying that you're making it very, very big. That means it's difficult for me to define it, because the ecosystems that you could set up for a bank are very different. Whether you focus on customer groups or perhaps you said earlier, I didn't hear it here today. Do you focus on the retail market? Are you focusing on institutional? No, then we're going in a completely different direction, also with matching and other things you need there. That means, uh, I'm assuming that in this case, it sounds very much like retail and a little bit like SME to me, so of course for provider matching. Those are probably not retail customers.

INTERVIEWER: Absolutely right.

EXPERT 2: I see that on the website. It might be very, very interesting to look in other directions as well. That was exactly one of the points I wanted to make. And exactly what you said about the studies. Were there any studies where such a system was actually implemented in Asia or elsewhere? Or are these always external platforms, because Tencent and others are? Yes, per se. Well, we have a bank somewhere, then suddenly it's in there. But it's not a bank per se that implements a Beyond Banking ecosystem, it's a platform around which an ecosystem has been built, where in the end it's also practical to have founded a bank

and also have it included. So, is there a study that actually takes this line? Meaning, as a bank, I do Beyond Banking as an ecosystem. (..) It is. Do you know if there was one? Because that would be exciting for me.

INTERVIEWER: Exactly. Off the top of my head, I can think of two observations or studies. One is a Georgian bank that has developed the bank as an ecosystem and is extremely successful with it as a brand, and it has developed precisely these services under this bank in an international national comparison. And here in Germany, not much yet. I see more of these regional banks starting out, for example, where perhaps a Volksbank is the sole developer, but then also under one brand, or through a merger of two or three Volksbanks or regional banks, which does happen. But there aren't that many German counterparts yet. That's true.

EXPERT 2: I see that too. I see it in these regional banks, in Volksbanks or savings banks or whatever. They have created a kind of marketplace in the region, which makes sense from my point of view. If you are a really big bank that focuses on the entire German market and doesn't have a specific regional focus, and then there's this Beyond Banking. To be honest, an ecosystem is always built around a specific value proposition, and Beyond Banking is simply everything except banking. That's still very, very vague. In my opinion, you have to start a little more piecemeal because it's not really an advertising purpose; it's more like, "I'll just offer everything," but it's actually a platform that you're offering. I connect my customer group with customer group B. And I somehow mix the services. For me, that's not an ecosystem in itself. For an ecosystem, you have to build something around a specific value proposition. From my point of view, that's just a hint in that direction.

INTERVIEWER: That's absolutely right, that could be the big goal, but it doesn't have to be. But I'm talking about the big picture. You're right, you start with small services, hence the model on the left. You look at a service and see if it's been accepted. Is there already a network effect? Can you add a second and a third, and can they perhaps be brought together? So you're right. And that brings me back to Expert 13. You start with small MVPs, maybe it doesn't work and you end up with just one service, then that's how it is, then it's just a bilateral purpose. Yes, but not yet a large ecosystem. That's the big picture of how it could be. But even small intermediate steps along the way can be valuable for a bank. Exactly.

EXPERT 2: So. And what I wanted to add is, will this become more extreme in the future? We all know that I mentioned it a few times when we got together at BE. We had PSD2, PSR, etc. Now we have it again, and the market will be like that as soon as we all agree at the EU level, etc. He has another meeting about it today. Everything will be offered externally by us, and then there will be much faster platform providers on the market who can simply set up such systems for you. And we are forced to disclose data from insurers and all sorts of other sources. So the question is, how feasible is it to do this in a bank at all? Once all data has been democratized, it will be. And that will be by law. I think that would be interesting for you. Just something to think about. What does the future hold in terms of regulation and how would that affect the model?

INTERVIEWER: Absolutely, I have that in mind, and I also briefly included it in my research. I also included compliance and data protection regulations in general and came back to open data banking. It has taken so long to implement that it can no longer be covered in my doctoral thesis. But in the grand scheme of things, it's certainly the other stream again. Okay, how can it be regulated from an open finance perspective now with Feder? What exactly is the impact of that? But you're absolutely right.

EXPERT 2: I could bet that it could completely disrupt the entire system.

INTERVIEWER: Blow it up, redesign it, who knows.

EXPERT 2: Restructure it. Exactly. (..)

INTERVIEWER: Expert 2. Thank you very much. Thank you.

EXPERT 11: Following on from the answers. What? What Expert 2 said. I see this moment BBE 3.0 as something quite temporary, because I would ask myself, what will the bank have left after the democratization of data? That it can have such a high status. And if, as a customer, I couldn't find provider three at my bank, for example, , but I could find it at another bank, that would mean for me that I would leave this area, look for another bank, connect with them, or wait until a kind of Beyond Banking 4.0 develops, where the bank is just one of many. So, personally, I see the importance of banks as perhaps being overrated. I'm sorry to say that.

INTERVIEWER: Great perspective. I'll come back to that later. For now, let's just focus on banking. I want to connect with others and later on, what about Banking 4.0 zero, 5.0. What if I add more banks? So, multiple participants?

Interinstitutionally connected, maybe even customers of other banks. So you can take that further, and you're absolutely right, it may only be a temporary stage, a temporary stage. Maybe it will stay with the other bank, just as it ends with banks at 2.0, you're right. Very good point of view. Yes, very cool. (...) Thank you very much. We have to move on a bit due to time constraints. Great, great. Great feedback. Thank you very much. Really valuable. Let's jump over to the design. A simple design. I have a radially generated three-layer model here, presented in a very simple way. Here on the right you can see the phases again. I would say reduced, which is also familiar from this technical model. That is, from market analysis to okay. So, the one who accepts the banking service. Now I want to start a pilot with MVP. I'm also looking over at Expert 13 again. Does that work at all with live or rapid prototyping? Or not? Do I stop here or do I continue? Okay, now I can use this MVP to develop data matching and create data recommendations that can be sent to the customer, i.e., as a demander, and also to the customer as a supplier, because interest has been expressed. Or even to the bank employee. If this is not to be fully automated, etc., and then I can also move towards five, I would like to further improve and scale the model so that it can be trained further to ensure additional matching constellations. And yes, what about IT? It must also adapt accordingly to the load or increasing load, of course, and that is why it is presented here again in brief. And here's a question for you: Is this acceptable to you? Directed at the current management, especially this shortened phase model? Is it comprehensible? It looks different. I'd appreciate your feedback on this. (...)

EXPERT 11: I think this simplified representation on the right is great; that's what I found lacking in the other diagrams. But I wonder why you chose this radial representation? The bank is in the middle. Do these other donut shapes have any meaning? Is it a distance from influence, or how should it be understood? Why is it on the very outside? But customer needs are relatively close, so can you please clarify that?

INTERVIEWER: Gladly. Well, I simply took your approach, which is also scientifically accepted by von Eyern and von Rome, who have already validated exactly such radial ecosystem models. That's why it worked well at first. I took a different approach here to say, okay, I would also like to mention the bank as the " " the main player, in order to address what else needs to happen from a strategic

management perspective. Okay, what does it contribute to? What strategic elements are dealt with there? Or what do I need to consider? And the technical level, okay, where does it take place? What do I need to consider in terms of development, architecture, essay, sales signals, etc.? And this is where the matching engine comes in, or rather, where it happens on the technical level. That's why I put it down here. It's just a completely different approach, one that's hardly comparable to the left one, especially when it comes to explaining these phases. So where am I heading now? What needs to be taken into account? In terms of elements? Exactly.

EXPERT 11: Okay, I can actually see that in italics, Core Strategic Domains and Technical Level are supposed to be the headings. I couldn't read that.

INTERVIEWER: Okay, good point. Maybe I need to explain that a little more clearly. Yes. (4) Thank you. Any further comments on the slide? (7)

EXPERT 12: Um. (...) Did I read a little further after the card turned me into a believer and no longer a DAU? (...) Yes, just one example. Just read it. The regional family also wants to buy it in the kitchen. The kitchen has to be pre-built. The kitchen builder runs the risk that when he starts building the kitchen, the Jünger family will back out and the kitchen builder will be left with €10,000 in debt. If I do it through the bank, the bank can say, "We guarantee you the €10,000 in preliminary work so that the kitchen builder is not at risk." So I've been thinking about it the whole time, also with the reputation, with, with, with. For me personally, if the bank is involved, if they can at least add a small service to it. I assure you, I don't know what you have. You want to drive a Ferrari over the weekend. Yes, so first point of. So, if he. If the bank can always do a little something extra, then I would even go to the bank. Yes, I assure you there. I. I guarantee you the payment. I. I have no idea. I'm an entrepreneur. I'd really like to set up my company in the US very quickly. Do we have everything ready? We. We have. Give me the money and you'll get the entire company structure. So, I can well imagine things like that. Yes, so I would really like to see a real use case here in this process, for example. A few scenarios why I would buy it?

INTERVIEWER: Very good. Good prospects, good approach. That brings us straight to the, let's say, artificially created construct as an example, which we can then transfer to these models. Is that right? And there's also mention of something like the bank perhaps acting as a guarantor for the payment or insurance. I'll come to that in a moment. Very good point. Expert 12 Yes, thank you. (4) I would then

move on to the next one, perhaps with an eye on the time, so that we still have a little time left to go through an example. Let's jump to Measures and KPIs, i.e., in the context of the four most important, let's say, goals, how Beyond Banking Services can also be shown or what topics they contribute to. First, there is Everyday Use and Active Interaction Cross Conversions or Forwarding to Core Banks Core Bank Products, Customer Retention Loyalty. And then I created another one, specifically for Beyond Banking 3.0 in this network effect or ecosystem approach. I have also added further exemplary KPIs below. This is only an excerpt. I will create a very large list in the next one. Where you can select further as experts. Is that important to you or not? I have marked the previous expert interviews with asterisks here to indicate that they are very important. They were mentioned particularly frequently or were considered important. That is why these are the user-related KPIs or, from a banking perspective, which KPIs. It is also interesting to measure these and which ones. Yes, I would say which topics or which advantages these KPIs contribute to. As I said, asterisks, banks, and also in terms of study relevance. And here are all the colors. These are my four, red, green, blue, purple. These are my four framework factors that I had before. And I have now added them to the KPIs, to what they contribute to. So which KPIs or which factors can be improved by which KPIs, I would say, or can also influence each other? I have another framework factor in addition to ecosystem virality, so to speak. (...) In addition to network effects, there is also how can I. How can the ecosystem itself still. Especially through the referral rate. How can the system itself still scale through viral marketing? Yes, those are the five framework factors. Question about this model, about the KPIs that have been selected, or even the framework factors that have now been added here. (4)

EXPERT 6: Question Not now. But the first thing most bank managers ask themselves is, how much will I earn from this? (5)

INTERVIEWER: Yes.

EXPERT 6: Something, right?

EXPERT 12: Well, I have that.

EXPERT 6: Charge something for this transaction now, or charge something for this matching? Yes. Have you found any empirical values or anything like that, what others in China or elsewhere charge for this?

INTERVIEWER: There are also some from the annual reports. Are there really any indications of how much money they earned with which service? Yes, there are. Of course, I can't see from them now what the explicit business case was, i.e., with the business case behind it, projections, etc. Unfortunately, you can't always see that in detail publicly, and I deliberately limited that in my research. That goes into a lot of detail. That would be the next step. Right now, that would be the next step. That means the goal is first here in management and also business analysts. So what can inform and inspire management? How can we potentially measure it? Because that was also a question from experts: How can we measure it at all, how can I track something like that? Then what kind of blueprint is there, if it's going to be a bit more technical to implement, and then the next step would be to go into the individual use cases, yes, with market research and everything, and quantify that.

EXPERT 6: For me, the three slides are there to convince management to give the go-ahead. Yes, and that's where I feel something is missing. Either I need to realize that I need to be patient in order to earn any money at all. So before I worry about how I can measure it, I want to say what first. What can I expect now?

INTERVIEWER: Yes, good, good. But I'm happy to add more, I don't need any more time to prepare. For example, I have something from BBVA Bank, the big bank. What is it? Is it Spain or South America? Where exactly is it? For example, there's one called Leo because he built an ecosystem like, how can I put a house in and then everything around it, up to the proof of mediation, and then they also provide craftsmen services. I think that's at least potentially possible. I'll have to look into it. So you'd like to back it up with figures. I can see what news or business cases I can find. And then as a supplement.

EXPERT 6: If I, as management, now have to make the decision. Either you know you have to invest now and then you need a lot of patience for something to come of it, or you see it first as marketing or something else. Or I want to know. It's already been tried and tested. I'm earning now. Otherwise, I would say to you with the figures, once you've started, "Yes, and now?"

INTERVIEWER: And now, gladly. I'll take that with me and then show another slide as an example. Yes, I think that's good. I'll gladly go along with that.

EXPERT 12: Expert 6, I think this is just a lot of hype. Every bank will want this. It's the latest hot thing. Everyone will invest money in it somehow. But I'm convinced, as with any new thing that's done, that probably 50% or more of them will fail completely because they don't understand what's actually behind it and what they can offer their customers. They'll just do something again because everyone else is doing it. So, then. I also estimate the failure rate to be high, and I don't know if I would sell it to management the way Sebastian has done there. What are the success factors that need to be considered if the bank wants to introduce this, what do they absolutely have to pay attention to and not just chase after a buzzword? The others are doing it. Let's do it too. It'll work out. Oh, we're on the losing side. Why?

EXPERT 6: We're doing that right now. And I really see that one of these issues is really perseverance. Building a network these days is not easy and it requires a lot of work and persistence. And I would be a little afraid if you showed me all these KPIs when I was making the decision, because I don't think that's so cool. Can you measure it right away? Yes, you can. You can show me the KPIs next week. And just like Expert 12 says, they don't even realize it, and after six months they scrap it and say, "Well, it wasn't successful."

EXPERT 12: That's exactly why we should start small, like he said. Hey, let's just do this kitchen thing. Uh, let's get this sorted quickly before I spend another five years implementing it and realize I've wasted another 38 billion and nothing has come of it.

INTERVIEWER: Exactly. I think I hear what you're saying. Then please add to that. Yes, please.

EXPERT 11: Expert 12, thank you very much. Well observed. Exactly. I have. I've written down a few things. I think the slide is good because it gives a good overview of the benefits an ecosystem can offer. That's good. I'm perhaps missing the core benefit a little. Yes, so that as CEO or whatever, I look at the slide and think, wow, reputation goes through the roof when I add something like this, because it's important to me. I've had many conversations with Sebastian, with various credit unions and banks, and I've also had a lot of conversations with savings banks in other professional contexts about a different platform, and of course it depended on the board. Yes, one of them only looked at his figures, and

when I told him, "Look, it will cost you \$5 and bring you \$10," he signed immediately. The other one said, "Yes, fine. In terms of costs, we're actually in a great position. I'd also say in terms of turnover or earnings. I want to boost my reputation. So maybe take another look and highlight the core message or the core factors a little more. And then I wrote down, because we've already talked about the big players, maybe some references. Yes, of course, it's clear when we say, "Hey, look, dear Sparkasse in Oberursel, this works really well in China. They're building huge platforms and it's going through the roof. Customers love it." But for them, that's too abstract because they say, "Hey, we have 200 customers." Yes, and what about them? They need something else. They have different needs. So maybe you need to scale down the references a bit and look for smaller, quick, simple, super success stories from Germany or the attic, for example. Those are the ones I can share.

EXPERT 12: Great, awesome.

EXPERT 13: I like that too. I still have to go for my €0.50. Very good. I know time is running out, right? But I think I would try extremely hard from a customer perspective to show management why. Why do we need to expand and why do we want to reinvent ourselves? I think what we're seeing is that we're increasingly losing the customer interface or customer relationship because we're simply not relevant enough to many customers in their daily lives. Yes, that's why we typically don't have an app on the smartphones of many shopping or retail customers anymore. We're just not relevant enough. We are losing relevance with customers, and this goes hand in hand with a loss of revenue shares, which are shifting to players who are obviously more relevant to customers. And, and. I think that would be my starting point, that we want to be a life companion. Whether it's job hunting or neighborhood help. Maybe it's some kind of talent exchange. I don't know what. But the fact that we actually need to think more broadly is one storyline. The second is that trust is a much-cited argument. I mean, the whole thing has a lot to do with trust. With the trust that we can build. Or the issue of betrayal has already been mentioned. Yes, and that in the end, of course, the whole thing will enable us to generate completely new revenue structures, independent revenue structures. Someone also said in a chat that we are doing everything we can to strengthen the interest-independent business. Because we believe that these sources of income will be much more sustainable for us in the long term and we

will be much less dependent on regulatory issues. Yes, so I would probably really tell it that way from the customer's perspective and ultimately establish, as we already said, that we take small steps and say, okay, first let's see if the customers even want this, if they accept it. Yes, let's do a small pilot and then see what possible solutions we could build and transfer. Problem Solution ID, which we can really manage, where actual validations can take place again and again and where management can also draw a line somewhere. Yes, not selling the big project, the big construction site, but the step-by-step approach. An established approach with clearly defined exit milestones.

INTERVIEWER: I think that's great. Everything that's been said lately is extremely valuable. I can totally relate to that. I've already made a note of everything and will take it into account in the next iteration. Thank you all very much. I have to go. Due to time constraints, we have to move on. We're going over now. Once again, let's look at the evaluation criteria. Some of you experts will be familiar with these from the last interview. I'll briefly state the criteria and then you can say "true," "false," or "half true," or just give a few key points or comments. We need to go through this relatively quickly. So, if you look at the three of them together, we're only looking at management here, i.e., this track here, Group Management, in the middle of these three slides. I'll just highlight it a little. Keep these three in mind. And now I'll tell you the evaluation criterion: feasibility, yes, no, or why? (8)

EXPERT 11: I'm perhaps missing a time perspective. So, how long will it take? How long will it run? That's what I would ask myself. Of course, I know that it will run forever, but as a manager, I would ask myself that. And possibly a resource perspective. How many employees do I need to hire for the new ecosystem? Transfer or hire?

EXPERT 12: Perfect.

EXPERT 12: I would answer Expert 1's question differently. I don't care how long it takes or whatever. When will I see the first positive figure? I don't care how long it takes, as long as you have the resources. But if you say I won't see my first positive figure for ten years, then no.

EXPERT 12: So I would look at it from a value perspective. When will you pay for it?

EXPERT 13: I say feasibility. Wrong question. I have to answer no because that's not clear to me from today. The question cannot be answered. I don't even know if I have the capabilities. And I don't see what exactly is planned. In the first iteration, it's not in there for me. So you have to, I would have to answer no. (..)

EXPERT 11: I see it the same way. So, as a bank, I'm ready for it. What are my resources? What is the current status? So, is there a lack of analysis of the bank's capabilities? And what regulatory hurdles might exist here? Is Banking 3.0 even something that the authorities are planning or will they take countermeasures? (...)

EXPERT 6: I'm not going to answer that question either. I'm missing something. What do you want? Do you want money now to hire an external contractor? Do we have the knowledge in-house? And you're now blogging about IT capacities? For how long? Um. What exactly do you want? As a decision. (...)

EXPERT 12: Understood.

INTERVIEWER: Let's move on to accessibility. (..) Are these three designs accessible to you? (6)

EXPERT 12: So without them. I just put a glass over my mouth. I didn't mean to. Um.

EXPERT 12: Yes, right now. If I were to use this as a pitch to convince the bank, I would also say no. I don't really want to be convinced. (...)

EXPERT 13: Yes, I'm sorry, but I really agree with that opinion. You'll get feedback from us for everything. So, as a member of the executive board or management board, I would never give my approval. For this part, because for me it's a detailed design that may become relevant at some point in the implementation phase, but not further down the line in terms of desirability, where I want to know whether customers would even accept something like this. And I think the three slides for management are good, because from a high-level perspective, they're not that far off, but. But I'm missing the messages, the KPIs need to be removed, and also the downstream "The Reason Why?" Then I would formulate it much more sharply and harshly and then point out: What specifically is the next step? What resources are needed, and what do we want to do by when, and when will we revisit this? These are roughly the resources we need for this. And then I could say, "Wonderful!"

INTERVIEWER: On to the next point: comprehensibility, meaningfulness. How comprehensible and meaningful are these three slides together? (..)

EXPERT 6: Are they very scientific? I find them completely understandable, but very scientific. And it gets me, if I were the management now, what should I say, not emotionally. So I don't feel any enthusiasm after that, I don't think, wow, if I don't do that now, then someone else will and I'll have missed out. I don't see the added value right now. It's too clean, actually. So it is. (...)

INTERVIEWER: Understood. We'll move on in a moment. I have to hurry. Clarity is. Are these three slides clear to you?

EXPERT 12: Yes, they're clear.

EXPERT 13: Yes, they are. But you're not telling a story. That's the weak point. If you want to convince people, you need a story.

EXPERT 12: That's a feature in isolation. That's clear.

INTERVIEWER: That's exactly what's important. Good that you mention it. Leave it. We'll now address each criterion in isolation, so clarity. Okay. Given. Now let's move on to simplicity. (...)

EXPERT 11: Not so simple, I would say. So, that brings us around a bit. (...) Man, man. You need instructions for that.

EXPERT 12: Understood.

EXPERT 13: I agree! The left side in particular is brutally complex. The middle is somewhat understandable, but not really simple. No. So you still need to work on the simplicity.

INTERVIEWER: Elegance. (...)

EXPERT 11: I think it could be more elegant. If you really just look at the design. (5)

EXPERT 13: Agree.

INTERVIEWER: Next, completeness. (...)

EXPERT 12: Define completeness. If you now...

EXPERT 6: What we said earlier.

INTERVIEWER: You've already. Let me put it this way, we'll skip that because you've already mentioned a lot of things that you're still missing. So that's seven off the list. Fine. Level of detail. (4)

EXPERT 13: Too deep, i.e., too fine-grained. (5)

INTERVIEWER: Be. Let's move on briefly to the level of detail.

EXPERT 12: Yes. (..) So, if the goal is to draw out emotionality and willingness to spend money, it's too detailed. Yes.

INTERVIEWER: I'll jump over to number nine. Internal consistency. Correctness. What do you think? (4)

EXPERT 11: I actually miss the transition from slide one to two here. On three. So this one. So what? Presumably, for management, it would be the slides again with the executive summary, this one sentence that is supposed to build a kind of story. What do the slides mean to me? Or also at the bottom with a little summary, this footnote. What? What's the takeaway? In these three slides per slide?

EXPERT 12: May I make an inference? Sebastian, from the three slides? If you now had the perfect place for management, how to buy in the entire slide. The exact research task of your doctoral thesis is not yet clear to me. So, everything is set up now, but what do you need to successfully introduce it? Or what is it anyway? Or what are the success factors on the German market? Or don't be angry with me, but I still don't understand the core research task in the doctoral thesis. (..)

EXPERT 13: I would structure the three slides. Why? How was it really? Along the Golden Circle? (..)

INTERVIEWER: Thank you. Go over to ten, applicability. (5)

EXPERT 6: So I would say that the purpose of convincing people to give money is not really there. (...)

EXPERT 11: As a manager, I would see the next steps a little bit like that, and I find that a little lacking. So when I say I understand that we need Beyond Banking in my bank, what do I do first? I know how to use the knife. But where do I start? That's what I'm missing.

EXPERT 12: Perfect.

INTERVIEWER: Last point: operability. (4)

EXPERT 11: I think that's pretty much missing here. It's been discussed at a relatively high level, but I'm missing the operationalization. (5)

INTERVIEWER: Okay, leave that. Okay, now let's look at the right side. (..) This is an example. The point now is to apply this example approach, this example construct artefact, to everything on the left, whether the purpose and everything else is fulfilled or can be evaluated. In other words, I have designed a model here that represents Kraft Services Marketplace. So we're back to a craftsman. These are the different phases that are represented here by the customer as the demand for a craftsman's service, Beyond Banking, i.e., the bank as a platform, what it does, and the customer as the provider of craftsmen, i.e., the craftsman himself, who offers such services. I'll come back to this briefly. You're welcome to read up on it. I wouldn't mind explaining it in detail. But here are the individual steps to illustrate this. Here, too, I may come back to the added value. Once again, the bank can act as a payment service guarantor, be the guarantor of the payment, or offer insurance. So keep all of that in mind for this example. And now comes the following question. (..) First, direction. According to Walls et al. 1992, there are observable realities, and these result from a subset of three different, let's say, elements. First, real tasks are real systems, real users, i.e., real tasks. To what extent can this example be applied to everything on the left in the sum, i.e., everything here? How can the tasks of this system, this construct, be implemented with this design? What are you missing? Yes. (..)

EXPERT 13: I find that very clear, because you're actually creating a customer journey here. Yes.

EXPERT 12: Yes.

EXPERT 13: That would probably be something I would tell management very early on. I would perhaps optimize the presentation a little. Or you could spice up the customer journey a little with some graphic visuals. Yes, but I think it's good. I see one sticking point, and that is that you always have the banking app in the foreground, or the bank's touchpoints. And for me, it could also be touchpoints. Or rather, it should even be touchpoints. And that's why I really want to promote this topic of embedding. The mission is to invest in your brand, but I just think it scales much better if you design it openly.

EXPERT 12: Great. (...) Realistic?

EXPERT 11: Earlier, we had the question: Why? Why this matching? This filtering? Let's do everything ourselves. I don't want to be limited to what the bank finds out for me. So here. 0.3 That would be a good task for some kind of AI. That means the bank provides the data and the customer can match it to the profiles via any interface without the bank dictating it to me. And I still feel like matching is taking place. So analysis of data. But not by the bank, but by my own efforts, and therefore the acceptance is much higher. But the example is very good.

INTERVIEWER: Great. (..) I'm going to move on to the real systems. So to what extent can this construct be transferred to a real system, which could now be in the banking ecosystem? In terms of feasibility of implementation or also of all the other participants who are still involved. (18) Now we're talking about real tasks. Let's move on to the real system. So how can this example be applied to one of the systems you see here, I mean an example of blueprints. Can it be transferred? But can it be implemented with that? The system can, of course, also be phase processes that take place here in this model or even the actual data matching engine. Does that fit? Can it be transferred to that? (5)

EXPERT 13: Yes, but there are a lot of layers missing in between. Yes, yes, yes. It's like the tip of the iceberg. And in between, there are a lot of levels that we can't see here. And at some point, the level on the left comes into play, and I would go out on a limb and say yes, probably plus or minus, it's an ID. (..)

EXPERT 12: Roughly understood in terms of process, you can take that as a starting point. (4)

INTERVIEWER: Now let's move on to the real users, as a dimension. To what extent can customers, i.e., users of this example, or also in this, let's say, in this system, can users, let's say, these customers be customers. Can they use it? Does that make sense? This example. (4)

EXPERT 13: If you turn it into a prototype. Yes, yes. If it. You have to turn it into a prototype. Into a prototype. And then you can validate whether customers think it's cool and what they say about it. Yes. Yes.

INTERVIEWER: Wonderful.

EXPERT 11: I think so too. (...)

INTERVIEWER: Very good. Jump over. Two more questions. I'll be quick, who can stay for another two or three minutes? Great. Otherwise, feel free to leave

if you're exhausted. Unfortunately, I can't tell by looking at you! I'd like to thank you all again. Now let's go back to the capability of the artefact. So. (5) The ability. I'll take that as the artefact as a whole. To what extent can it fulfill this purpose here? (4)

EXPERT 11: I think the role, the role of the bank in your designs is much too large here than in the example. That's my feeling. (...) This Beyond Banking Service platform does not necessarily have to be run by a bank, and a bank can also be a customer key, a kind of supplier of financial services in that sense. So, to me, the importance of the bank is presented as very low in the example on the far right of this image. Perhaps rightly so. (...)

INTERVIEWER: Broad comments. (9) So the purpose can be implemented. With what we have here. (10)

EXPERT 13: Yes, I agree.

EXPERT 12: We can start talking about that right away. Yes. I have the same statement as before in the architecture overview. It's a starting point. Yes, of course, a lot of brainpower still needs to go into it. That's also flying. But it's a starting point.

EXPERT 13: I am extreme. I find this point from Expert 11 extremely central. Yes, as a bank, we have tried to do many things, i.e., orchestration. And we have neither had the capabilities nor has it been accepted. Yes, I believe this point is very, very, very relevant. Ultimately, we simply want to make life easier for our customers and not put ourselves at the center. At least, that's the mindset I want to start from. And here, it looks very much like an ego system to me. Yes, the bank in the middle and everyone bustling around it. Yes, and those are actually exactly the frameworks that never worked. Yes, sorry to say, because I... (..) In the best case scenario, that's how it is, but I wouldn't imply that it always has to be that way, and I certainly wouldn't see it as a starting point.

INTERVIEWER: Thank you. (...) Then one last point, and we're done. Back to the scope of application. That is, in order to implement this with the circumstances here, is the scope sufficient, is the area of application sufficient? I've already heard that some people might be missing something. Or is it sufficient? (6)

EXPERT 11: Yes. (...)

EXPERT 13: Moving forward with both eyes closed and a lot of good will. (4)

EXPERT 12: Correct.

EXPERT 11: Using the example of the bank as the center of the universe, it is clear that the bank cannot play a major role here. So all these platforms, features, the bank, if you look at it generically, it doesn't have any of these capabilities and probably can't do it alone. That means that for Beyond Banking, we definitely still need this gray eminence with the technical capabilities to deliver this—a partner, an independent partner. (...)

INTERVIEWER: Thank you. Any further comments? Additions, scope of application. Sufficient scope. What else are you missing? (8)

EXPERT 11: A little bit. The business-to-business aspect is missing. So, that's a really good example. Private individuals, perhaps private individual to private individual or private individual to limited liability company, could perhaps be used as an example for two other large corporations. How would you benefit from this? Because. Because. There's a bit of money in it and it can serve the banks that cater to their complicated wishes. Or are we then too much? (..)

INTERVIEWER 2: Yes, good.

EXPERT 13: I'm not in the scope. But then companies like Siemens become very good discussion partners, or let's say, I said, that's the Champions League, you'll fall off your chair. So if you could talk to the Siemens people, who have already been to our CCM, that would probably be exciting.

INTERVIEWER: Great. So, one last time, if anyone else would like to say anything, please feel free to do so now. (...)

INTERVIEWER: Thank you all very much. I'm ending the recording.

APPENDIX 24. DSR – Eval 3: Compiled Design M3

Step 1 - Informing and Inspiring

Target group: Management and influential audience

Step 2 - Execution/Implementation/Blueprint

Target group: Business Analysts and IT

Current situation and need for action

Why Beyond Banking Exists/Doesn't (3.8)?

As a starting point for Beyond Banking

Introduction and success factors

Why Beyond Banking Exists/Doesn't (3.8)?

The decisive lever for growth, customer proximity and competitiveness in the digital age of banking

What is Beyond Banking (3.6)?

Design M3

Why Beyond Banking Exists/Doesn't (3.8)?

Customer Journey/Use Case

Customer Journey is the key success factor for BBE implementation

Next Steps

From Vision to Action

Executive Summary

BBE 3.0 at a glance

Step 3 - Performance measurement/Evaluation

Target group: Management/Business Analysts

APPENDIX 25. DSR – Eval 4: Expert Survey – Questionnaire

Expert survey on Beyond Banking Ecosystems

The aim of the thesis is to develop an evaluated design for BBE 3.0. This will be evaluated in several evaluation cycles using design science research. This expert survey will be used to carry out the final iteration stage in order to evaluate the design.

What is Beyond Banking Ecosystems 3.0 (BBE 3.0)? C2C brokerage – connecting customers as suppliers and consumers in a smart (bank) marketplace, promoting organic cross-selling and up-selling, strengthening customer loyalty and generating sustainable network effects. The survey is based on the material compiled in the Conceptboard, which can be accessed via this link (log in as a guest): <https://atruvia.conceptboard.com/board/ntc1-zq0y-6419-puk7-3nto>

When you submit this form, it will not automatically collect your details like name and email address unless you provide it yourself.

* Required

Treatment 'Embedded Finance'

1. One expert suggests that 'embedded finance' should be taken into account in the model. Should this be considered in the model? *

- ☒ Yes, under step 1
- ☐ Yes, under step 2
- ☐ Yes, under step 1 and 2
- ☐ No
- ☐ I don't know what 'embedded finance' is.
- ☐ Other

2. How exactly should this artefact, 'Embedded Finance', be visualised in Step 1 or 2 (or both)? How does this artefact relate to other artefacts or phases/processes?

Enter your answer

Assessment of applicability (=proof of usefulness)

3. How would you rate the scientific/technical model (Step 2 only) based on the following criteria? *

	No	Rather no	Neutral	Rather yes	Yes
Usefulness	☐	☐	☐	☐	☐
Technical Feasibility	☐	☐	☐	☐	☐
Problem Relevance	☐	☐	☐	☐	☐

4. How would you rate the entire model (all steps together) according to the following criteria? *

	No	Rather no	Neutral	Rather yes	Yes
Usefulness	☐	☐	☐	☐	☐
Technical Feasibility	☐	☐	☐	☐	☐
Problem Relevance	☐	☐	☐	☐	☐

5. In design science research (DSR), the three realities of tasks, systems and users refer to the contextual environment in which the design artefact is evaluated. The aim is to understand how the artefact behaves in real task contexts, how it is integrated into real systems, and how it is used by real users (evaluation of the quality of a design artefact). In the previous evaluation cycle (Eval 3), experts individually related and evaluated the observable realities of 'real tasks,' 'real systems,' and 'real users' to the design. Now, the interaction of these three realities in the context of the design is to be evaluated. In other words, how does the artefact/design (scientific/technical model in Step 2) behave in the interaction of all three realities? (1=poor, 5=very good) * 

☆ ☆ ☆ ☆ ☆

6. Now we will evaluate the applicability of the scientific/technical model (Step 2). How likely is it that you can imagine using the model in your own company (banks) or in other companies (banks)? Please rate this using the stars (1=low, 5=high). * 

☆ ☆ ☆ ☆ ☆

7. Now we will evaluate the applicability of the entire model (all steps). How likely is it that you can imagine using the model in your own company (banks) or in other companies (banks)? Please rate this using the stars (1=low, 5=high). * 

☆ ☆ ☆ ☆ ☆

Performance Measurement

8. The most relevant KPIs for measuring beyond banking services and (banking) ecosystems are listed below as examples. Please rate them according to importance/relevance. * 

	Not important	Rather not important	Neutral	Rather important	Important
Average implementation time	☐	☐	☐	☐	☐
Adoption Rate (also opt-ins)	☐	☐	☐	☐	☐
Bank satisfaction (CSAT)	☐	☐	☐	☐	☐
Conversion Rate	☐	☐	☐	☐	☐
Cross-Sell Conversion Rate	☐	☐	☐	☐	☐
Cross-Sell Lead Rate	☐	☐	☐	☐	☐
Cross-Side Network Growth (Growth in supply and demand on a C2C platform)	☐	☐	☐	☐	☐
Customer Retention Rate	☐	☐	☐	☐	☐
Drop-off Rate (per step)	☐	☐	☐	☐	☐
Multi-Service Usage Rate (Number of services used per customer)	☐	☐	☐	☐	☐
Multiple Utilisation Rate (Percentage of users who use the BBS multiple times in a given period (e.g. month))	☐	☐	☐	☐	☐
Net Promoter Score (NPS)	☐	☐	☐	☐	☐

Number of BBS introduced per bank	☐	☐	☐	☐	☐
Peer-to-Peer Transaction Rate (Average number of mutual transactions per user in the C2C network)	☐	☐	☐	☐	☐
Referral Rate (Percentage of users who actively recruit new users)	☐	☐	☐	☐	☐
Support requests rate	☐	☐	☐	☐	☐
Viral Coefficient (Number of new users generated by an existing user)	☐	☐	☐	☐	☐
Churn-Rate	☐	☐	☐	☐	☐
Service Penetration Rate	☐	☐	☐	☐	☐
Communication participation/ application (Number or percentage of banks where, for example, notifications appear in the app/web – only if monitoring is available)	☐	☐	☐	☐	☐

9. What other KPIs are important to you for measuring beyond banking services and (banking) ecosystems? Please list them in the text field. 

Enter your answer

Verification of hypotheses

10. Please evaluate the following hypotheses in relation to the entire survey: * 

	No	Rather no	Neutral	Rather yes	Yes
An exemplary, conceptual implementation design can be used as a blueprint for banks to align scalable Beyond Banking Ecosystems strategically.	☐	☐	☐	☐	☐
This design approach offers considerable added value for banks and customers.	☐	☐	☐	☐	☐
The scalability of BBEs (Beyond Banking Ecosystems) is given despite banks' technical and infrastructural challenges.	☐	☐	☐	☐	☐
Decisive influencing factors and evaluation criteria can determine the value of a successful BBE.	☐	☐	☐	☐	☐

APPENDIX 26. DSR – Eval 4: Expert Survey – Raw Data Results

One expert suggests that 'embedded finance' should be taken into account in the model. Should this be considered in the IID model?		How exactly should this artefact, 'Embedded Finance', be visualised in Step 1 or 2 (or both)? How does this artefact relate to other artefacts or phases/processes?
1 Yes, under step 1		
2 Yes, under step 1		As one of the success factors.
3 Yes, under step 1 and 2		Processing of orders (payment management), insurance services (e.g. also for transactions on the platform)
4 I don't know what 'embedded finance' is.		From my point of view embeddd finance CAN be a part of beyond banking. From my point of view both strategies CAN complement each other. - STEP 1: as an optional 'value enabler' - STEP 2: as an optional technical integration modul/component
5 Yes, under step 1 and 2		
6 No		
7 I don't know what 'embedded finance' is.		
8 Yes, under step 1 and 2		In my opinion, embedded finance can be one of the use cases especially collaborating with e-commerce platforms or market places. For example, a customer wants to purchase an electronic with a relatively higher price and an immediate loan from the partner bank can be offered in the platform, or bank can also do the other way around.
9 Yes, under step 1 and 2		Embedded Finance ensures the customer interactions through touchpoints owned by 3 parties, is key for implementing a better customer experience and important in order to scale services and gain more reach and other customer segments through channels not owned by the bank.
10 No		

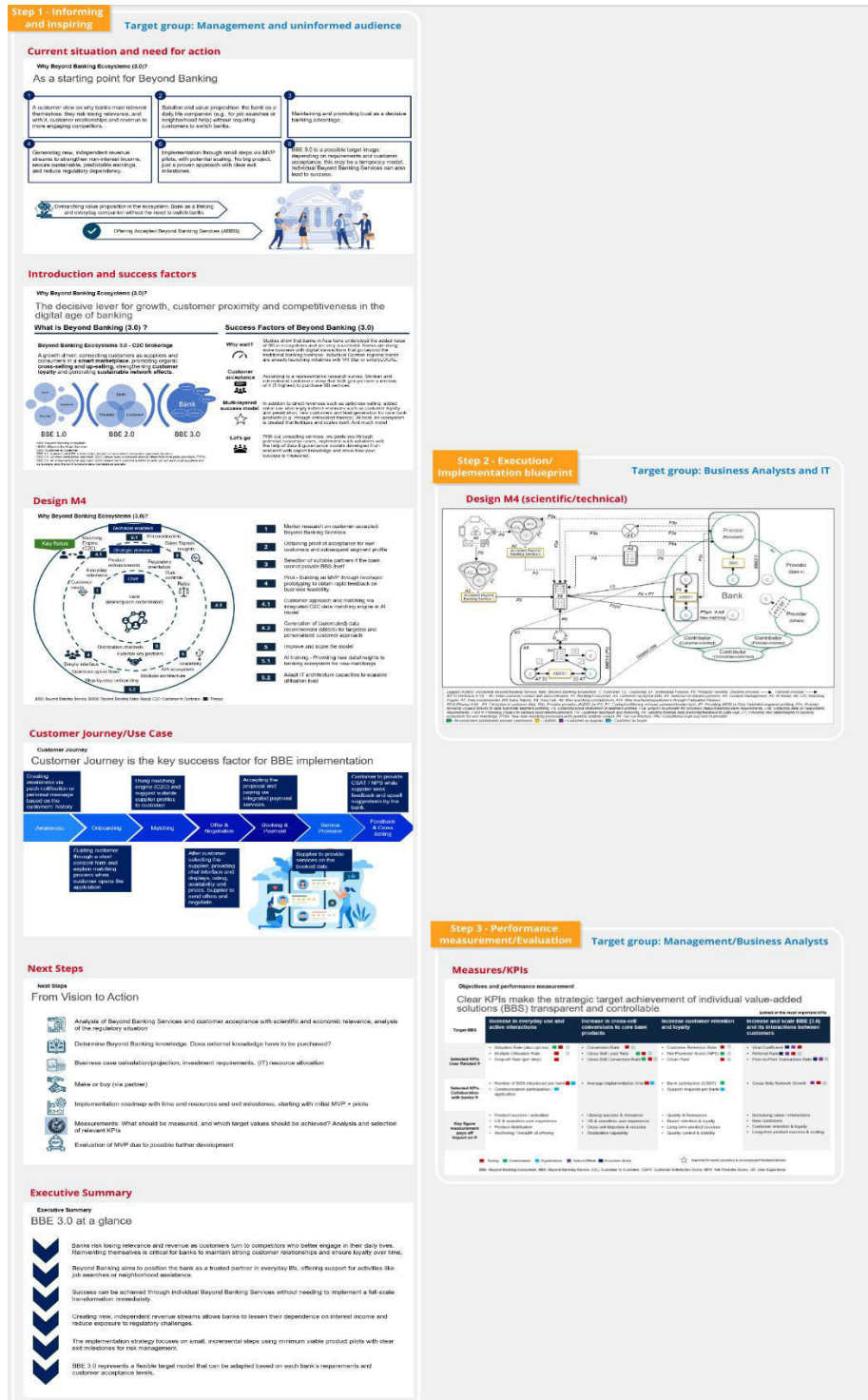
ID	Usefulness	Technical Feasibility	Problem Relevance	Usefulness2	Technical Feasibility2	Problem Relevance2
1	No	Rather no	Neutral	Rather yes	Rather yes	Yes
2	Rather yes	Rather no	Rather yes	Rather yes	Rather no	Neutral
3	Rather yes	Rather yes	Neutral	Rather yes	Rather yes	Rather yes
4	Neutral	Yes	Yes	Yes	Yes	Yes
5	Rather yes	Rather yes	Rather yes	Rather yes	Neutral	Yes
6	Yes	Rather yes	Rather yes	Rather yes	Rather yes	Rather yes
7	Rather yes	Neutral	Rather yes	Rather yes	Rather yes	Rather yes
8	Rather yes	Yes	Rather yes	Rather yes	Rather yes	Rather yes
9	Neutral	Neutral	Neutral	Rather yes	Rather yes	Yes
10	Yes	Rather yes	Yes	Yes	Yes	Yes

ID	In design science research (DSR), applicability of the three realities of tasks, systems and users refer to the contextual environment in which the design artefact is evaluated. The aim is to understand how the ar...	Now we will evaluate the applicability of the scientific/technical model (Step 2). How likely is it that you can imagine using the model in your own company (banks) or in other companies (banks)? ...	Now we will evaluate the applicability of the entire model (all steps). How likely is it that you can imagine using the model in your own company (banks) or in other companies (banks)? Please rate...
1		3	4
2		4	3
3		4	4
4		3	4
5		5	4
6		5	5
7		3	3
8		5	4
9		3	2
10		4	5

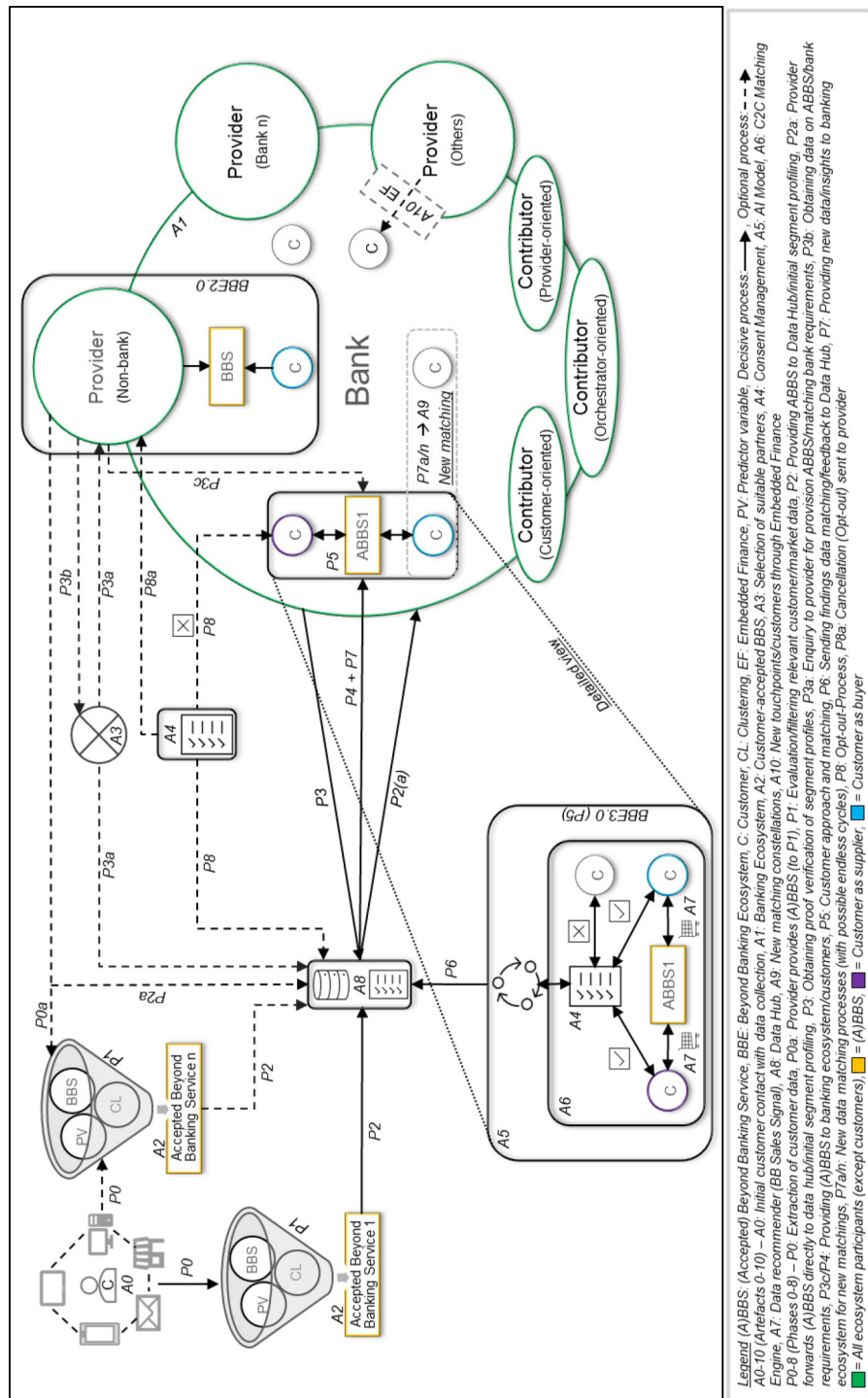
ID	Average implementation time	Adoption Rate (also opt-ins)	Bank satisfaction (CSAT)	Growth (Growth in supply and demand on a C2C platform)			Customer Retention Rate	Drop-off Rate (per step)	Rate (Number of services used per customer)
				Conversion Rate	Cross-Sell Rate	Importance			
1	Rather important	Rather important	Neutral	Important	Important	Important	Neutral	Rather important	Not important
2	Neutral	Important	Rather important	Rather not important	Neutral	Not important	Neutral	Rather not important	Rather important
3	Neutral	Rather important	Rather important	Rather important	Neutral	Important	Neutral	Rather important	Rather not important
4	Neutral	Rather important	Important	Important	Rather important	Important	Important	Neutral	Rather important
5	Neutral	Important	Rather important	Important	Important	Important	Important	Rather important	Rather important
6	Rather important	Neutral	Rather important	Rather important	Neutral	Neutral	Rather important	Rather important	Neutral
7	Rather not important	Important	Important	Important	Important	Important	Rather important	Rather important	Rather important
8	Neutral	Important	Neutral	Important	Rather important	Rather important	Important	Rather important	Important
9	Rather not important	Important	Important	Important	Important	Important	Important	Important	Rather important
10	Rather not important	Rather important	Important	Important	Important	Important	Important	Rather important	Rather important
ID	Rate (Percentage of users who use the BBS multiple times in 1 month)	Net Promoter Score (NPS)	Number of BBS introduced per bank	Transaction Rate (Average number of mutual transactions)	(Percentage of users who actively recruit new users)	Support requests rate existing user	Churn-Rate	Service Penetration Rate	participation/application (Number or percentage of banks)
1	Rather not important	Rather important	Not important	Not important	Neutral	Rather important	Rather important	Rather important	Neutral
2	Rather not important	Not important	Not important	Rather not important	Not important	Rather not important	Rather not important	Rather important	Rather not important
3	Rather important	Rather important	Not important	Rather not important	Rather important	Rather important	Neutral	Rather important	Not important
4	Rather important	Important	Neutral	Neutral	Rather important	Neutral	Important	Rather important	Important
5	Rather important	Rather important	Important	Rather important	Rather important	Rather important	Rather important	Important	Neutral
6	Rather important	Neutral	Rather not important	Rather important	Rather important	Neutral	Important	Neutral	Rather important
7	Neutral	Important	Neutral	Rather important	Rather important	Rather important	Rather important	Neutral	Neutral
8	Important	Rather important	Neutral	Rather important	Rather important	Rather important	Rather important	Rather important	Neutral
9	Important	Important	Important	Important	Rather important	Important	Important	Important	Rather important
10	Rather important	Important	Neutral	Rather important	Rather important	Rather important	Rather important	Rather important	Neutral

ID	What other KPIs are important to you for measuring beyond banking services and (banking) ecosystems? Please list them in the text field.	An exemplary, conceptual implementation design can be used as a blueprint for banks to align scalable Beyond Banking Ecosystems strategically.	This design approach offers considerable added value for banks and customers.	The scalability of BBEs (Beyond Banking Ecosystems) is given despite banks' technical and infrastructural challenges.	Decisive influencing factors and evaluation criteria can determine the value of a successful BBE.
1		Rather yes	Rather yes	Neutral	Yes
2		Neutral	Rather yes	No	Rather yes
3	Number of users, number of service providers, number of services, length of stay on the platform	Rather no	Rather yes	Neutral	Rather yes
4		Rather yes	Rather yes	Rather yes	Neutral
5	The listed metrics are more focusing on Engagement, Customer behaviour, partner/network Metrics. Which is crucial - however measuring financial impacts matters from my point of view as well (e.g. ROI, ARR, etc.)	Rather yes	Rather yes	Neutral	Rather yes
6		Rather yes	Rather yes	Rather yes	Neutral
7	Willingness to leave other existing competing platforms	Rather no	Rather yes	Yes	Rather yes
8	Average revenue per customer for the supplier and the bank.	Yes	Yes	Rather yes	Yes
9	Customer Effort Score (CES)	Neutral	Neutral	Yes	Yes
10	Steigerung des Ertrages pro Kunde nach Nutzung von BBS, Grundsätzlich: generierte Provisionserträge, Anbahnungsdauer vom ersten Kontakt bis zum Abschluss	Rather yes	Rather yes	Rather yes	Yes

APPENDIX 27. DSR – Eval 4: Compiled Design M4



APPENDIX 28. DSR – Eval 4: Design M4 (scientific/technical)



APPENDIX 29. DSR – Eval 3 and 4: KPI List

KPI	Description	Measurement variable	What it measures	Pays off
Activation rate of banks	Percentage of connected banks that have put the BBS into production and released it	%	How many banks have actively introduced the BBS?	Product distribution
Adoption rate	Proportion of bank customers who have used the BBS at least once	%	How many people have actually activated the product?	Activation/product success & UX
Average implementation time (time to go-live)	Time from project start to successful activation of the BBS at the bank	Days	How long does it take to go live?	Implementability
Average session duration	Average time spent by users per visit	Minutes per session	Intensity of use and user interest	UX/UI team, product, management
Awareness-to-adoption rate	Ratio between awareness and actual use of a service	% of informed users who use the service	Effectiveness of communication and value proposition	Marketing, change management
Bank satisfaction (CSAT)	Evaluation by bank contacts via surveys or dialogue formats	%	How satisfied is the bank with the product, service, and cooperation?	Quality control
Churn rate	Percentage of users who do not return after 30 or 90 days	%	How many are permanently lost?	Long-term product value
Communication participation (indirectly measurable)	Number or percentage of banks where, for example, notices appear in apps/on websites – <i>only if monitoring is available</i>	% or number (optional)	How visible is the BBS at the bank?	Engagement recognition (indirect)
Community engagement score	User engagement level in social or peer formats	Score based on likes, posts, comments	Social network effects and loyalty	Community team, marketing
Conversion rate	Percentage of bank customers who complete a BBS process and activate the product	%	How many successfully complete the process?	Completion Success Relevance and UX
Critical mass achievement time	Time until a user base is reached at which point the ecosystem grows independently	Time span (days/months)	Point in time at which network effects become effective	Ecosystem owner, strategy
Cross-sell conversion rate	Percentage of generated leads that lead to an actual product sale	%	How many leads turn into actual sales?	Cross-sell success
Cross-sell lead rate	Number or percentage of leads generated for other banking products from the BBS	Number or %	How often do potential customers become interested in other products?	Cross-sell impulse

Cross-Side Network Growth Rate	Growth of supply and demand on a C2C platform	$(\Delta \text{ Supplier} + \Delta \text{ Buyer}) \div \text{Total base} \times 100\%$	Platform balance and vital ecosystem	Platform Orchestrator
Customer Satisfaction Score (CSAT)	Evaluation of usage, e.g., on a scale of 1–5 after completing the BBS	% scale 1–5	How satisfied are users immediately after use?	Quality feedback (specific)
Drop-off rate (per step)	Percentage of users who drop out at a certain step in the process	% per step	Where do users drop off?	UX / friction Seamless user experience
Feature adoption rate	Percentage of users who use a new feature	Percentage of active users who use the feature	Success and relevance of new functionalities	Product development, innovation
Frequency of use	Average number of uses per active user per month	Number	How often is the BBS used per user?	Usage depth/product success
Interaction Depth Index	Depth of interaction within Beyond Banking functionalities	Weighted index based on usage intensity	Usage maturity per customer	Data analytics, UX
Liquidity Rate	Ratio of active matches to all potential connections	% of actual transactions vs. matches	Market depth, platform efficiency	Platform Manager, Product Owner
Match success rate	Proportion of successful matches in the C2C model	% of successful matches	Efficiency of the matchmaking process	Platform architecture, customer experience
Multiple usage rate	Percentage of users who use the BBS multiple times in a given period (e.g., month)	%	How many use the BBS more than once?	Product success
Multi-service usage rate	Number of services used per customer	$\emptyset$ Services/user	Depth of integration into everyday life	Platform economy, service management
Net Promoter Score (NPS)	Willingness to recommend on a scale of 0–10	Scale -100 to +100	How willing are users to recommend the product?	Brand loyalty / total value
Number of BBSs introduced per bank	Average number of productive BBSs per bank	Number	How many BBSs are in use?	Anchoring / range of products
Partner satisfaction score	Satisfaction of external partners (e.g., banks or third-party providers)	Score from surveys	Quality of cooperation, likelihood of recommendation	Partner Management, Business Development
Peer feedback score	Average feedback or rating score from user to user	Score from 1–5	Trust level and quality of interactions	UX team, Trust & Safety
Peer transaction rate	Average number of mutual transactions per user in the C2C network	Transactions ÷ active users	Platform activity & network liquidity	Products, Customer Success

Platform retention rate	Return rate of users to the platform	% of returning users after X days	Stickiness, user retention	Product Team, Customer Success
Referral rate	Percentage of users who actively recruit new users	Number of referrers ÷ active users	User retention, organic growth	Growth team, marketing
Service penetration rate	Percentage of customers who use at least one BBS	% of users with ≥1 BBS	Adoption beyond the basic account	Product development, strategy
Supply-demand ratio	Ratio of supply to demand in C2C or platform models	Number of suppliers / number of consumers	Balance in the ecosystem, risk of "cold starts"	Market Orchestrator, Matchmaking
Support requests per bank	Number of technical or organizational support cases during onboarding or live operation	Number / average per bank	How many problems occur?	Stability/support effort
Time between service adoption	Time between the use of two services by the same customer	Average time span	Cross-selling cycles	Sales, Customer Success
Time-to-First-Value (TTFV)	Time until a user experiences added value for the first time	Time (e.g., days since registration)	Onboarding efficiency, rapid benefits	Customer success, onboarding
Touchpoint conversion rate	Conversion according to specific customer touchpoints (app, email, bank branch)	Conversion rate per channel	Which channel effectively brings users to the service	Multichannel strategy, sales
Transaction Repetition Rate	Repeated interactions between the same C2C users	Proportion of repeat transactions	Trust and customer satisfaction in C2C commerce	Platform operators, CRM
Upsell uplift per user	Value increase through upselling to a user	Revenue increase per user (per month, year)	Effectiveness of cross-selling/upselling in the portfolio	Sales, monetization
Users per bank	Percentage of users who use the BBS multiple times in a given period (e.g., month)	%	How many end customers use the BBS at a bank?	Impact/usage success
Value-added service margin	Margin generated through third-party services	Revenue – costs per service	Monetization potential of beyond banking features	Finance, Strategy
Viral coefficient (K factor)	Number of new users generated by an existing user	Invites/user × Conversion Rate	Organic growth and scaling potential	Marketing, Product, Growth
Viral Cycle Time	Time until new users are acquired through invitations	Average time in days or hours	Speed of viral spread	Marketing, Product Release

Based on Abbas (2023), KPI.zone (n.d.), Livan et al. (2017), Makkonen (2024), Sanches & Ramos (2025), Schüller & Petrik (2023), Steinhardt (2024), Theodorakopoulos et al. (2025) and Wirtz et al. (2019)

