

Master Thesis

in

Master of Science (M.Sc.) International Management

Future of the German Banking Sector

Scenario planning with INKA 4 to generate future
scenarios and derive sustainable strategies

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“The future depends on what you do today.”

Mahatma Gandhi

Abstract

The German banking landscape is currently undergoing a paradigm shift of an unprecedented magnitude. As the financial world is changing, the future of German banks is highly uncertain. A multitude of present-day driving factors will shape the banking world of tomorrow. Therefore, this thesis aims to investigate and analyze the future of the German banking sector until 2030. The concept of scenario planning serves as underlying method for this research. Based on current factors influencing the German banking sector, the present thesis systematically develops coherent future scenarios. The generation of these scenarios is performed with the help of the scenario software INKA 4. This enables to assess a comprehensive picture of the future environment and the interactions between external influencing factors. Based on the most consistent future scenario, implications for the strategies of German banks are derived. As a result, German incumbents can question their strategic orientation and position themselves optimally for the future.

Keywords: *Scenario planning, German banking sector, Vision 2030, Strategy*

Key findings

- The future of the German banking sector is mainly affected by 19 major driving factors along five areas of influence including Technological, Economic, Regulatory, Social and Environmental.
- In total, 14 future scenarios were generated with INKA 4. Two scenarios were selected and extensively described to illustrate opposing future developments for the German banking sector until 2030.
- Based on expected changes and implications in the most consistent scenario, the sustainable '*Strategy 2030*' for German banks is outlined. Three strategic pillars, namely embrace digitalization, openness instead of reticence, and customer-centric thinking form the fundamental basis.

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List of abbreviations

AI	Artificial Intelligence
API	Application Programming Interface
AUM	Assets under Management
BaaP	Banking-as-a-Platform
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht
BCBS	Basel Committee on Banking Supervision
BD	Big Data
BigTechs	Largest and most dominant companies in the IT sector
BIS	Bank for International Settlements
CA	Consistency Average
CAGR	Compound Annual Growth Rate
CBDC	Central Bank Digital Currency
CIR	Cost-Income-Ratio
COE	Cost of Equity
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CS	Consistency Sum
DLT	Distributed Ledger Technology
EBA	European Banking Authority
ECB	European Central Bank
EU	European Union
FCM	Fuzzy Cognitive Map
FinTech	Financial Technology
FS	Financial Services
GDP	Gross Domestic Product
G-SIB	Global Systemically Important Banks
laaS	Infrastructure-as-a-Service
IFS	Interactive Future Simulations
IMF	International Monetary Fund

INTERAX	Interactive Cross Impact Simulation
IT	Information Technology
JST	Joint Supervisory Team
KWG	Kreditwesengesetz
KYC	Know-Your-Customer
LR	Leverage Ratio
LSI	Less Significant Institutions
MiFID	Markets in Financial Instruments Directive
MiFIR	Markets in Financial Instruments Regulation
MRO	Main Refinancing Operations
M&A	Mergers and Acquisitions
NCA	National Competent Authority
PaaS	Platform-as-a-Service
PMT	Probabilistic modified trends
PP	Probability Parameter
PSD	Payments Services Directive
ROE	Return on Equity
RWA	Risk-Weighted Asset
SaaS	Software-as-a-Service
SI	Significant institutions
SSM	Single Supervisory Mechanism
TIC	Trend Impact Analysis
TPP	Third Party Provider
XS2A	Access to Account

1 Introduction

1.1 Background and relevance

The global banking sector has experienced many ups and downs over the last years. At the moment, the banking landscape is undergoing a paradigm shift that has never been seen before in this magnitude. More than a decade after the last global financial crisis, financial institutions are facing fundamental changes by new challengers and challenges. A new era is about to dawn in the world of banking, and it is highly uncertain how the banks of tomorrow will look like and which facets will characterize them. But one thing is certain, they will look different from the banks of today. A wide range of present-day driving factors will have a decisive influence on the future of the banking sector.

First of all, rapid technological developments have resulted in a fundamental reinvention of the structure of financial institutions (Arslanian and Fischer 2019d). Almost no other industry sector is facing such fundamental challenges from the digitization as the financial industry (Brühl 2018). Innovative FinTechs and BigTechs have brought revolutionary changes in the banking sector and questioned the business model of incumbent banks (Anand and Mantrala 2019; Gomber et al. 2018). The profound technological change will presumably only be the beginning for a reinvented financial sector (Chen 2018; Arslanian and Fischer 2019d). Moreover, socio-economic developments such as the trend towards sustainability and altered customer behavior are impacting the banking industry. The digitalization particularly changed the way how people want to engage with their bank (Hellenkamp 2018c). The majority of today's bank customers are already digitally literate and open-minded towards financial innovations (Strietzel et al. 2018). Hence, digital processes and systems are gradually replacing conventional bank branches. These development trends permit customers to decide how and via which communication channel they want to be connected to their bank (Schuster and Hastenteufel 2019).

At the same time, the banking industry is confronted with sector-specific challenges. Increasing regulatory requirements, the current low interest rate environment, and margin pressures aggravate the difficult situation of German banks. In particular, the deluge of financial regulations since the financial crisis in 2008 has posed major challenges for banks. In conjunction with persistently low interest rates, the incumbents' scope for economic action is diminishing (Schuster and Hastenteufel 2019).

In a world of Artificial Intelligence (AI), Blockchain, and Open Banking, the banking sector in Germany will undoubtedly be completely different from what it is today. Therefore, the future of banks stands at a crossroads. They have to find answers to the multitude of pressing challenges in order to remain successful and viable. In the end, there will be winners and losers, as in every revolution. Some banks will be capable of adapting and thriving in the light of these changes, while others will be struggling to reinvent themselves to remain relevant (Arslanian and Fischer 2019d).

Only few studies have attempted to provide a holistic picture of the major drivers of change and their respective future impact on German banks. Most studies have only focused on individual aspects of the subject. Therefore, the aim of this thesis is to provide scientifically substantiated indications of challenges confronting the German banking sector until 2030. The thesis further intends to create holistic and plausible future scenarios on the basis of current literature. For that reason, the participative scenario technique was chosen as underlying methodology for this study. This instrument allows to develop coherent visions of the future and identify corresponding consequences as well as challenges. Wack expressed the usefulness of scenario planning activities as follows: "In our times of rapid change and discontinuity, crises of perception – the inability to see a novel reality emerging by being locked inside obsolete assumptions – have become the main cause of strategic failures" (Wack 1984, p. 95). This statement applies precisely to the current situation of German banks. If they continue to

think in their deadlocked way and are unable to envision and evaluate their future, they are at risk of falling behind.

The scenario software INKA 4 serves as the instrument to generate these future visions based on driving factors influencing the German banking sector. The systematically elaborated overview of possible future scenarios permits a look at future developments and resulting challenges. This serves as a foundation for banks to evaluate possible scenarios in 2030. On the basis of the generated scenarios, strategies and recommendations for action are derived. In conclusion, these will enable German banks to pursue a promising path at the present crossroads. In this context, the opening quotation from Mahatma Gandhi: “The future depends on what you do today” is very fitting for the demanding and unpredictable future of German banks.

1.2 Research objective

This thesis focuses on the future of the German banking sector by 2030. The long-term time horizon was chosen to ensure that the thesis does neither result in short-term trend continuations nor speculative long-term developments. The sector is expected to change drastically during this period. The research questions of the present thesis build on initial problems described in the section above. In general, the research questions phrase research objectives into questions, which can be answered by the research (Zikmund 2010). Besides the research questions, it is therefore also necessary to explicitly state the research objectives of the work. The research questions often act as a precursor to the development of the concrete research objectives (Saunders et al. 2009). According to Zikmund, the research objectives describe the concrete intended research results which direct the overall research process (Zikmund 2010). In this regard, the following **Table 1** presents the specific research questions and objectives of this thesis.

Table 1: Research questions and objectives of this thesis

Research questions	Research objectives
(1) What are major drivers of change influencing the German banking sector?	<ul style="list-style-type: none"> • Identification of key driving factors for the German banking sector. • Elaboration of the individual driving factors in the appropriate format and incorporation in scenario planning software.
(2) How will the future of the German banking sector look like in 2030?	<ul style="list-style-type: none"> • Generation of multiple, plausible, and coherent future scenarios for the German banking sector by 2030 with respective scenario planning software.
(3) How should German banks prepare and position themselves to cope with possible future scenarios?	<ul style="list-style-type: none"> • Analysis of implications for the strategies of German banks based on generated scenarios. • Conception of sustainable strategies and courses of actions for German banks.

1.3 Outline of the thesis

The present thesis is divided into eight chapters. A thematic introduction and background to the topic was already provided in section 1.1 of the first chapter. In addition, this section identified the research gap in the specific field and emphasized the scientific importance of the thesis. Section 1.2 followed with the definition of the research objectives and main research questions. In this section the overall structure of the thesis is explained.

Chapter two is devoted to the theoretical foundations of the German banking sector. Section 2.1 explains the basic functions and tasks of a bank. The structural features of the German banking sector are subsequently presented in section 2.2. In this respect, individual bank segments are discussed in greater

detail. The next section 2.3 will look at the German and European banking supervision in more depth. Lastly, section 2.4 provides a comprehensive analysis of the current situation of German banks.

Chapter three provides the theoretical basis of scenario planning for strategic foresight. The concept and definition of scenario planning is initially described in section 3.1. Section 3.2 follows by presenting the origins of the scenario planning technique. In the next section 3.3, the method and scenario building technique are explained. In the last section 3.4, a number of criteria for evaluating scenarios are specified.

Building on the theoretical foundations, the fourth chapter applies the method of scenario planning to the German banking sector with the aim to generate future scenarios. First of all, the research strategy and methodological approach of this thesis are explained in section 4.1. This is followed by an extensive and qualitative literature review of the key driving factors for German banks in section 4.2. This section is further structured into the individual areas of influence. Section 4.3 continues with the description of the procedure in the scenario software INKA 4. The section 4.3 finally presents the results of the thesis, including the detailed description of the selected future scenarios.

The following chapter five examines the implications for the strategies of German banks. In this respect, sustainable strategies and courses of action based on these implications and changes are outlined.

The sixth chapter contains a substantive summary of the present thesis and highlights the main outcomes.

Chapter seven represents the last chapter of this thesis and contains a conclusion as well as limitations of the work. At the end, a concise recommendation for future research is given.

2 German banking sector

2.1 Basic functions of banks

In principle, there is no universal definition of banks. Banks and their activities are subject to a continuous process of change. Thus, the structure of banking cannot be static. From a legal perspective, banks in Germany are defined by the German Banking Act (in German: Kreditwesengesetz - KWG). A distinction is made between institutions and financial companies, which in turn determines the respective legislative framework conditions. According to the German Banking Act, institutions are hereinafter referred to as credit institutions (§ 1 section. 1 sentence 1 KWG) and Financial Services (FS) institutions (§ 1 section. 1a sentence 1 KWG) (Hellenkamp 2018b).

In this sense, credit institutions are companies that conduct banking business on a commercial basis or to an extent that constitutes a commercially established business operation. Business field examples of credit institutions are lending, securities, payment, and deposit transactions. Savings banks and cooperative banks belong to this banking category. Conversely, FS institutions are companies that provide FS to others on a commercial basis or to an extent that requires a commercially organized business operation, and which are not credit institutions. FS include investment brokerage, advice, and management as well as financial portfolio management. For example, asset management and leasing firms belong to these specific companies. However, both banking types participate in the financial market, which generally includes the money, capital, credit, and foreign exchange market. (Hellenkamp 2018b; Springer 2017). Commonly, banks receive capital from investors and pass it on to borrowers. Compared to capital markets, banks not only create a market place for supply and demand, but also act as a market participant themselves. For this reason, banks are considered financial intermediaries. In doing so, they exercise different transformation functions (Hartmann-Wendels et al. 2019a; Hellenkamp 2018b).

2.2 Structural features

2.2.1 Overview

The financial system of Germany is a prototype of a bank-based system (Detzer et al. 2017; Allen and Gale 2001). In Germany, unlike other developed countries, a large share of the banking sector consists of publically owned banks (savings and cooperative banks), which are not exclusively profit-oriented (Detzer et al. 2017). In principle, credit institutions are allowed to conduct all kinds of banking business. As a result, the German banking system is considered a universal banking system (Detzer et al. 2017; Hartmann-Wendels et al. 2019a). **Figure 1** provides a general overview of the German banking system.

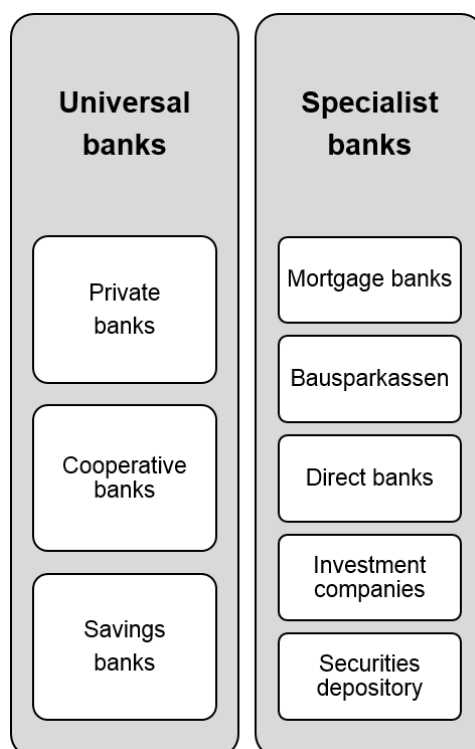


Figure 1: German banking system

Source: adapted to (Hartmann-Wendels et al. 2019a, p. 29).

Within the scope of this work, credit banks are referred to as private banks due to their profit-oriented nature. The underlying structure of the German banking sector is based on the so-called “Three-Pillar-System” (Behr and Schmidt 2016; Gilquin 2014). The three pillars are: private banks, cooperative banks (in German:

Genossenschaftsbanken), and savings banks (in German: Sparkassen) (see **Figure 1**) (Behr and Schmidt 2016; Detzer et al. 2017; International Monetary Fund 2016). In principle, the German banking system extends beyond these three pillars (Behr and Schmidt 2016). However, this thesis concentrates exclusively on the three main banking pillars, which are explained in greater detail in the next sections.

Generally, the “Three-Pillar-System” has existed for more than a century and has undergone comparatively few structural changes throughout the years. However, the institutional structure of banks within each pillar differs substantially (Behr and Schmidt 2016). **Table 2** summarizes key structural data of the German banking system from 2016 until 2018.

Table 2: Key structural data of the German banking system (2016-2018)

Bank groups	Number of institutions			Number of branches		
	2016	2017	2018	2016	2017	2018
Private banks	281	284	282	9,407	9,004	7,732
Big banks	4	4	4	7,005	6,820	6,298
Regional banks	167	165	159	2,246	2,024	1,274
Branches of foreign banks	110	115	119	156	160	160
Landesbanken	9	8	6	384	356	240
Savings banks	403	390	386	10,555	9,818	9,492
Cooperative banks	975	918	878	10,156	9,442	8,942
Other banks	56	53	51	1,472	1,452	1,428
Mortgage banks	15	13	11	36	38	44
Bausparkassen	20	20	20	1,400	1,385	1,357
Banks with special tasks	21	20	20	36	29	27
Total	1,724	1,653	1,603	31,974	30,072	27,834

Source: adapted to (Deutsche Bundesbank 2019d, p. 82, 2020, p. 104).

Moreover, **Table 3** contains information on the market share in terms of total assets of the various banking groups.

Table 3: Market share by banking groups (2017-2018)

Bank groups	Total assets 2017		Total assets 2018	
	Number (in million €)	%	Number (in million €)	%
Private banks	3,694,036	44.33%	3,568,154	43.16%
Big banks	2,230,408	26.77%	2,201,659	26.63%
Regional banks	1,056,715	12.68%	970,885	11.75%
Branches of foreign banks	406,913	4.88%	395,610	4.79%
Savings banks and Landesbanken	2,074,829	24.90%	2,062,261	24.95%
Cooperative banks	890,218	10.68%	933,916	11.30%
Other banks	1,673,879	20.09%	1,702,025	20.59%
Mortgage banks	228,704	2.74%	231,533	2.80%
Bausparkassen	230,196	2.76%	234,540	2.84%
Banks with special tasks	1,214,979	14.58%	1,235,952	14.95%
Total	8,332,962	100.00%	8,266,356	100.00%

Source: adapted to (Deutsche Bundesbank 2020, p. 106).

To sum up, the unique German banking sector consists of 1,603 institutions with almost 28,000 branches in the year 2018. The aggregated total assets of German banks fell slightly from 8.3 trillion euros in 2017 to 8.2 trillion in 2018. The market share of the three core banking pillars in terms of total assets is divided as follows: private banks (43.16%), cooperative banks (11.30%), and savings banks (24.95%) (see **Table 2** and **Table 3**).

2.2.2 Private banks

The private banks pillar comprises several subgroups including big banks, regional banks, and branches of foreign banks (Detzer et al. 2017; Hellenkamp 2018a). All private banks are organized on a private basis and the objective of their business activities is the pursuit of profit (Hartmann-Wendels et al. 2019a). This clearly distinguishes them from the other two pillars (Behr and Schmidt 2016). In 2018, 282 private institutions existed in Germany with assets accounting for more than 40% of total market share. Almost two thirds of this amount was contributed by big private banks (see **Table 2** and **Table 3**). Four German banks are considered big banks in 2018, namely Deutsche Bank, Commerzbank, UniCredit Bank, and Deutsche Postbank. (Hartmann-Wendels et al. 2019a). The following **Table 4** shows the ten largest banks in Germany in terms of total assets.

Table 4: Ten largest banks in Germany in 2018

Rank	Bank	Total assets (in million €)	Employees	Sector
1	Deutsche Bank AG	1,348,137	91,737	Private
2	DZ Bank AG	518,733	31,896	Cooperative
3	KfW	485,790	6,376	Public
4	Commerzbank AG	462,369	49,410	Private
5	Unicredit Bank AG	286,688	12,252	Private
6	DB Privat- und Firmenkundenbank AG	276,116	28,178	Private
7	Landesbank Baden- Württemberg (LBBW)	241,214	10,017	Public
8	Bayerische Landesbank	220,227	7,703	Public
9	ING Holding Deutschland GmbH	171,439	4,790	Private
10	Landesbank Hessen- Thüringen (Helaba)	162,968	6,074	Public

Source: adapted to (Kuck 2019, pp. 12–17).

Deutsche Postbank was recently fully acquired by Deutsche Bank and integrated into the DB Privat- und Firmenkundenbank AG, as indicated in **Table 4**. The Deutsche Bank is by far Germany's largest bank and the sole major international player in the country. In 2018, Deutsche Bank's total assets amounted to more than 1.3 trillion euros, which is more than twice as much as the second largest bank. Traditionally, big banks have acted as house banks for the large industrial corporations and provide them with long-term loans (Detzer et al. 2017).

Furthermore, regional banks belong to the private banks pillar. Regional banks were originally understood to be privately organized banks whose activities were geographically limited to a certain area (Hartmann-Wendels et al. 2019a). This group includes HypoVereinsbank, ING Holding Deutschland GmbH or Targobank AG & Co. KGaA. In the meantime, numerous regional banks operate nationwide (Hellenkamp 2018a; Hartmann-Wendels et al. 2019a). Moreover, banks established by industrial enterprises such as the Mercedes-Benz Bank and Volkswagen Bank belong to this group (Detzer et al. 2017).

Finally, branches of foreign banks are part of the private banks pillar in Germany. The presence of branches from foreign banks has increased strongly in the German banking sector (Hartmann-Wendels et al. 2019a). According to the banking statistics provided by the Deutsche Bundesbank, their number has risen from 20 in 1980 to 119 in 2018 (Deutsche Bundesbank 2019c; Detzer et al. 2017). Moreover, their total market share amounts to 4.8% in 2018 (see **Table 3**).

2.2.3 Cooperative banks

The second pillar comprises the cooperative banks, which primarily include the Volks- and Raiffeisenbanken. The number of institutions in this pillar decreased from 975 in 2016 to 878 in 2018, but still make up for more than half of total institutions in Germany (see **Table 2**). However, in terms of total assets, this banking group is the smallest among the three segments with a market share of 11.30% in 2018 (see **Table 3**).

The first cooperative credit institutions were founded in the mid-19th century with the objective to support their members' business activities (Hartmann-Wendels et al. 2019a; Behr and Schmidt 2016). Local, small and medium-sized cooperative banks are at the core of the cooperative banking group (Behr and Schmidt 2016). Similarly to savings banks, they have a simple business model and maintained a regional limitation of their sphere of activity (Hartmann-Wendels et al. 2019a; Behr and Schmidt 2016). Furthermore, local cooperative banks are independent legal entities and embedded in a close network of associated institutions. The specific institutional structure of cooperative banks clearly distinguishes them from other banks. The cooperative banks are in the hands of their members, which are at the same time their main clients (Behr and Schmidt 2016; Detzer et al. 2017). Their main business is the provision of loans, which they refinance through a high proportion of savings deposits (Hartmann-Wendels et al. 2019a).

The DZ Bank AG has acted as the central institution for cooperative banks and is considered the second largest bank in Germany (see **Table 4**). This central institution supports the Volks- und Raiffeisenbanken with liquidity management, execution of payment transactions, and in times of higher credit demand or excess liquidity (Hartmann-Wendels et al. 2019a; Hellenkamp 2018a).

2.2.4 Savings banks

The third pillar of the German banking sector is the savings banks. These include local savings banks and Landesbanken whose owners are public law entities, i.e. municipalities, districts or federal states (Hartmann-Wendels et al. 2019a; Hellenkamp 2018a). In 2018, 386 savings banks existed with more than 9,000 branches nationwide. The number of savings banks branches has declined continuously, but still accounts for the highest proportion in direct comparison (see **Table 2**). Combined, the savings bank pillar with more than two trillion euros in total assets makes up a quarter of the total market in Germany (see **Table 3**).

A general description of their tasks is prescribed by the savings bank laws of the individual federal states (Hartmann-Wendels et al. 2019a). They are usually required to serve the common interest of local clients and communities. Despite their provision to avoid making losses and to operate efficiently, the maximization of profits is not their main objective (Detzer et al. 2017). The majority of the profit is used for charitable projects or to strengthen equity (Behr and Schmidt 2016). The core of this pillar are legally independent and small to medium-sized local savings banks (Behr and Schmidt 2016). The numerous institutions of the savings bank sector operate within the framework of a financial association (Hellenkamp 2018a). Historically, they have served small and medium-sized companies in their region to ensure better access to credit (Detzer et al. 2017).

Besides the local savings banks, there are also the Landesbanken in this segment. At the moment there are six Landesbanken in Germany, including the Bayerische Landesbank (BayernLB), Landesbank Baden-Württemberg (LBBW), Norddeutsche Landesbank (NORD/LB), and Landesbank Hessen-Thüringen (Helaba) (Hellenkamp 2018a). In general, Landesbanken are jointly owned by local savings banks and by one or more federal states (Behr and Schmidt 2016; Detzer et al. 2017). The Landesbanken primarily have two functions. Firstly, they act as the main bank of their respective federal state and handle all of its banking businesses. Secondly, they serve as clearing bank for local savings banks within their region (Behr and Schmidt 2016; Detzer et al. 2017). In addition, the Landesbanken enable investment and borrowing of funds within the savings bank network and provide a clearing facility for payments (Hartmann-Wendels et al. 2019a).

Overall, this specific network structure was a crucial factor for the lasting success of savings banks. The functional capability of this pillar is based on the regional principle, which confines banking business to the local area. Due to this principle, equivalent savings banks are regarded as partners rather than competition (Behr and Schmidt 2016; Flögel and Gärtner 2018).

2.3 Banking supervision

The performance of an economy is highly dependent on a functioning and reliable banking and financial system. Therefore, banking supervision aims to guarantee a stable and efficient banking system to achieve its macroeconomic function (Hellenkamp 2018a; Bundesanstalt für Finanzdienstleistungsaufsicht n.d.). In Germany, the principal legal framework for banking supervision is the German Banking Act, signed in 1961. § 6 section (2) KWG specifies the main objectives of banking supervision in Germany, which are to prevent irregularities within the banking system (Bundesanstalt für Finanzdienstleistungsaufsicht n.d.). This is intended to prevent undesirable developments that could affect the efficient functioning of the banking system (Hellenkamp 2018a).

The Deutsche Bundesbank and Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) are responsible for the banking supervision in Germany. In particular, the BaFin is the managing authority exercising supervision in accordance with the German Banking Act. The cooperation framework between these two supervision authorities is subject to § 7 section (1) KWG (Bundesanstalt für Finanzdienstleistungsaufsicht n.d.).

Fundamental reforms were undertaken in response to the financial crisis in 2008. In 2014, the Single Supervisory Mechanism (SSM) was launched by the European Central Bank (ECB) in order to promote uniform supervision of the European banking union (Bundesanstalt für Finanzdienstleistungsaufsicht n.d.). The SSM refers to a system of banking supervision with the objective to create and secure a stable financial system in Europe. Since then, the ECB has been solely responsible for the central tasks relating to banking supervision (Hellenkamp 2018a; Bundesanstalt für Finanzdienstleistungsaufsicht n.d.; Hartmann-Wendels et al. 2019b; European Central Bank 2018a). A distinction is made between direct and indirect supervision, as illustrated in the following **Figure 2**.

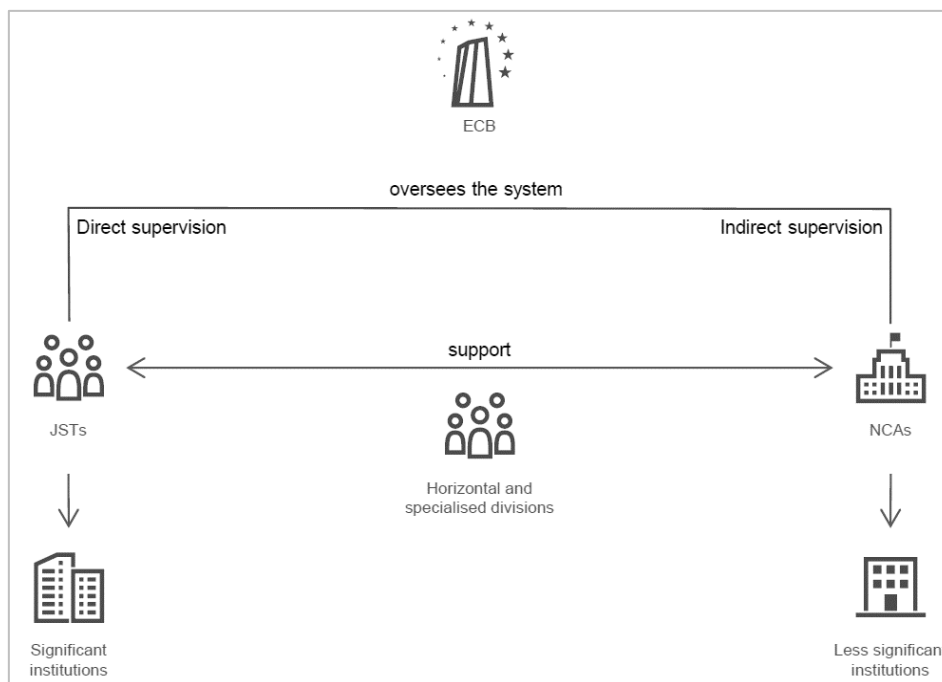


Figure 2: Operating principle of the SSM

Source: (European Central Bank 2018a, p. 8).

In this respect, Significant Institutions (SI) are under direct supervision of the ECB (Hellenkamp 2018a; European Central Bank 2018a). At the end of 2018, 59 German institutions were classified as SIs and thus under direct supervision of the ECB (Bundesanstalt für Finanzdienstleistungsaufsicht 2019b). Whereas Less Significant Institutions (LSI) are under indirect supervision of the ECB, and the National Competent Authority (NCA) remains responsible (Hartmann-Wendels et al. 2019b; Hellenkamp 2018a). The ECB and the NCAs cooperate closely in the supervision of significant institutions. For that purpose, a Joint Supervisory Team (JST) is established for each major credit institution (European Central Bank 2018a; Hartmann-Wendels et al. 2019b).

Beyond that, there are further institutions responsible for financial market regulation. Firstly, the European Banking Authority (EBA) aims particularly to ensure the functioning of the European Union (EU) internal market through effective and appropriate supervision and regulation (Hellenkamp 2018a). Secondly, as financial systems of all developed economies are closely interlinked, there is an increased need for international harmonization of banking

supervision. At the international level, the Basel Committee on Banking Supervision (BCBS), situated within the Bank for International Settlements (BIS), is responsible for establishing internationally uniform regulatory rules (Hartmann-Wendels et al. 2019b).

2.4 Status quo of German banks

In recent years, banks have been confronted by the ongoing digitization, tougher regulation, low-interest rate environment, and increased competition (European Central Bank 2018b). These burdens have revealed structural weaknesses of German banks, which are described in the following.

In 2018, the profit situation of German credit institutions deteriorated. Annual net profit fell by 39.2% to 12.2 billion euros compared to the previous year. Not a single banking segment was able to achieve its targeted annual net profit for the year 2017 (Deutsche Bundesbank 2019d). Cooperative and savings banks accounted for more than half of annual net profit, despite holding only a little more than a third of total assets, as stated in **Table 3** (Deutsche Bundesbank 2019d). In a highly fragmented market, their earnings tend to decline, while costs remain high despite all austerity programs. As a result, profits do not cover the significantly declining Cost of Equity (COE) (Sinn and Thobe 2019).

The following **Table 5** provides an overview of the main profitability indicators Return on Equity (ROE) and Cost-Income-Ratio (CIR). The ROE is defined as the quotient of annual net income and shareholders' equity. In addition, the CIR gives another indication of the profitability of financial institutions. The lower the ratio, the more income remains after deduction of operating costs (Deutsche Bundesbank 2019d).

Table 5: ROE and CIR of individual banking groups (2016-2018)

Bank groups	ROE (after tax) in %			CIR in %		
	2016	2017	2018	2016	2017	2018
Private banks	3.20%	2.79%	1.54%	74.3%	79.4%	79.3%
Big banks	2.50%	2.30%	1.24%	81.4%	88.7%	87.9%
Regional banks	4.45%	3.33%	1.90%	64.2%	67.8%	66.1%
Branches of foreign banks	-	-	-	56.6%	53.3%	54.9%
Landesbanken	-1.95%	0.98%	-3.89%	63.6%	72.5%	76.5%
Savings banks	7.42%	6.72%	4.82%	67.8%	67.1%	68.2%
Cooperative banks	8.39%	7.05%	5.51%	66.6%	65.7%	66.2%
All Banks	4.27%	4.08%	2.40%	69.3%	71.9%	73.1%

Source: adapted to (Deutsche Bundesbank 2019d, 84,88).

In general, banks in Germany had problems to grow ROE in the recent past (Koch et al. 2019). As shown in **Table 5**, between 2016 and 2018 the ROE continuously decreased in all banking segments. The ROE after tax has almost halved since 2016 and stood at 2.40% by the end of 2018. However, there were significant differences across the individual banking segments. Savings and cooperative banks performed better than private banks, with a ROE of 4.82% and 5.51% respectively. The private banking segment only achieved a ROE of 1.54% in 2018. In particular, big private banks had difficulties to regain their ROE levels prior to the crisis (Koch et al. 2019). The average ROE of banks in Europe was around 7.0% in 2019 according to the Risk Assessment Report by the EBA. German banks are located at the last place and are thus not considered profitable by European standards (European Banking Authority 2019c; Oliver Wyman 2018). Generally, the low profitability level of German banks can be seen as an overcapacity indicator in the market (Oliver Wyman 2018).

The CIR rose across all three bank pillars in the last years and underlines the challenging situation of German banks. According to Sinn and Thobe, the CIR

increased by 10% since 2010 (Sinn and Thobe 2019). In 2018, the CIR of all banks was 73.1%, with private banks achieving the highest value. In particular, big banks, which in theory should benefit from economies of scale, are least profitable, as seen in **Table 5** (Deutsche Bundesbank 2019d). In European comparison, German banks showed the worst cost efficiency among all countries. The average CIR of more than 80% among the included German institutions is well above the sample average of 64.1% (European Banking Authority 2019c).

Declining income and increasing costs contributed equally to the overall CIR surge (Koch et al. 2019). The interest income, still the most important income component of German banks, remained below its long-term average (Deutsche Bundesbank 2019d). The key driver for low income generation is the overbanked and thus underpriced financial market (Koch et al. 2019). High expenses for the ongoing digitalization, staff, and implementation of new regulations put additional pressure on the cost side (Sinn and Thobe 2019; European Banking Authority 2019c). For German institutions, personnel expenses still accounted for 50.2% of total administrative expenses in 2018, although the total number of employees declined from 608,399 in 2016 to 571,084 in 2018 (Deutsche Bundesbank 2019d). Recently the number of employees seemed to rise again due to the need of highly qualified specialists for the digitization and necessary implementation of regulatory requirements (Deutsche Bundesbank 2019d; Koch et al. 2019). Other administrative expenses such as investments in product development, IT, and digitization initiatives account for the rest. Finally, administrative expenses in relation to total assets are currently at their highest level since 2003 (Deutsche Bundesbank 2019d).

Moreover, the overall number of financial institutions constantly declined in the last 20 years. The consolidation process in the German banking sector continued in 2018 (Deutsche Bundesbank 2019c). As mentioned earlier, the number of institutions declined from 1,724 in 2016 to 1,603 in 2018 (For comparison: 1,990 in 2014; 2,053 in 2012; 2,277 in 2007; 3,578 in 1997; 4,719 in 1990) (Deutsche

Bundesbank 2020). Since the financial crisis in 2008, the average yearly decline of credit institutions stands at 2% (Sinn and Thobe 2019), resulting in leaner bank pillars (Oliver Wyman 2018). According to Koch et al., the number of German banks fell by 43% between 2000 and 2017. However, the consolidation rates vary between the different banking segments. Consolidation activities occurred especially among cooperative banks (76%), followed by saving banks (15%) and private banks (6%) (Koch et al. 2019). Nonetheless, Germany still has an above-average number of banks per million of bankable inhabitants (Koch et al. 2019). The ongoing consolidation development indicates an excess capacity in the market (Oliver Wyman 2018), as supply exceeds demand (Koch et al. 2019).

At the same time, the number of branches continued to decline substantially in 2018. At the end of 2016, 31,974 branches were reported. This number fell by 4,140 to 27,834 branches in 2018. This represents a reduction of almost 13% (see **Table 2**). Considering the overall development of branches since 1998, a continuous thinning of the branch network in the German banking sector can be seen (Deutsche Bundesbank 2019c).

In summary, despite an ongoing consolidation process, the German banking sector remains highly fragmented with 1,603 institutions at the end of 2018. The concentration of assets is lower than in other national banking markets, as the big banks only hold slightly more than a quarter of total assets (see **Table 3**). Moreover, German banks still show a dense branch network with almost 28,000 branches in 2018. The overall level of competition is high, which results in lower price levels compared to other markets and restricts revenue generation (Koch et al. 2016; Behr and Schmidt 2016). Hence, German banks have been struggling to grow profitability in recent years. In particular, shrinking ROE and a rising CIR emphasize this challenge (see **Table 5**). The structural features of the German banking sector described in chapter 2.2 contribute to this challenging situation. Nevertheless, the banking system has been relatively stable in recent years (Behr and Schmidt 2016). In the end, it will be crucial how German banks are dealing with the current and upcoming challenges.

3 Scenario planning for strategic foresight

3.1 Concept and definition

The environment is characterized by constant change, uncertainty, complexity, and innovation (Amer et al. 2013; Varum and Melo 2010; Verity 2003). Therefore, more and more companies are using scenario planning methods to cope with these essential aspects (Amer et al. 2013). One methodology of future analysis is scenario planning, in which systematically coherent future scenarios are developed for a chosen topic on the basis of the momentary situation, as illustrated in **Figure 3** (Geschka and Schwarz-Geschka n.d., 2012). In other words: “Scenario planning simplifies the avalanche of data into a limited number of possible states” (Schoemaker 1995, p. 26).

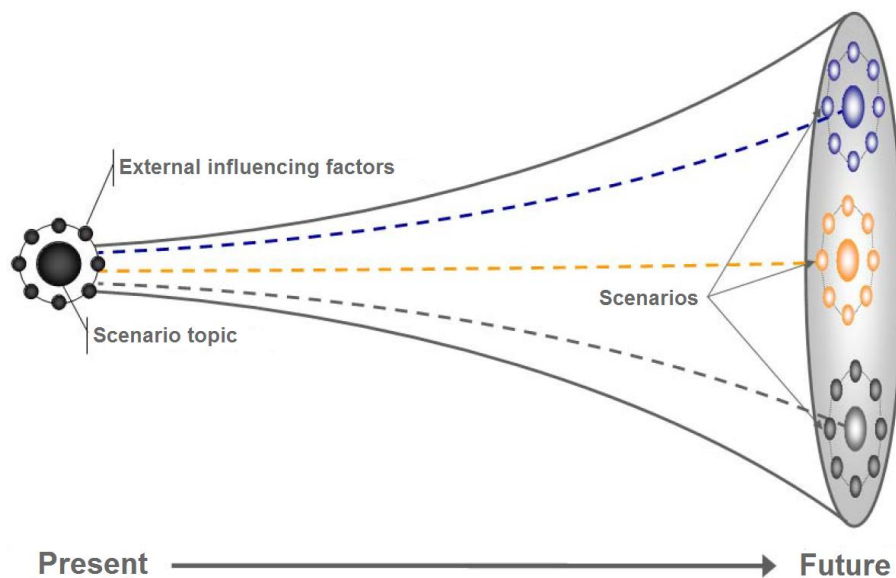


Figure 3: Scenario technique model

Source: adapted to (Geschka and Schwarz-Geschka n.d., p. 2).

The concept of scenario planning is based on the assumption that a subject is essentially determined by external influences. Thus, in order to determine future scenarios, it is necessary to analyze the future development of external influences (Geschka and Schwarz-Geschka n.d., 2012). In general, scenarios

create a holistic picture of the future environment and interactions between external influencing factors (Martino 2003; Schoemaker 1995). This promotes strategic thinking and thus contributes to transcend thinking limitations through the creation of multiple future perspectives (Amer et al. 2013). In the literature, scenario planning has been defined in several ways by scholars and practitioners. The following **Table 6** shows some of the most cited definitions of scenario planning.

Table 6: Scenario planning definitions

Author	Date	Definition
Kahn	1967	"Hypothetical sequence of events leading to a possible future." (Kahn and Wiener 1967, p. 6)
Porter	1985	"An internally consistent view of what the future might turn out to be - not a forecast, but one possible future outcome." (Porter 1985, p. 63)
Schoemaker	1995	"Scenario planning is a disciplined method for imagining possible futures that companies have applied to a great range of issues." (Schoemaker 1995, p. 25)
Schwartz	1996	"A tool for ordering one's perceptions about alternative future environments in which one's decisions might be played out." (Schwartz 1991, p. 45)
Ringland	1998	"That part of strategic planning which relates to the tools and technologies for managing the uncertainties of the future." (Ringland 1998, p. 2)

In summary, scenarios are not considered explicit forecasts or predictions (Chermack et al. 2001; Lindgren and Bandhold 2009) and do not provide an accurate future description (Varum and Melo 2010). Rather, they aim to deepen the understanding of the paths leading to different future scenarios (Schoemaker 1995; Porter 1985; Verity 2003). In short, scenarios present a variation of

plausible future events (Chermack et al. 2001). This thinking in alternative futures is an essential aspect of the scenario planning technique and clearly distinguishes it from other forms of future foresight (Geschka and Schwarz-Geschka 2012, n.d.; Schwenker and Wulf 2013). According to Schoemaker, the use of scenario planning for organizations is particularly favorable in certain types of conditions (Schoemaker 1991). These types of conditions are described as follows:

- (1) High uncertainty
- (2) Cost-intensive surprises have happened in the past
- (3) Inadequate new opportunities are generated
- (4) Strategic thinking is of low quality
- (5) Significant industry changes occurred or are about to happen
- (6) Common framework is preferred
- (7) Strong opinion differences exist
- (8) Competitors are applying scenario planning (Schoemaker 1991, p. 27)

The general objective of scenario planning is to provide answers to the following two questions: firstly, what could happen, and secondly, what would be the impact? (Chartered Global Management Accountant 2015). Burmeister and Schulz-Montag go one step further and consider the following domains and questions, presented in **Table 7**, as the main drivers for the use of scenario planning (Burmeister and Schulz-Montag 2009).

Table 7: Main drivers for the use of scenario planning

(1) Market strategies	<ul style="list-style-type: none"> • What will our core markets look like in five to ten years? • How do we intend to position ourselves strategically in the market?
(2) New business areas	<ul style="list-style-type: none"> • What new business areas do we want to develop? • How do we intend to create value in these business areas?

(3) Product innovations	<ul style="list-style-type: none"> • What are the needs of tomorrow's customers? • With which products and services do we inspire tomorrow's customers?
(4) Risk minimization	<ul style="list-style-type: none"> • What challenges in the environment in which our company operates must we prepare for? • Which new threats could endanger our position? • How do we develop future-proof strategies to counter these threats?

Source: adapted to (Burmeister and Schulz-Montag 2009, p. 283).

This leads to the conclusion that scenario planning improves decision-making in an uncertain and complex environment (Schwenker and Wulf 2013), as it is aiming to compensate for underestimation of change (Schoemaker 1995). Further, it impels managers to challenge their current strategy and thinking (Chermack et al. 2001). Thereby a greater flexibility and identification of future innovations can be achieved (Hiltunen 2009; Varum and Melo 2010). Moreover, it offers organizations the chance to increase understanding of their fast-changing business environment and its implications (Sarpong and Amoah 2015). Hence, organizations are able to assess their plans, tactics, and strategies in consideration of plausible future environments (Chartered Global Management Accountant 2015). Verity states that this enables managers to develop superior strategies in the long term (Verity 2003).

The anticipation of future trends is a decisive factor for the overall competitiveness of firms (Varum and Melo 2010). In times of rapid changes and uncertainty, the ability to react quickly can make a difference between a flourishing business and failure (Chermack et al. 2001). Hamel and Prahalad argue that developing strategic foresight is crucial to stay ahead of the change curve (Hamel and Prahalad 1994).

3.2 Origins of scenario planning

Since earliest times, humans have been intrigued by the future and used the concept of scenarios for exploring the future. Scenarios as a planning tool are firmly entrenched in the military sector. Throughout the history, scenario techniques have been utilized by military strategists for war game simulations (Bradfield et al. 2005). Nonetheless, formulated principles of scenario techniques were firstly documented in the 19th century by von Clausewitz and von Molke, two Prussian military strategists (Reibnitz 1989).

The establishment of modern day scenario planning emerged after World War II (Amer et al. 2013; Ringland 1998). Most authors ascribe the emergence of strategic scenario planning to Herman Kahn and the Rand Corporation (Lindgren and Bandhold 2009; Verity 2003; Chermack 2011). The Rand Corporation was established with the objective to research new weapon systems (Chermack et al. 2001; Bradfield et al. 2005). This assignment demanded the development of simulation models which would allow to investigate future environments (Bradfield et al. 2005). Therefore, Kahn established a scenario technique named “future-now” thinking (Chermack et al. 2001; Lindgren and Bandhold 2009; Ringland 1998; Verity 2003). This technique intended to combine imagination with detailed analyses (Chermack et al. 2001). In the mid-1960s, Kahn established the Hudson Institute to expand his scenario technique to public policy and social forecasting (Bradfield et al. 2005). His aim was to help people break their mental blocks and to think the unthinkable (Ringland 1998; Chermack 2011).

Shortly thereafter, the concept of scenario planning moved to the business community. General Electric and Royal Dutch Shell Company (Shell) were the first to use scenario planning as strategic tool in the 1960s and 70s (Bradfield et al. 2005; Verity 2003). Shell introduced the study “Year 2000” in 1967 in order to examine Shell’s economic position in 2000. The study did foresee discontinuity and oil price increases. On that basis, the Horizon Year Planning was launched in 1969 in order to look forward to the year 1985 (Ringland 1998; Bradfield et al. 2005). The work of Shell during that period is described in two Harvard Business

Review articles by Pierre Wack (Wack 1985a, 1985b). Their capability to anticipate possible futures and to act fast was the primary reason behind their success during this time (van der Heijden 1996). The success of Shell with scenario planning led to a change in future thinking among other organizations (Chermack 2011; Chermack et al. 2001). Empirical research by Linneman and Klein showed that nearly 50% of US Fortune 1000 companies were utilizing scenario planning between 1977 and 1981. They further observed that scenario planning was generally applied for long-term planning (10 years or longer) and was more popular among larger firms (Linneman and Klein 1983).

In the 1980s, the use of scenario planning decreased due to recessions and reductions in staff. Additionally, the over-simplistic use of scenario planning convoluted the nature of scenarios with forecasts (Chermack et al. 2001; Ringland 1998). Renewed interest in scenario planning in the 1990s led several consulting firms to develop their own scenario planning techniques (Chermack 2011; Lindgren and Bandhold 2009).

In a world of increasing uncertainty, the need and application of scenario planning techniques has grown again in recent years (Chermack 2011). Bishop et al. conclude that scenario planning is the core element of future studies (Bishop et al. 2007). According to Bain & Company's annual Management Tools & Trends survey, the use of scenario planning as a strategic management tool is expected to rise in the upcoming years (Rigby and Bilodeau 2018).

3.3 The scenario building technique

According to the literature, there are numerous methods for generating scenarios, without a predominant approach (Amer et al. 2013; Chartered Global Management Accountant 2015; Bradfield et al. 2005). The scenario building techniques by Schoemaker and Schwartz are among the most cited in the respective literature (Amer et al. 2013; Varum and Melo 2010). Schoemaker presented a comprehensive scenario development technique, which

compromises ten steps (Schoemaker 1993; Schoemaker 1995). Eventually, numerous scenario building techniques from simplistic to complex and quantitative to qualitative have been established and used (Amer et al. 2013). In general, scenario development techniques are categorized into three main schools of approaches (Amer et al. 2013; Bradfield et al. 2005; Varum and Melo 2010). These main schools are as follows: (1) Intuitive logics school, (2) Probabilistic modified trends (PMT) school, and (3) the French school of La prospective (Amer et al. 2013; Bradfield et al. 2005). Besides, there are four quantitative scenario development techniques (Amer et al. 2013; Bradfield et al. 2005). These quantitative methods are: (1) Interactive Cross Impact Simulation (INTERAX), (2) Interactive Future Simulations (IFS), (3) Trend Impact Analysis (TIC), and (4) Fuzzy Cognitive Map (FCM) (Bradfield et al. 2005; Amer et al. 2013; Huss and Honton 1987). Finally, Amer et al. argue that a mix of quantitative and qualitative scenario planning techniques are preferable and result in more robust scenarios (Amer et al. 2013).

In this research, the scenario software INKA 4, developed by Geschka & Partner Unternehmensberatung GmbH, is applied. Therefore, particular emphasis is placed on the description of this scenario building technique. According to Meyer-Schönherr, the scenario method in INKA is considered a combination of quantitative and qualitative methods, which follows a systematic and formalized approach (Meyer-Schönherr 1992). The scenario technique by Geschka & Partner Unternehmensberatung GmbH is based on eight individual steps, which are visualized in **Figure 4**. The individual steps of the scenario building technique are described in more detail hereafter.



Figure 4: Eight steps of the scenario building technique

Source: adapted to (Geschka and Schwarz-Geschka 2012, p. 7).

Step 1: Structuring and defining the topic

First of all, the concise subject must be delimited. Structural features, characteristics, and current problems must be identified. Moreover, the status quo of the subject is described.

Step 2: Identifying and structuring main influencing factors

All external factors influencing the topic are identified, collected, sorted, and structured. The influencing factors are then categorized into areas of influence and evaluated in terms of their impact intensity.

Step 3: Formulating descriptors and developing projections

The determined influencing factors are defined as descriptive or quantitative parameters (descriptors). For complex topics, the number of descriptors is generally limited to 64. The descriptors have to include all significant factors and allow for a recording of both quantifiable and qualitative developments. Further, the current situation has to be specified for all defined descriptors. Based on this, projections for the scenario target year are established. The projections are based on forecasts as well as expert knowledge. For descriptors which do not show clear trends, different development paths should be set as alternative projections. For all projections, substantiated and plausible justifications must be provided.

Step 4: Formation and selection of alternative consistent assumptions

The fourth step comprises the formation and selection of alternative assumptions by a calculation algorithm. The INKA 4 software is based on a matrix, which compares the values of all alternative descriptors. It is estimated which projections are mutually dependent, which are unrelated, and which are mutually exclusive to each other. Based on this, INKA 4 generates several consistent sets of assumptions, which form the framework for the formulation of scenarios in the next step.

Step 5: Developing and interpreting selected impact scenarios

In general, the scenarios must develop from the current situation towards the future. As the leap into the future should not go too far, intermediate steps (usually five years) are defined. A comparison is made at each intermediate step and the corresponding developments in the next period are tracked. This allows for a cross-linked development process from the current situation to the scenario target year.

Step 6: Introduction and impact analysis of unexpected disruptive events

Unexpected trend-breaking events that steer the development into a different direction, are detected with the use of creativity techniques. Possible disruptive

events can be earthquakes, major explosions, reactor accidents, political events, pandemics or technological breakthroughs.

Step 7: Deriving consequences and recommendations for the task

The future visions of the topic area are derived from the generated scenarios and ultimately interpreted and presented in a clear manner. Consequently, recommendations for action are deduced.

Step 8: Conceptualizing of measures and strategies

The final step does not necessarily belong to the scenario building technique in a narrow sense. However, it is beneficial that the scenario team also thinks about the conceptualization of measures and strategies in order to successfully prepare for the future. Therefore, consequences are deduced from the final scenarios to develop strategic guidelines and concrete measures (Geschka and Schwarz-Geschka 2012; Schwarz-Geschka 2017).

3.4 Scenario criteria

In the literature on scenario planning, several researchers have identified criteria for the validation of scenarios. According to Amer et al. there is no accurate number of optimal future scenarios in the respective literature (Amer et al. 2013). However, several researchers suggest the development of three to six alternative scenarios. Schoemaker and Van der Heijden recommend at least two or more scenarios (Schoemaker 1993; van der Heijden 1996). Wilson proposes four scenarios as an appropriate number (Wilson 1998). Others state that the number of scenarios depends largely on the consideration of uncertainties (Amer et al. 2013). In the following **Table 8**, Pillkahn gives a general recommendation of possible numbers of scenarios and their implications.

Table 8: Number of scenarios and their implications

Number of Scenarios	Implications
1	It will be the most likely scenario, though it is convenient for strategy formulation, but one scenario will not yield any alternate future or future options.
2	Two scenarios are usually based on two extreme situations (optimistic and pessimistic scenarios) which are difficult to handle in the context of evaluation.
3	Recommended by many researchers but there is a risk of focusing on the middle (most likely) scenario Possible, good cost-benefit ratio.
4	Possible, good cost-benefit ratio.
5	Possible.
More than 5	Possible, but cost of drafting and evaluating large number of scenarios will be very high and not justifiable.

Source: adapted to (Pillkahn 2008, p. 200).

Besides the appropriate number of scenarios, validation criteria are equally important. Van der Heijden outlines five validation criteria for scenarios in his widely cited work. These validation criteria are defined as follows:

- (1) **At least two scenarios** are needed to reflect uncertainty.
- (2) Each scenario must be **plausible** and **grow logically** from the past and the present.
- (3) Scenarios must be **internally consistent**.
- (4) The scenarios must be **relevant** to the client's concern.
- (5) Scenarios must produce a **new and original perspective** on the issues (van der Heijden 1996, p. 187).

Furthermore, Wilson suggests five criteria in order to select and elaborate scenarios. These are explained as follows:

- (1) **Plausibility:** The selected scenarios must be plausible; that is, they must fall within the limits of what might conceivably happen.
- (2) **Differentiation:** Scenarios should be structurally different. In other words, they should not be so close to one another that they become simply variations of a base case.
- (3) **Consistency:** Scenarios must be internally consistent. The combination of logics in a scenario must not have any built-in inconsistency that would undermine the credibility of the scenario.
- (4) **Decision-Making Utility:** Each scenario, and all the scenarios as a set, should contribute specific insights into the future that will bear on the decision focus you have selected.
- (5) **Challenge:** The scenarios should challenge the organization's conventional wisdom about the future (Wilson 1998, p. 91).

To conclude, three to five scenarios are suitable for a scenario planning project (Amer et al. 2013). Moreover, it is crucial to generate a manageable amount of scenarios that capture the situation dynamics effectively and address the core topic (Mietzner and Reger 2005). In addition, consistency and plausibility are pivotal for the validation and credibility of scenarios (Amer et al. 2013; Schoemaker 1993). In that regard, the use of a consistency matrix ensures the internal consistency of scenarios (Amer et al. 2013). The consistency matrix is applied to review the compatibility of variations within the different scenario drivers (Pillkahn 2008). Finally, Chermack et al. emphasize the importance of checking the validity of scenarios to assure that they provide an adequate basis for key decisions (Chermack et al. 2001).

4 Scenario planning for German banking sector

4.1 Research strategy and methods

The examination of the future of the German banking sector implicates an exploratory research design. This research design allows to understand a problem or an explicit situation in more depth, and thereby extends the comprehension of the specific research subject (Saunders et al. 2009). Further, the research approach of this thesis is based on a qualitative strategy. The qualitative research strategy principally emphasizes the use of textual description instead of quantification in the data collection and analysis (Bryman 2012). The concept of scenario planning was chosen as the fundamental method, because it is one of the most practical tools to create a holistic picture of the future and to understand the paths leading to it.

In order to obtain a comprehensive overview of driving factors for the German banking landscape in 2030, extensive literature research was conducted. The comprehensive literature review was performed from September 2019 to February 2020. Published literature, developments, and events after February 2020 are not considered in this study. The literature review served to collect secondary data from a significant number of sources. Secondary data can generally be defined as data previously collected for other scientific purposes. This data offers beneficial information to answer the respective research question (Saunders et al. 2009). The suitability and value of secondary data was achieved by evaluating the reputation of the source and citation frequency. Altogether, several full-text databases were used to collect current and relevant data. These databases were: EconBiz, Business Source premier (EBSCO), Science Direct, Emerald Insight, Nomos, and Springer Link. Moreover, Google Scholar was used to find open access scientific articles. In the context of identifying current key drivers of change for the future of the German banking sector, more than 250 literature sources were identified, analyzed, and used.

The diligent literature review was conducted along the distinct areas of influence. The determination of areas of influence was based on the concept of the PESTLE or PEST analysis. In general, the PESTLE analysis examines environmental influencing factors along six dimensions: (P) Political, (E) Economic, (S) Social, (T) Technological, (L) Legal, and (E) Environmental (Johnson et al. 2009; Ho 2014; Steuernagel 2017). This strategic framework allows to identify, understand, and categorize external influences (Ho 2014). Johnson et al. argue that PESTLE analysis and scenario planning tools are interrelated. The PESTLE tool allows to identify and provide an extensive list of key drivers of change (Johnson et al. 2009; Cairns and Wright 2018). These can be considered as high-impact environmental influencing factors that affect the future of the chosen subject. Depending on how they evolve, fundamentally different futures can be created. The generation of future scenarios in turn is based on these key drivers of change. Therefore, scenario planning is based to a large extent on the PESTLE analysis. This allows to explore varied possibilities on how the macro-environment potentially changes (Johnson et al. 2009). The PESTLE dimensions themselves are not driving forces, but rather act as areas of influence (Cairns and Wright 2018).

For those reasons, the dimensions of the PESTLE analysis were selected to define the areas of influence for this research. However, in the context of this thesis, the political dimension of the PESTLE analysis was not included. This is due to the fact that clear long-term political trends and their precise effects on the future of German banks cannot be clearly identified and scientifically justified. In addition, the legal dimension was renamed to regulatory, as this better corresponds to the research subject. Finally, the following five areas of influence were determined for this thesis: Technological, Economic, Regulatory, Social, and Environmental. Within the scope of the literature review, 19 key drivers of change were identified in the various areas of influence. These current driving factors for German banks are presented in more detail in the following section.

4.2 Driving factors for German banks

First of all, the 19 key driving factors will determine how the German financial system will look like in 2030. **Figure 5** depicts an overview of the areas of influence and the respective drivers of change.

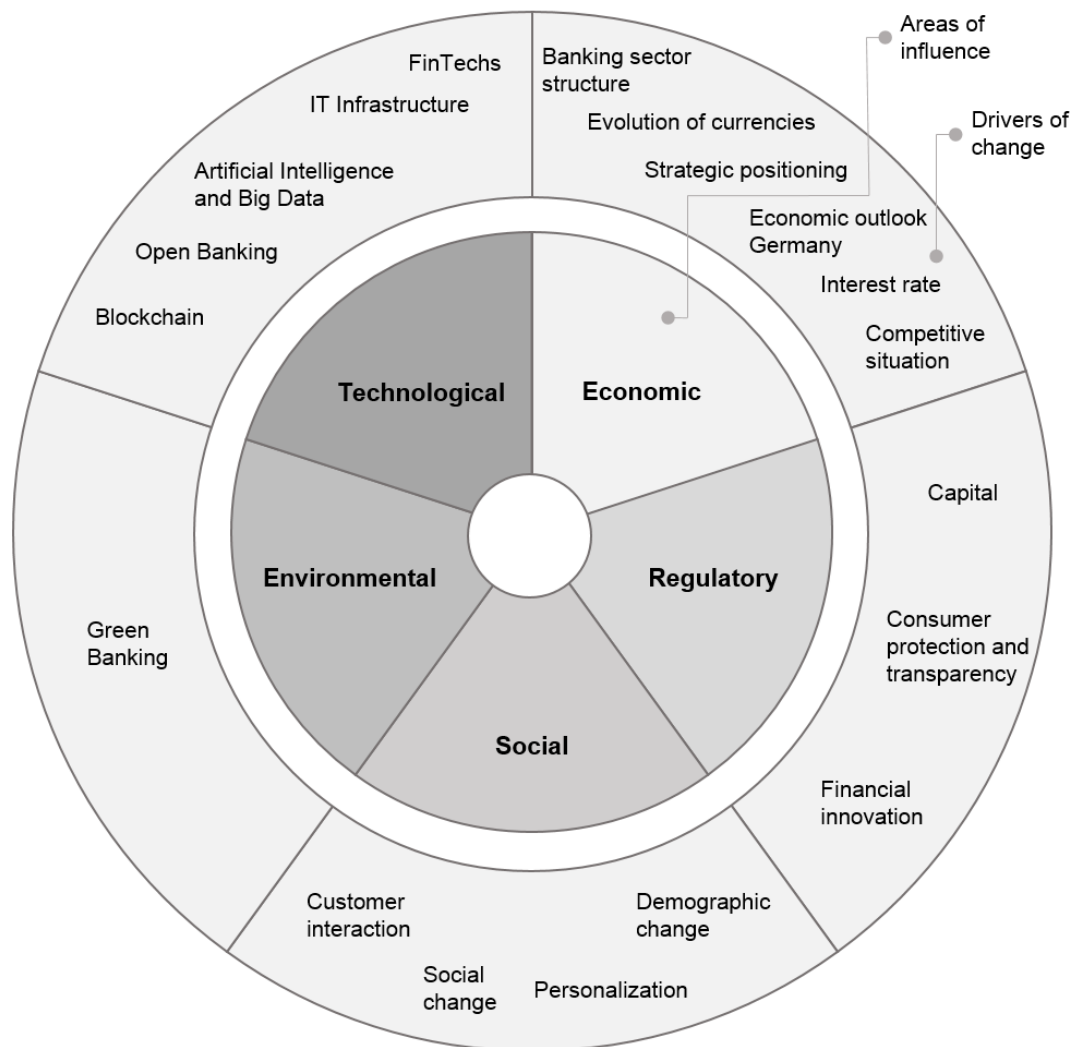


Figure 5: Overview of driving factors for the German banking sector

In the following, the individual drivers of change are described in greater detail including the various streams of opinion detected in the literature. In this context, the 19 key driving factors are highlighted in bold letters for better understanding. Please also refer to **Appendix A** – List of final descriptors for a detailed view of the driving factors pursuant to the specified structure in the INKA 4 software.

4.2.1 Technological

The digitalization has reached unprecedented heights and particularly the financial sector is undergoing far-reaching technological changes (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). The rapid advances in technology and consumer adoption enable a radical reinvention of the financial sector (Arslanian and Fischer 2019d; World Economic Forum 2018a). Chen argues that technological changes are just the start of a new financial world (Chen 2018). In particular, the driving factors **FinTechs**, **Blockchain**, **Artificial Intelligence and Big Data**, **Open Banking**, and **IT infrastructure** strongly influence the future of German banks.

First of all, **FinTechs** are considered the groundbreaking disruption, which substantially transform the banking sector (Lee and Shin 2018; Gimpel et al. 2018). The term stands for the interlinkage of finance and technology (Arner et al. 2015; Alt et al. 2018; Gomber et al. 2017; Dorfleitner et al. 2017a). Gimpel et al. specify FinTech as follows: “FinTech characterizes the usage of digital technologies such as the Internet, Mobile Computing, and Data Analytics to enable, innovate, or disrupt financial services” (Gimpel et al. 2018, p. 247). In particular, innovative Information Technology (IT) solutions, emergence of start-ups, changing customer behavior, favorable regulations, and the sharing economy have led to the rapid FinTech movement (Alt et al. 2018; Lee and Shin 2018). FinTechs make use of advancements in IT to deliver innovative financial solutions with respect to the new requirements of customers (Anand and Mantrala 2019). On the whole, the FinTech movement threatens the business model of incumbents, but also provides opportunities (Omarini 2018).

A growing body of literature has examined the FinTech movement and implications for incumbents. On the one hand, the relevance of incumbents could be diminished by new entrants (Skan et al. 2015). This digitally disrupted scenario implies that technology enabled financial innovations by FinTechs challenge the business model of incumbents (Klus et al. 2019). Drummer et al. argue that FinTechs are more innovative, leaner, agile, and customer centric (Drummer et

al. 2016). In their study, Dorfleitner et al. provided a forecast for FinTechs in Germany. In a real case scenario, the market volume for crowdlending and payments will rise significantly (Dorfleitner et al. 2017b). Ultimately, traditional financial service providers will struggle in responding to value-creating and innovative FinTech applications (Gomber et al. 2018).

On the contrary, incumbents deal with the revolutionary change by cooperating with FinTechs to combine their strengths (Anand and Mantrala 2019). This allows banks to access new and innovative technologies, capabilities, and approaches (Deloitte 2018). Häring underlines cooperation advantages such as stronger customer relationship and expanded customer reach (Häring 2018). According to several investigations of banks reaction to FinTechs, it is visible that the majority favors strategic partnerships in order to benefit from their advantages (Brandl and Hornuf 2017; European Banking Authority 2019c). Since 2014, the number of strategic cooperations has multiplied tenfold (PwC 2018) and more than 80% of incumbents are seeking to partner with the new market entrants (PwC 2017b). This future scenario can be coined as a “If you can’t beat them, join them” scenario (King 2019; Häring 2018). In conclusion, the trend of cooperation between incumbents and FinTechs to exploit the potential of new technologies will most likely continue.

Secondly, **Blockchain** possesses vast potential to radically disrupt and reconfigure the banking industry according to many experts (Rosati and Čuk 2019; Casey et al. 2018; Beinke et al. 2018; Guo and Liang 2016). Blockchain is mostly described as Decentralized or Distributed Ledger Technology (DLT) (Frizzo-Barker et al. 2019). Firstly applied in 2008 as the underlying technology of Bitcoin, it is now the core of the FinTech revolution (Rosati and Čuk 2019). Basically, the technology provides a decentralized, digital database (Morkunas et al. 2019), which enables peer-to-peer value transfers (Frizzo-Barker et al. 2019). Hence, intermediaries such as banks are no longer required to authenticate transactions (Frizzo-Barker et al. 2019). Generally, four characteristics are specific to Blockchain, namely persistency, anonymity, decentralization, and

auditability (Zheng et al. 2017). A large body of literature highlights the potential and advantages of Blockchain to revolutionize banking by 2030. Korschinowski et al. identify increased transparency and monitoring of transactions as the major advantage of Blockchain (Korschinowski et al. 2018). Dubbed the “trust machine” (Economist 2015), the technology can further improve security and efficiency (Frizzo-Barker et al. 2019) as well as lower entry barriers (Casey et al. 2018). Several studies point out numerous fields of application in banking, such as digital identity (know-your-customer), risk assessment, payments and remittance, credit and lending, smart contracts, trading, digital currencies, etc. (Higginson et al. 2019; Rosati and Čuk 2019; Zheng et al. 2017; Swan 2015). This projection ultimately foresees the creation of a safer and fairer financial sector in Germany based on the Blockchain technology (Casey et al. 2018).

Conversely, several research papers stress the regulatory, technical, and implementation challenges associated with Blockchain. Firstly, the distributed nature of the technology leads to regulatory challenges, which need to be addressed by regulators. Legislation have a considerable impact on how fast and far the technology will develop (Yeoh 2017). Secondly, technical challenges regarding the scalability of transactions will pose problems (Korschinowski et al. 2018; Casey et al. 2018). Currently, transactions are restricted to seven per second, due to block mining and size. At the present time, this is not sufficient to cope with real-time transactions (Zheng et al. 2017; Korschinowski et al. 2018). Rosati and Cuk argue that in the strongly regulated, conservative, and profit-seeking banking sector, factors such as customer acceptance, uncertainty of the outcome, and increased regulation burdens are decisive for the adoption of Blockchain. They also state that the transition to Blockchain enabled business models is currently slow (Rosati and Čuk 2019). Eventually, the technology might not be able to overcome these challenges to reach its full potential until 2030 (Iansiti and Lakhani 2017).

Thirdly, **Artificial Intelligence and Big Data** are driving more and more developments in business and technology (World Intellectual Property

Organization 2019). These advances fundamentally impact the banking world due to the abundance of digital data and possibility to detect patterns among the data (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a; World Intellectual Property Organization 2019). AI is a field of computer science, which involves intelligent systems that are able to perform tasks associated with human intelligence as problem-solving, decision-making or learning (Patterson 1990; Bellman 1978). In essence, AI is about using machines to interpret data to derive insights, identify patterns, and take action (Arslanian and Fischer 2019e). So far, AI and Big Data (BD) applications in the German banking sector have been modest and typically involve customer identification, fraud prevention or processes related to Know-Your-Customer (KYC) (Kaya 2019b). The review of literature on this topic revealed that two future perspectives are likely, namely the full implementation or partial implementation of AI and BD.

The first scenario implies that German banks will fully seize the technological opportunity presented by AI and BD. This will permanently change the dynamics of how banks operate (Jubraj et al. 2018; Kaya 2019b). Financial service providers will use the technology mainly along four dimensions: personalization, automation, innovative value propositions, and enhanced decision-making (Arslanian and Fischer 2019a; World Economic Forum 2018b). This allows banks to deploy personalized FS on a large scale (Arslanian and Fischer 2019a). Tailored services and products can result in greater customer experience (Corea 2019) and optimized customer acquisition (Arslanian and Fischer 2019a). Moreover, AI enabled automation has the potential to reduce operational costs of German banks due to enhanced speed and efficiency (Arslanian and Fischer 2019a). Particularly, Robotic Process Automation (RPA) allows for significant effectiveness and efficiency improvements in banking (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). Furthermore, the combination of analytics and large data quantities permits banks to generate deeper insights and thus facilitates innovation and value creation (Jubraj et al. 2018; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). Lastly, the advances in accuracy of prediction greatly improves risk assessment, optimization of capital, customer

identification process, detection of fraudulent activity, and overall decision-making (Kaya 2019b; Arslanian and Fischer 2019a; Lau and Leimer 2018). To sum up, the full deployment of AI and BD simplifies, individualizes, and speeds up processes within the bank and between the bank and the customer. This is key to overcome profitability challenges and remain competitive in the market (Jubraj et al. 2018; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a).

The second scenario indicates that incumbents face several obstacles, which hinder full implementation of AI and BD. Therefore, a partial implementation appears more likely. The main obstacles are regulatory constraints concerning data privacy, increased customer sensitivity towards sharing personal data, lack of trust creation, and lacking technology expertise and infrastructure (Corea 2019; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). First of all, the highly regulated nature of the banking industry may hinder an efficient use of the technology (Kaya 2019b). The current outdated financial framework fails to keep up with advancing technologies and thus creating high uncertainty and hindering full deployment (World Economic Forum 2018b; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). Moreover, the consumer interest to preserve privacy still outweighs the added value of AI services (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). According to the Big Data and Trust consumer study, German consumers are most sensitive about sharing their financial information in international comparison (Rose et al. 2018). Moving forward, lack of protection and transparency may lead to adverse effects in trust (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). In addition, incumbents will struggle to fully adopt AI and BD because of lacking technology expertise and legacy IT infrastructure (Arslanian and Fischer 2019a; World Economic Forum 2018b).

Another driving factor for the German banking sector is **Open Banking** or Application Programming Interface (API) Banking. This concept is about creating equal competition conditions between traditional banks and other firms in the market (Dietz et al. 2018). It is mainly based on the introduction of the Payment

Services Directive (PSD) II, technical interfaces (APIs), and technology advances (Borgogno and Colangelo 2019; Doyle et al. 2017). The PSD II, effective since January 2018 (Deutsche Bundesbank n.d.), forces banks to open up their customer and transaction data to Third Party Provider (TPP) (Doyle et al. 2017; Brühl and Krahen 2019). Specifically, the APIs enable a fast and simple integration of this data into TPP applications (Bramberger 2019a). In a nutshell, Open Banking facilitates the creation of open and digital ecosystems as well as considerably removes entry barriers for non-bank firms (e.g. FinTechs, BigTechs, etc.) (Dietz et al. 2018). This conversion poses serious challenges and opportunities for German banks (Botta et al. 2018). They either decide to embrace Open Banking or they will face an increasing disintermediation of their value chain.

Regarding the latter, it can be assumed that the data monopoly of traditional banks will be broken in the future (Citi GPS 2018). The market dynamics will change decisively with the movement towards open financial ecosystems and new market entrants (Deloitte 2019). As a result, the traditional business model of banks, which includes the ownership of product, technology, distribution, and customer data, is being challenged (Mattila et al. 2018). The Access to Account (XS2A) framework under PSD II particularly fosters the disintermediation of the value chain (Citi GPS 2018). Post PSD II, incumbents will likely lose the ownership of customer interface to TPPs (Mattila et al. 2018; Doyle et al. 2017). Several experts argue that incumbents will gradually inherit the role as primary service provider in a digital financial ecosystem (Mattila et al. 2018; Schmitz et al. 2017; Bramberger 2019a). Consequently, banks will prospectively face market share losses, decreasing profit margins, and cost pressure due to the increased competition. In summary, banks will face a disintermediation of their value chain and inherit a different role in the foreseeable future (Doyle et al. 2017; Citi GPS 2018).

Regarding the first option, German incumbents may decide to embrace the paradigm shift presented by the concept of Open Banking. By welcoming the

opening-up of the market, banks will have the opportunity to cooperate with new entrants and benefit from their competitive advantages. Hence, banks are able to better understand new behaviors and needs of customers (Monitor Deloitte 2018), and adapt their business model accordingly (Korschinowski et al. 2017; Bramberger 2019a). Another advantage of exchanging and enriching customer data with TPPs is the improvement of existing services and products (Bramberger 2019a; Borgogno and Colangelo 2019). The open revolution will offer a great chance to transform the banking business towards an open and digital ecosystem (Monitor Deloitte 2018). Doyle et al. argue that this change presents the opportunity to generate new sources of untapped revenue and to become more customer-centric (Doyle et al. 2017). On the basis of these developments, banks will more and more adopt a Banking-as-a-Platform (BaaP) strategy (Zachariadis and Ozcan 2016; Ernst and Young 2018). In that respect, banks may contribute their knowledge of compliance, security or authentication and benefit from new revenue streams, technology advancements, and digital innovations (Ernst and Young 2018). In this shared and digital ecosystem, where product and distribution are unbundled, incumbents have to embrace Open Banking and collaboration to maintain their relevance (Doyle et al. 2017).

Lastly, the **IT infrastructure** has been identified as a crucial factor for the future of German banks. The aforementioned new technologies, new customer requirements, increasing number of regulations, and tight budgets put pressure on the IT infrastructure of German banks (Freudenstein et al. 2019). Generally, relative IT expenses in the banking industry are considerably higher than in other industries (Alt and Puschmann 2016). According to an investigation by Citi Research, banks IT expenses accumulate for more than eight percent of total revenue. Further, between 15% and 25% of annual costs are assigned to IT (Citi GPS 2018). In general, more than two thirds of this spending is allocated to maintaining outdated systems (Arslanian and Fischer 2019c). The legacy IT architecture of banks, which were appropriate in the past, reveal several difficulties today. These difficulties particularly include the lack of agility, flexibility, and efficiency as well as difficult modification and connection (Citi GPS 2018;

Strietzel et al. 2018). Specifically, German banks lag behind in terms of digital banking maturity according to the EMEA Digital Banking Maturity 2018 study (Groote et al. 2018). There is a great discrepancy between current IT requirements and the outdated IT infrastructure of banks (Herrmann and Heinke 2018). These obsolete IT systems cannot cope with the new requirements (Strietzel et al. 2018) and thus require reconstruction measures (Herrmann and Heinke 2018; Freudenstein et al. 2019). In summary, the outdated, costly, insufficient, and product-centric IT infrastructure impairs the organizational ability of banks to handle the evolving financial ecosystem. Consequently, moving away or renovating from their legacy IT is key for incumbents (Arslanian and Fischer 2019b). Strietzel et al. argue that a successful banking sector transformation in Germany can only succeed if an up-to-date core banking system is in place (Strietzel et al. 2018). According to the literature, there are two options for German banks moving forward, either to outsource their IT to the cloud or to modernize and update their existing legacy IT.

Outsourcing IT systems to the cloud will enable banks to overcome present limitations and thus concentrate on their core competences. The current legacy IT reached the point of needlessness, and integration within these outdated systems is complex and costly (Citi GPS 2018). Research concerning the impact of digital transformation on sourcing strategies in Germany supports this view by highlighting rising outsourcing activities among banks. Further, cloud services use is expected to increase in the near future (Demirbas et al. 2018). In general, a broad array of services are offered by cloud providers, such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) (Röseler and Steinbrecher 2019). Outsourcing entails several advantages, for example increased efficiency, agility, and scalability as well as lower barriers for the integration of third party services (Arslanian and Fischer 2019b; Srinivas et al. 2018). Hence, costs and complexity are reduced and incumbents will improve their competitiveness (Dorschel 2018). On the other hand, Röseler and Steinbrecher point out the operational risks associated with outsourcing. If the identification, control, and mitigation of operational risks are no

longer within the organizational boundaries of banks, specific regulatory requirements are essential (Röseler and Steinbrecher 2019; Moeller 2017).

Modernizing and updating their legacy IT is the alternative option for German banks. This will be achieved by integrating new technologies and applications into their core IT system (Arslanian and Fischer 2019b). Based on a study on technology priorities for FS firms, 23% of survey participants view modernizing their IT system as most important field (Srinivas et al. 2018). Several experts state that this allows incumbents to achieve enhanced user experience, high scalability, real-time processing, and standardization of API interfaces, reduced complexity, and lower time-to-market (Dorschel 2018; Citi GPS 2018; Herrmann and Heinke 2018). In summary, a holistic modernization of the legacy IT is highly relevant for incumbents in order to not slow down their digital transformation journey (Herrmann and Heinke 2018). However, some are hesitant to renovate their core banking system, because of large initial investments, long amortization period, and execution risks (Citi GPS 2018).

4.2.2 Economic

Over the course of the literature review with particular focus on the economic dimension, six driving factors were identified, namely **interest rate, evolution of currencies, strategic positioning, economic outlook Germany, competitive situation, and banking sector structure.**

The **interest rates** in Germany have been declining since 2008, resulting in an ultra-low interest rate environment at the present. This is mainly attributable to the severe reduction of the ECBs policy rates after the financial crisis in 2008 (Hennecke 2017; Deutsche Bundesbank 2019a). In 2016, the ECB interest rate on the Main Refinancing Operations (MRO) was reduced to 0%, which has remained in effect until now (European Central Bank n.d.). In December 2019, the Governing Council decided to keep the ECB interest rate unchanged at its low level (European Central Bank 2019c). The deposit facility rate (overnight credits to banks) stands at -0.5% with effect from September 2019 (European

Central Bank n.d.). In Germany, the long-term interest rate was reported at -0.35% in November 2019, compared to 0.31% in November 2018 (OECD 2020a). In this context, the impact of the recent economic slowdown on banks has not been directly visible due to the low interest rates (Deutsche Bundesbank 2019g). The subject of interest rates has been widely discussed in the literature and two trends were identified. Over the next ten years, interest rates can either slowly increase or remain at their current low level.

A slow interest rate increase could occur if economic growth and inflation will rise so sharply that a higher ECB interest rate becomes appropriate. Another situation implies that the ECB is forced to prevent a financial crisis with a restrictive monetary policy (Schafföner and Mar 2018). According to Deutsche Bundesbank, risks of potential economic downturns tend to be neglected by German banks (Deutsche Bundesbank 2019a). Generally, banks grant loans (long-term) and finance themselves through deposits (short-term). Memmel argues that this discrepancy makes them very vulnerable to abrupt interest rate increases (Mommel 2019). A sudden rise in interest levels could have a negative impact on the financial system in Germany. This is mainly due to high asset prices, which could react strongly to minor interest rate changes (Deutsche Bundesbank 2019g).

A considerable number of experts expect a lasting low interest rate environment in Germany. The ultra-low interest policy by the ECB will likely continue in the future with the goal to provide monetary easing (Demiralp et al. 2017), create simpler borrowing conditions, and stimulate consumer spending and investments (European Central Bank 2019c). This scenario will potentially result in higher risk-taking by banks and strengthens the search for yield. However, the vulnerability of the financial system towards unexpected macroeconomic developments also increases (Deutsche Bundesbank 2019g; Heider et al. 2019). According to the OECD long-term interest forecast, based on an economic assessment, interest rates in Germany will stand at -0.33% in 2021 (OECD 2020b). This scenario implies an increase in interest rate risks for banks. Particularly, small- and

medium-sized banks will be more affected than other banking segments (Teichert 2018; Deutsche Bundesbank 2019g). In contrast, risk evaluation and prevention activities of German banks are currently at a very low level (Deutsche Bundesbank 2019g). A study by Heider et al. further suggests that negative policy rates effect the financial stability (Heider et al. 2019). In conclusion, a persistently low interest rate environment may deteriorate the condition of the banking sector (Oliver Wyman 2018) and put pressure on banks' core interest margin (Dombret et al. 2019).

Secondly, the **evolution of currencies** shapes the future of the banking sector in Germany. Primarily, money functions as a medium of exchange for goods and services, common unit of account as well as store of value (Mishkin 2016; Bouveret and Haksar 2018; Fiedler et al. 2019). In recent years, the digitalization and advances in IT changed the monetary system profoundly (Fiedler et al. 2019; Brunnermeier et al. 2019; Adrian and Mancini-Griffoli 2019; Dixon 2017). Digital or virtual currencies appeared since 2009 when Bitcoin was introduced (Wilson 2019; Lastra and Allen 2018). They mostly rely on DLT (Bouveret and Haksar 2018) and refer to the digital representation of money (fiat or non-fiat currencies), which are denominated in their unit of account and issued by private organizations (He et al. 2016). The concept of DLT has already been explained in the previous section. In essence, they enable direct peer-to-peer value transfers without the need for intermediaries such as banks (He et al. 2016; Rangeley 2018; Fiedler et al. 2019; Bouveret and Haksar 2018; Dwyer 2015). In 2018, worldwide more than 1,600 digital currencies were in circulation (Lastra and Allen 2018; Wilson 2019) with a market capitalization of around 400 billion US dollars (Schilling and Uhlig 2019; Lastra and Allen 2018). In 2019, the three largest cryptocurrencies in terms of market capitalization were Bitcoin, Ethereum, and Ripple with a total share of almost 80% (Belke and Beretta 2019). The future of currencies is uncertain and various factors will have a significant impact on their evolution (Heller 2018). Two opposing scenarios are conceivable, namely the dominance of digital currencies or traditional currencies.

The first projection identified in the literature implies a continuing trend towards digital currencies, which disrupts the evolution of money. This view is based on the tremendous advantages and opportunities they possess. These advantages include direct peer-to-peer payments, Blockchain technology, and reduced transaction time and cost (Wilson 2019; He et al. 2016). Fiedler et al. argue that digital currencies have the potential to increase economic welfare through the exploitation of a network system (Fiedler et al. 2019). Various identified opportunities support this trend, namely the introduction of promoting regulations, broad global reach, and capability to promote financial innovation (Wilson 2019). The notion of introducing a Central Bank Digital Currency (CBDC) in Europe supports this idea. This results from the clear advantages of CBDC compared to privately issued digital currencies, as it allows governments to supply, monitor, and regulate it (Mayer 2019; Lastra and Allen 2018; Fiedler et al. 2019). However, it is uncertain if and when the ECB will introduce a CBDC in Europe (Fiedler et al. 2019). Rangeley claims that the Blockchain technology offers a unique chance to build an innovative monetary system, which is controlled by all people and allows for free trade with everybody (Rangeley 2018). Nevertheless, regulatory, security, and legal challenges have to be resolved and closely monitored in this projection (Fiedler et al. 2019).

On the other hand, several studies support the view that traditional currencies will remain dominant. The hype bubble around digital currencies may burst due to their weaknesses and threats. Major weaknesses of digital currencies are high volatility, slow transaction rate, mining problems, low consumer protection, and lack of transparency (Wilson 2019; Bouveret and Haksar 2018; Fabris 2019; He et al. 2016; Yuneline 2019). The large fluctuations in value are a great barrier for an increasing usage (Wilson 2019; Adrian and Mancini-Griffoli 2019). Fiedler et al. also argue that the aggregation of user data could support the competitive advantage of the supplier and promotes monopolistic tendencies in the market (Fiedler et al. 2019). Possible threats supporting the downfall of virtual currencies in the future include a restrictive regulatory policies, association with illicit activities or loss of user trust (Wilson 2019). These tendencies and associated

risks will ultimately lead to a declining usage of digital currencies and therefore to a dominant role of traditional currencies. This view is supported by the fact that cash is still the most frequently used payment instrument in Germany in 2017. More than 70% of all transactions were carried out with cash (Deutsche Bundesbank 2018).

Thirdly, the **strategic positioning** of banks is questioned and requires fundamental reconsideration (Koch et al. 2019; Borroni and Rossi 2019). The current situation of banks in terms of income, costs, and profitability was already outlined in section 2.4 of this thesis. In response to these challenges, two tendencies can be identified in the literature. German banks will either pursue growth strategies or focus on cost cutting strategies.

Future strategies of banks largely depend on their current profit situation. Better performers tend to pursue growth strategies (European Central Bank 2018b; Koch et al. 2019). According to a profitability assessment by the ECB, best performers with higher ROE followed a high-income strategy (European Central Bank 2018b). Koch et al. argue that banks with a focus on growth strategies have been more successful in maintaining a higher ROE. Hence, in order to become a leading bank, growth strategies seem most promising (Koch et al. 2019). This implies that incumbents will need both to develop a customer-centric approach and to embrace the digitalization in order to boost their growth (Sinn and Thobe 2019; Koch et al. 2019).

In the other scenario, German banks will deploy cost cutting strategies in order to overcome profitability challenges and structural cost issues (Koch et al. 2019; European Central Bank 2018b). According to research by the ECB, low performing banks usually tend to focus on this strategy (European Central Bank 2018b). The main target area is the rising operating expenses, which entails for instance the rationalization of branch networks and reduction of staff expenses (European Banking Authority 2019c). In 2018, average staff costs accounted for close to 40% of income (Deutsche Bundesbank 2019d). Therefore, further staff

reductions are unavoidable (Sinn and Thobe 2019). In the long run, cost cutting alone will not be decisive, as banks have to maintain investments in IT and new technologies. This is vital to remain competitive and achieve long-term goals (European Central Bank 2018b; Koch et al. 2019). Research showed that average ROE of banks focusing on cost cutting strategies decreased by 2%, while average CIR increased by 3%. Eventually, this strategy can be risky as client satisfaction or service quality might be negatively impacted (Koch et al. 2019).

The **economic outlook Germany** is another critical factor for German banks. After years of economic prosperity with real Gross Domestic Product (GDP) growth of more than 2% annually, the German economy faced a slowdown in 2019 (Deutsche Bundesbank 2019b; European Commission 2019a). Germany, a strongly export-dependent economy, has been struggling with weak growth of global trade (OECD 2019). In 2019, the GDP rose by only 0.4% (European Commission 2019a), and the economy more or less continues to stagnate. Recent economic developments may stimulate a gradual recovery of the German economy in the long-term future (Bundesministerium für Wirtschaft und Energie 2019).

An expected stagnation scenario results from structural challenges and external factors. Firstly, the great export dependence poses risks to economic growth. Emerging trade disputes, a China slowdown, protectionism, and technology changes hold additional risks (OECD 2019; International Monetary Fund 2019). According to an economic forecast, the budget surplus is expected to reduce to 0.6% in 2020 and 0.2% in 2021 of GDP (European Commission 2019a). The International Monetary Fund (IMF) further highlights a disadvantageous demographic change, imminent energy transition, and slight productivity progress as a brake on economic growth (International Monetary Fund 2019). Long-term GDP projections estimate that Germany will fall behind in comparison with the largest economies globally (Hawksworth et al. 2017).

A moderate growth scenario is based on moderate GDP growth forecasts. The OECD Economic Outlook expects the GDP to rise by 0.4% in 2020 and 0.9% in 2021 (OECD 2019). Deutsche Bundesbank assumes a GDP increase of 1.2% in 2020 and another 1.3% in 2021 (Deutsche Bundesbank 2019b). The IMF even forecasts a growth of 1.7% in 2020 and 1.5% in 2021, which from then on will steadily decline to only 1.1% in 2024 (International Monetary Fund 2019). Main reasons for these forecasts are solid private consumption, a supporting labor market situation, and rise in export (International Monetary Fund 2019; Deutsche Bundesbank 2019b; European Commission 2019a). To conclude, the German economy will face weaker growth in the next few years, but will gain momentum in the medium run (Deutsche Bundesbank 2019b).

Fifthly, the **competitive situation** changed in recent years due to the market entry of FinTechs and BigTechs. With their innovative products and services, they strongly increased competitive pressures on incumbents (BearingPoint 2019; Alt and Puschmann 2016). In general, competition in the banking sector influences the product quality, level of innovation, and production efficiency (Claessens 2009). Other experts further argue that competition fosters efficiency and innovation (Vives 2019) as well as improves overall bank stability (Goetz 2018). At the same time, the tougher competition puts pressure on the profitability of traditional banks (Financial Stability Board 2019a; Vives 2019). The literature points towards two possible future scenarios, either intensified competition from BigTechs or from FinTechs.

The first scenario implies that BigTechs or TechFins such as Facebook, Amazon, Apple or Google will increase the competitive pressure on incumbents. Their competitive advantages are a large customer base, recognition, and greater financial resources (Tanda and Schena 2019a; Financial Stability Board 2019a, 2019b; Schmaus and Heinrich 2018). This enables them to rapidly scale their business and make use of network effects (Financial Stability Board 2019a, 2019b). Moreover, they own advanced technology and are able to invest continuously into new ones (Tanda and Schena 2019a). Many experts believe

that BigTechs pose a greater threat than FinTechs, as their proficiency and advantages are harder to replicate (Stulz 2019; Financial Stability Board 2019a; Citi GPS 2018). The new entrants will profoundly change the sector on the medium to long run according to several literature sources (Balz 2019; Schmaus and Heinrich 2018; Stulz 2019).

The other scenario implies that FinTechs pose a greater competitive threat to incumbents. However, FinTechs currently struggle with access to a wide customer base and funding in order to be a serious threat. The nature of the relationship between incumbents and FinTechs has in the past been cooperative rather than complementary (Financial Stability Board 2019a). Therefore, some experts believe that FinTechs do not pose a great competitive threat to traditional banks (Citi GPS 2018; Financial Stability Board 2019a). Some argue that they constitute a competitive threat in only some parts of the financial system, such as crowdlending or Robo-advisory. Finally, FinTechs depend largely on how innovative technologies will evolve (Buch 2018).

Lastly, the development of the **banking sector structure** influences the future of German banks. The historical development and present situation of the sector structure was already specified in section 2.4 of this thesis. The vast majority of literature on this subject presents the view that further consolidation is inevitable in the strongly fragmented German banking sector (Andreeva et al. 2019; Sinn and Thobe 2019; Koch et al. 2019; Oliver Wyman 2018). The process of consolidation can happen either slowly or rapidly.

Several experts state that there are currently no indications that the slow consolidation dynamics will change. In theory, the sector shows consolidation potential, which is however not exploited in practice (Sinn and Thobe 2019; zeb 2018). One reason for this is the three pillar structure of the banking system, as consolidation primarily occurred horizontally in the past (Koch et al. 2019; Sinn and Thobe 2019). According to an ECB survey, the incomplete Banking Union, regulatory uncertainty, and problematic integration of IT systems are the largest

impediments to consolidation (European Central Bank 2019a). Different national requirements and regulations also act as barriers for cross-border mergers (Andreeva et al. 2019). Mergers on European level require restructuring on national level first. Finally, due to the slow consolidation and lack of exploitation of the associated synergies, German banks have only limited chances to earn their ROE in the foreseeable future (Sinn and Thobe 2019).

In the course of a rapid consolidation scenario, Mergers and Acquisitions (M&A) will lead to fewer institutions and higher concentration in the banking sector by 2030. One study supports this view by predicting a substantial decline, leaving only 150 to 300 remaining banks in Germany by 2030 (Oliver Wyman 2018). Recent consolidation developments also indicate higher merger activities (Koch et al. 2019). One main driver for fusions are estimated cost savings of 30% to 40% on average (Sinn and Thobe 2019). Research on causal effects of M&A on EU bank productivity states that long-term productivity improvements can be generated (Aljadani and Toumi 2019). The ongoing digitalization results in a disproportionate increase of cost synergy potential (Jentzsch and Menig 2018). Another factor is the creation of a European banking union, which could remove barriers for higher merger dynamics. In conclusion, higher consolidation activities allow banks to make use of economies of scope and scale, which in turn improve overall profitability (Andreeva et al. 2019).

4.2.3 Regulatory

Regulation was and always will be the pivotal force in the development of the banking sector (Dietz et al. 2018). In response to the financial crisis in 2008, more restrictive regulatory requirements were introduced by the regulating authorities (Schuster and Hastenteufel 2019). The review of literature on this topic has revealed that three regulatory measures will mainly influence the future of German banks, namely **capital**, **consumer protection and transparency**, and **financial innovation**.

Firstly, the future development of **capital** regulations will affect German banks. The Basel Framework, a complete set of prudential regulations for banks, determines the exact capital requirements in the EU. The framework was established by the BCBS (Basel Committee on Banking Supervision 2020). In 2017, the Basel III reform package has been adopted and will be phased in from 2022 onwards. The objective is to ensure a resilient banking sector and strengthen regulation (European Banking Authority 2019b). Moreover, the reform aimed to revise the Risk-Weighted Asset (RWA) framework and enhance comparability of capital ratios among banks (Basel Committee on Banking Supervision 2020, 2017). In essence, the RWA determines the capital requirement of banks to cope with unexpected losses. The transposition into European law will take place within the revised European Capital Requirements Regulation (CRR) III and the Capital Requirements Directive (CRD) VI (Bundesanstalt für Finanzdienstleistungsaufsicht 2019b; Deutsche Bundesbank 2019g). Moving forward, German banks will either face higher or lower capital requirements.

The vast majority of published literature supports the projection that German banks will face higher capital requirements due to the implementation of the Basel III reforms. First indications of this were an increase of the capital conservation buffer to 2.5% in 2019, compared to 1.875% in 2018 and 1.25% in 2017. In addition, Basel III will require a total capital share of minimum 8% of RWA at all times (Basel Committee on Banking Supervision 2017). For German banks, the minimum capital requirements will certainly increase by 22.2% on average due to a rising output floor (Deutsche Bundesbank 2019f). The output floor determines the lower limit of RWA and acts as a backstop to which banks can lower their capital requirements using internal models (Basel Committee on Banking Supervision 2017). In 2018, about 37% of German banks determined their RWA with internal measures (Deutsche Bundesbank 2019f). Moreover, a greater risk sensitive output floor of 50% will be implemented in 2022. Henceforth, the output floor will increase by 5% each year to 70% in 2026 and another 2.5% to 72.5% in 2027 (Basel Committee on Banking Supervision 2017). Global Systemically

Important Banks (G-SIB) additionally face a minimum 3% Leverage Ratio (LR) requirement and an additional leverage buffer in 2022 (Basel Committee on Banking Supervision 2020). This implies a LR, which acts as a non-risk backstop to limit leverage build-up, of 4.4% for German banks (Deutsche Bundesbank 2019f; Basel Committee on Banking Supervision 2020). Overall, the Basel III reforms will have a greater impact on large and G-SIB banks than on medium- or small-sized banks (European Banking Authority 2019b). The total capital requirement for the implementation of the definitive Basel III reform program approximately amounts to 14 billion euros, which might diminish the prospects for German banks (Deutsche Bundesbank 2019f).

On the other hand, only few publications support the scenario of lower capital requirements. This is mainly due to the number of authorities involved. Therefore, it remains uncertain how a future scenario could look like and which implications it would entail (Koch et al. 2017). However, supporters of more liberal capital regulations argue that strict capital requirements potentially increase the cost of bank credit and impede economic activity (Dagher et al. 2016). Koch et al. further state that Basel III reforms will negatively impact the ROE of banks (Koch et al. 2017). Furthermore, Dagher et al. found out that capital requirements between 15% and 23% of RWA are sufficient to absorb potential losses in most cases of banking crisis. Additional increases in capital requirements only contain marginal effects on banking crisis prevention. Lower capital requirements provide fewer inducements for regulatory arbitrage and reduce the risk of banks transferring activities to unregulated financial intermediaries (Dagher et al. 2016).

Beyond that, consumer data is at the core of banks' business models and affect every aspect of banking (Srinivas et al. 2019). The ongoing digitalization is fundamentally changing the way data is generated, collected, stored, shared, and used. Therefore, effective **consumer protection and transparency** regulations are highly relevant and have to adapt to today's digital environment (OECD 2018). The recent General Data Protection Regulation (GDPR), in force since 2018, addresses this topic. It aims to protect personal data, improve privacy

rights, and ensure free movement of data in the EU (Koerner 2018; Goethals and Imeson 2019). The Markets in Financial Instruments Directive (MiFID) II and Markets in Financial Instruments Regulation (MiFIR), effective since 2018, aim to increase transparency as well as strengthen and harmonize consumer protection (Bundesanstalt für Finanzdienstleistungsaufsicht 2019b, 2018b; Haselmann et al. 2019). Moving forward, regulations concerning this subject will either protect consumer more effectively or fail in this attempt.

The first prognosis referred to in the literature implies that regulatory authorities will introduce effective measures to protect financial consumers. This is due to the increasing importance and complexity of this topic in the banking sector. Financial consumers are paying more attention to how and what personal data is collected (Srinivas et al. 2019). Therefore, regulators will likely take action to establish appropriate consumer protection frameworks, which entail several considerations. These considerations include technological neutrality, balance between the benefits and extent of protection as well as preservation of flexibility and adaptivity (OECD 2018; World Bank Group 2017). Srinivas et al. further claim for a new, extensive, flexible, and forward-looking regulatory framework to address consumer privacy (Srinivas et al. 2019). To sum up, in an increasingly digital environment, consumer protection and transparency will be extensively and effectively regulated in Germany according to this scenario.

The second projection covers the view that consumer protection and transparency are insufficiently addressed by regulators in the foreseeable future. Parker et al. argue that consumers currently face an inconsistent and complicated data protection framework (Parker et al. 2020). The lack of appropriate protection is due to certain deficits and challenges today. One challenge is the simultaneous promotion of broad data generation and privacy protection. Secondly, Srinivas et al. argue that traditional consumer data is covered by the current regulatory framework, but data from emerging technologies is not (Srinivas et al. 2019). Parker et al. state that data generally is hard to manage, as it grows exponentially and travels quickly (Parker et al. 2020). Overall, regulatory action in the field of

consumer protection has been limited and data protection enhancements are unlikely in the near future (Srinivas et al. 2019).

As already mentioned, new technologies have led to revolutionary changes in the sector, creating new opportunities but also risks (Zetzsche et al. 2017; Anagnostopoulos 2018). Regulations regarding **financial innovation** are directly related to this development. The EBA already established a FinTech roadmap for Europe to monitor and engage in financial innovation. Regarding this, innovation facilitator initiatives such as innovation hubs and regulatory sandboxes have been established (European Banking Authority 2019a; European Banking Authority and European Securities and Markets Authority 2019). The revised PSD II represents another initiative to foster innovation through more competition (Brener 2019). An expert group on regulatory obstacles to financial innovation argued that potential benefits of FinTech cannot be fully realized currently due to a fragmented, unclear or absent regulatory framework (European Commission 2019b). Zetzsche et al. emphasize the balance between traditional regulatory aims (e.g. consumer protection and financial stability) and promotion of innovation (Zetzsche et al. 2017). Two opposing trends, namely regulations that facilitate or hinder financial innovation characterize the future.

With regard to the first tendency, a regulatory framework will be implemented to accommodate and facilitate financial innovation in the future. According to a set of recommendations to promote financial innovation, the framework will contain the following regulatory reforms. Firstly, it will respond to emerging risks and opportunities related to the use of technologies such as DLT, AI, and BD. Secondly, an equal playing field between incumbents and new market players will be ensured. Thirdly, regulations concerning data access, use, and sharing are established. In the future it will be crucial that policy makers understand the vast potential of FinTech (European Commission 2019b). The regulatory framework significantly impacts and shapes this future. Zetzsche et al further argue that financial innovation requires smart and digitized regulations (Zetzsche et al. 2017). In order to ensure a banking sector which is capable of keeping up

with rapid technological changes, regulatory reforms have to be initiated (European Commission 2019b). Anagnostopoulos reasons that in order to achieve this, collaboration between incumbents, FinTechs, and regulators is elementary. This helps to better understand the effects of new financial innovations on the industry sector (Anagnostopoulos 2018).

Regarding the second tendency in the literature, regulatory frameworks may hinder financial innovation because policy makers fail to implement adequate measures. This is mainly attributable to the conflict of objectives that regulators have in promoting innovation while minimizing risks (Schleussner 2017). In his book, King argues that especially developed countries have regulatory frameworks build in the analog era, which are not suitable for the digital era (King 2019). If regulators fail to make changes, the full potential of FinTech cannot be exploited (European Commission 2019b). Ultimately, an over-regulated market environment will slow down advantageous financial innovation (King 2019).

4.2.4 Social

The literature review on the future of German banks from a social perspective identified four key driving factors, namely **demographic change**, **customer interaction**, **personalization**, and **social change**.

Firstly, the **demographic change** influences German banks in several dimensions. Banks need to reconsider their customer relationship, customer approach, and product offerings as well as how to attract and retain qualified employees (Bauer et al. 2015; Meybom 2015; Schuster and Hastenteufel 2019). At the end of 2018, approximately 83 million people lived in Germany and the demographic change is well underway. In the last decades, the number of younger people has been declining while simultaneously the number of older people has been growing. At present, every second person is older than 45 years and every fifth person is older than 66 years. In 2018, the structure of total population by age group was as follows: 15.3 million (18.4%) children and younger people (< 20 years), 51.8 million (62.5%) people of working age (20 ≤ x

< 67 years), and 15.8 million (19.1%) older people (≥ 67 years). Without immigration, the population in Germany would have been shrinking for years, because the number of deaths exceeds the number of births annually since 1972 (Statistisches Bundesamt 2019c, 2019a).

One future scenario implies a moderate development of fertility, life expectancy, and migration based on the second version of the population projection by the Statistisches Bundesamt. Firstly, the annual birth rate will amount to 1.55 children per woman. Secondly, the life expectancy will increase to 84.4 years for men and 88.1 years for women. Thirdly, migration will decrease continuously between 2018 and 2026 and then remain constant at 221,000 people. Based on the outcome of the population projection, the population will grow until 2024 to 83.7 million people and then starting to decline. In 2030, approximately 83.3 million people will live in Germany. However, the number of people of employable age will decrease and the number of young people will only slightly increase. Due to the current age structure, the number of senior citizens will most certainly increase until 2030 (Statistisches Bundesamt 2019b, 2019c).

Another scenario implies an assumption of lower fertility rate, increase in life expectancy, and minor migration based on the fourth version of the population projection for Germany by the Statistisches Bundesamt. First of all, life expectancy will strongly increase in this projection to 86.2 years for men and 89.6 for women. Secondly, migration will decline until 2030 and then remain constant. Thirdly, fertility rate will sink to a level of 1.4 children per woman. This scenario hypothesizes a rapid aging of the population, and a steady decline after 2024. In 2030, approximately 83.1 people will live in Germany. Particularly, the share of senior citizen, older than 67 years, will rise sharply to 19.2 million. As a result, the labor force potential will decrease by 3.4 million, which results in the lowest number of working people compared to other scenarios (Statistisches Bundesamt 2019c, 2019b).

The digitalization and changes in customer behavior have initiated a shift in the way banks interact with their customers (Schwarz 2019; Hellenkamp 2018c). The **customer interaction** is greatly influenced by digital methods and channels, which replace traditional branch concepts (Schuster and Hastenteufel 2019). The sharp decline in the number of bank branches resulted from these shifts in client behavior and profitability reasons (Koch et al. 2019; Deutsche Bundesbank 2019c). More details on the total number of branches and decline rate among the different banking segments were already given in section 2.4 of this thesis. Simultaneously to this development, mobile banking has seen growing importance and use among customers and banks (Schuster and Hastenteufel 2019). Tam and Oliveira define mobile banking as a financial product or service which utilizes portable technologies (Tam and Oliveira 2017). These developments allow customers to choose how and through which channel they want to engage with their bank (Schuster and Hastenteufel 2019). In the foreseeable future, the customer interaction will either be digital or in person.

A personal form of interaction between banks and customers will remain probable in Germany according to several literature sources. First of all, Kaya argues that Germans still value face-to-face interactions for their banking activities. According to his research, around 70% of Germans visit a bank branch once per month and 27% once per week. However, visiting rates for individuals from generation Y are lower than from generation X or baby boomers (Kaya 2019c). Other experts argue that it is unlikely that digital channels and communication will completely substitute analog channels. Branch concepts will eventually undergo a fundamental transformation, but will most likely remain a significant customer interaction touch point. Future branch concepts will enable an enhanced customer experience through the integration of digital technologies without losing personal customer contact completely (Hellenkamp 2018c; Kaya 2019c).

On the other hand, many experts believe that digital interaction will replace traditional face-to-face contact. This viewpoint results from advances in IT and shift in customer demand. In Germany, online banking adoption has been on the

rise. In 2018, 60% of individuals were using online banking compared to 35% in 2007 (Kaya 2019c). This segment as well as the self-directed customer segment are expected to grow in the near future (Koch et al. 2019). Schuster and Hastenteufel argue that there is a clear tendency towards digitized and automated banking advisory. Technological solutions such as Robo-advisor or Chatbots greatly impact the interaction and advisory process (Schuster and Hastenteufel 2019), as they possess numerous advantages (Belanche et al. 2019). Robo-advisors are defined as digital platforms, which enable an automated advisory and investment process for customers (Jung et al. 2018; Schwinn and Teo 2018). Jung et al. argue that the traditional person-to-person advisory process will be transformed into a digital person-to-computer advisory process (Jung et al. 2018). In Germany, Robo-advisor adoption has been modest so far with more than 3.8 billion euros Assets under Management (AUM) in 2018 (Kaya 2019a). The Compound Annual Growth Rate (CAGR) in terms of AUM is expected to stand at around 35% (2020-2023), resulting in more than 30 billion euros AUM by 2023 (Statista n.d.).

With the rise of IT and improved data collection, banks are able to personalize product offerings and marketing output (Tong et al. 2012; Vesanen 2007). **Personalization** can be defined as the process to deliver a tailored solution to customers by using technology to collect and analyze customer information and behavior (Peppers and Rogers 1997; Vesanen 2007). Netflix is one specific example of a firm already leveraging the power of personalization (Brodski et al. 2019). Service personalization in banking implies the understanding of customers' preferences, technology engagement level, and financial circumstances in order to serve them in a personal, direct, and relevant way (Desmangles et al. 2018). German banks can either seize this opportunity or continue a one-size-fits-all approach.

An end-to-end integration of data-driven personalized services and experiences in banking is enabled through the advanced technology ecosystem and increased data collection. Banks will realize these advances by collecting data about

customer profiles or risk and transaction behavior (Desmangles et al. 2018). This data is transformed into deeper insights, which enables banks to create precise 360 degree profiles of each customer to serve them according to their individual needs through multiple channels (Brodski et al. 2019; Desmangles et al. 2018). In this sense, banks will adapt a customer centric approach and deliver value to customers by customized experiences and services (Desmangles et al. 2018). According to the Global Financial Consumer study, more than 75% of respondents are willing to share personal data in order to receive bespoke offers and services (Gera et al. 2019). Customized experiences are all about delivering a relevant experience, through the most appropriate channel, at the right time, and to all customers (Desmangles et al. 2018). This will positively affect customer relationship, satisfaction, and loyalty (Tong et al. 2012; Wang et al. 2017; Stewart et al. 2019). Moreover, it will allow banks to boost their competitive advantage, profits, and growth (Brodski et al. 2019; Arora et al. 2008; Stewart et al. 2019; Desmangles et al. 2018).

The projection of a one-size-fits-all approach implies that the majority of German banks will lag behind in terms of personalization due to several obstacles. First of all, legacy IT constrains hinder the scalability (van den Heuvel et al. 2019; Brodski et al. 2019). Brodski et al. argue that internal changes are required to achieve mass-personalization. This includes breaking up data silos and putting the customer at the center (Brodski et al. 2019). Moreover, research showed that more than 40% of customer churn resulted from inadequate personalization (Desmangles et al. 2018), which indicates the growing relevance (Stewart et al. 2019). For the younger generation (18-34 years), personalization is considered a join-or-leave cause (Desmangles et al. 2018). Banks may risk 5% to 25% of their revenue, if they fail to improve the customer experience and implement personalization. In summary, most incumbents will struggle to entirely understand what customers want and offer them a personalized and relevant service (van den Heuvel et al. 2019).

Over the last years, the technological evolution has dramatically influenced the way people inform themselves, communicate, and demand products and services (Cocca 2014). This **social change** or behavioral shift influences customer decisions and the way they want to engage with banks (Hellenkamp 2018c). In that regard, banks have to adapt their way of serving varying customer segments. In 2030, two disparate customer segments might dominate the banking sector in Germany, namely traditionalists or modernists.

With regard to the first segment, it is assumed that traditionalist consumers will be the most dominant customer segment in banking by 2030. The Global Financial Services Consumer study found out that traditionalists and skeptics, who are less confident or avoid using new technologies, account for over 70% of consumers in Germany. They favor face-to-face interactions more than digital communication and view mobile banking as insecure. More than 50% of these consumers are not willing to share their personal data. On the contrary, pioneers who are entirely open for new ways of communication and have faith in technology, account for only 5%. To sum up, the technology mistrust will lead to a low acceptance of digital interaction channels (Gera et al. 2019).

On the other hand, several literature sources argue that the majority of German consumers will embrace the new digital world. The so-called modernists have an affinity towards technologies and are desirous for new innovations. According to the Global Financial Services Consumer study, the vast majority of them use their smartphone as primary device. Further, they demand fully personalized services and are willing to share their data in this regard (Gera et al. 2019). This consumer segment also asks for an efficient and convenient customer experience (Clarke and Kinghorn 2018; Andriotis and Haslanger 2016). This requires a seamless integration between digital and physical channels (Gera et al. 2019). In particular, the generations Y and Z, characterized as digital natives who are always online and hyper-connected represent this segment (Warschun et al. 2017; Hellenkamp 2018c). A survey by PwC additionally highlights the growing importance of digital technologies within the life of consumers (PwC 2019). Beyond that, modernists

tend to trust their bank, but are likely to compare and switch banks in search for better-value service (Gera et al. 2019). A survey on FinTech adoption in Germany found out that around 31% of respondents are likely to switch to FinTech providers due to comfort and confidence in new technologies (Jünger and Mietzner 2019). In addition, these customers are typically more ethically minded and regard the corporate social responsibility of banks as important (Gera et al. 2019; Warschun et al. 2017).

4.2.5 Environmental

In the last years, the topic of sustainability in the financial industry has moved to the forefront (Holle 2019). Particularly, the Paris Climate Agreement in 2015 and the Agenda 2030 set the ground for a greener and more sustainable financial industry. The financial requirements for the realization of these Sustainable Development Goals, which include environmental and climate protection goals, are considerable (Schäfer 2018, 2017; Berrou et al. 2019). This has far reaching implications for the financial sector, because banks are interlinked through lending and investments with all economic sectors (Stremlau 2019). In this regard, the concept of **Green Banking** or Green Finance has become an integral part of the financial sector. It can be designated as an approach of promoting environmentally, socially, and economically friendly practices in banking (Garg 2015). Lalon defines it as a form of banking in which the nation and country benefit environmentally (Lalon 2015). The term has become a buzzword in recent years (Lalon 2015; Zhixia et al. 2018) and is experiencing rising popularity (Zhelyazkova and Kitanov 2015). Dombret argues that the notion of Green Banking has the potential to initiate a paradigm shift in the financial sector (Dombret 2018). Banks can make a great contribution to alleviate global environmental risks and finally help shape a more livable world (Garg 2015). A greener financial system in Germany holds great opportunities, but also risks for incumbent bank (Dombret 2018; Röseler 2019). Summarizing the above, it can be noted that German banks have principally two options moving forward. Firstly, to promote Green Banking practices or secondly, to disregard them.

The first projection implies that the majority of financial institutions in Germany will promote Green Banking, which results from several factors. Firstly, the German regulatory agencies Deutsche Bundesbank and BaFin together with other ministries set the goal to turn Germany into a “Global Sustainable Finance Champion” (Holle 2019). By promoting and integrating sustainability initiatives, the financial sector can contribute to a more sustainable economy (Holle 2019). This entails opportunities such as access to new business areas (Dombret 2018) as well as enhanced reputation (Garg 2015). A growing body of literature has evaluated the potential of innovative technologies such as AI, BD, and Blockchain to enable Green Banking practices (Nassiry 2019; Dorfleitner and Braun 2019). Specifically, Blockchain applications can improve accountability and transparency in order to reduce greenwashing risks among banks (Dorfleitner and Braun 2019). First signs of a greener financial sector can already be observed in the steady growth of sustainable investments in Germany in recent years (European Sustainable Investment Forum 2018; Deutsche Bundesbank 2019e). To conclude, the promotion of Green Banking practices will create a more efficient, stable, and sustainable banking sector (Holle 2019; Dombret 2018).

The other future projection implies a disregard of Green Banking practices, which is attributable to several constraints and risks identified in current literature. Firstly, Migliorelli and Dessertine argue that the market momentum might not be enough, as there are limited incentives for investors to consider sustainability factors into their investment decisions. They further state that the costs of screening, classification, release, and monitoring pose a constraint for the implementation of green practices (Migliorelli and Dessertine 2019). Moreover, the development towards a more sustainable economy poses indirect or direct credit, market, and operational risks to banks such as drastic asset price fluctuations, long-term price increases, reputational damages for whole industries or credit defaults (Röseler 2019; Dombret 2018). As a final point, Schäfer argues that the majority of German banks have not yet integrated green practices into their business model (Schäfer 2017). He further claims that the vast majority of

banks have disregarded sustainable business opportunities and the adoption of green products or services in the past (Schäfer 2018).

4.3 Process outline in INKA 4

The software application used to generate the future scenarios was the INKA 4 scenario software. In the following, the specific procedure of the software is explained. Firstly, the areas of influence serve to structure the scenario project, as they bundle a number of descriptors. A descriptor is a descriptive parameter for one external influencing or driving factor. In general, the number of total descriptors is limited to 64. However, it is not recommended to fully exploit this scope in order to prevent confusion within the scenarios. Larger scenario projects normally include up to 30 descriptors, which are of relevance to the topic. In this project, 19 final descriptors were used for the generation of the scenarios. In the next step, a relevance assessment of the individual descriptors was carried out. For this purpose, a relevance scale with the following values was applied: (0) No relevance, (1) Low relevance, (2) Medium relevance, and (3) High relevance. However, the determination of relevance is not considered in any way in the calculation. The relevance merely functions as a point of reference for setting priorities in the interpretation and communication of the scenarios.

Beyond that, plausible and well-founded projections must be elaborated for each descriptor. A minimum of two and a maximum of five projections are allowed for each descriptor. In this context, it is recommended to create a maximum of three projections in order to lower complexity and develop distinctive projections. A probability of occurrence has to be assigned for each projection based on the individual assessment and extensive literature research. In total, a probability sum of 100% must be reached for each descriptor. **Appendix A** – List of final descriptors provides a detailed view on all applied descriptors with their respective relevance, projections, and probability of occurrence.

In the next step, all descriptors with their respective projections are juxtaposed. Consistency matrix analysis involves assessing the relationship between all projections, assuming they occur at the same time. The relationship between the projections was based on a scale with consistency values ranging from -3 to +3. **Table 9** below displays the consistency value scale with the respective meanings.

Table 9: Scale and meaning of consistency matrix

Scale	Meaning
+3	Belonging necessarily together, mutually dependent
+2	Supporting each other
+1	Fits into the same climate
0	Unrelated (coexistence possible)
-1	Fits badly together
-2	Contradictory
-3	Mutually exclusive

Source: adapted to (Schwarz-Geschka 2017, p. 15).

This step is crucially important for the generation of scenarios, as it determines their consistency. The relationship assessment between each projection in the consistency matrix was done based on the judgment of the author and according to the extensive literature review conducted. An example of a consistency matrix analysis within the INKA 4 software is displayed in the following **Figure 6**. Please also refer to **Appendix B** – Consistency matrix for the complete consistency matrix of this scenario planning project.

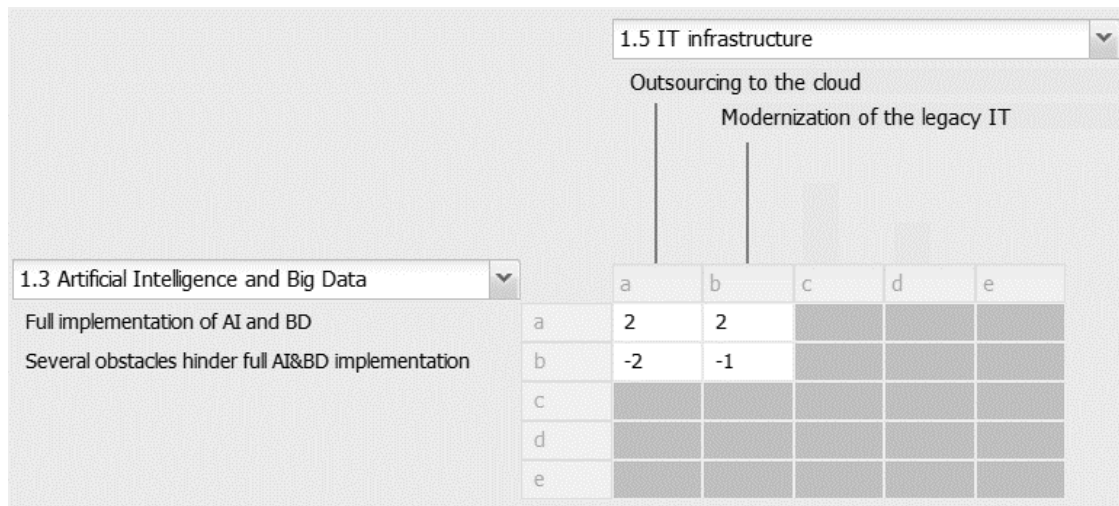


Figure 6: Example of a consistency matrix analysis in INKA 4

Source: INKA 4 Scenario Software.

After the calculation, INKA 4 provides some evaluation results for each scenario. Both, the most likely scenario and the scenario with the greatest difference to the most consistent scenario are highlighted. The number of diverse projections between the scenarios is also given. The first key figure for the evaluation is the Consistency Sum (CS), which is the sum of all consistency values that have been added for the scenario. The CS indicates the general quality of the generated scenarios. The Consistency Average (CA) for each scenario is the CS divided by the number of all non-zero values within the calculation. Moreover, a Probability Parameter (PP) is calculated for all scenarios. The PP is not defined as a probability in a mathematical sense, but as the arithmetic mean of the individual probabilities of all selected projections. Thus, the PP is only relatively meaningful when comparing the scenarios. In conclusion, these evaluation results help to assess and interpret the constructed scenarios (Schwarz-Geschka 2017).

4.4 Results

The calculation of the scenarios in INKA 4 resulted in 14 future scenarios for the German banking sector. First of all, the generated scenarios were examined according to the scenario criteria presented in chapter 3.4. This ensured that the obtained scenarios were plausible, differentiated, consistent, and relevant. Thus,

the present scenarios form an appropriate basis for critical decisions. In general, the structure of the individual scenarios is based on the different combinations of projections within the descriptors. The obtained scenarios were subsequently ranked according to their CS. The following **Figure 7** illustrates the ranking of all 14 scenarios produced.

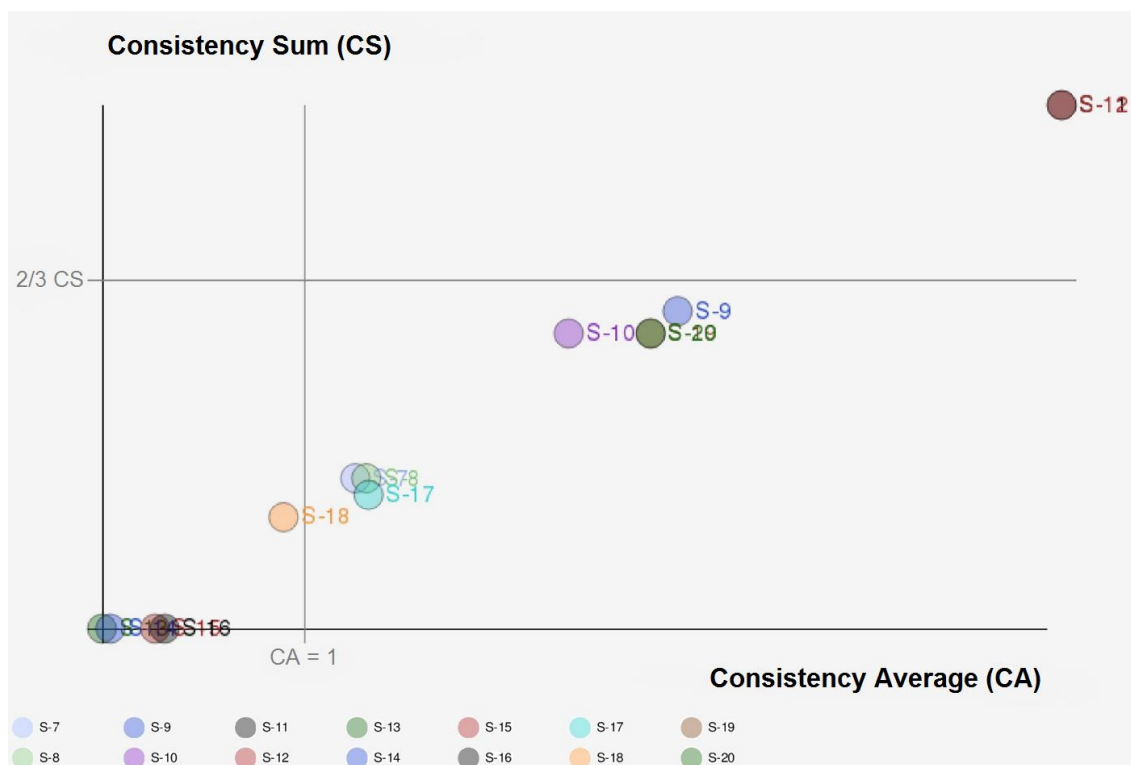


Figure 7: Scenario portfolio

Source: INKA 4 Scenario Software.

These are hypothetical consistent future scenarios, which show the spectrum of possible future developments for the German banking sector. The high number of scenarios can be attributed to the fact that the number of defined descriptors was set to three instead of two in order to generate clear variations within the scenarios. Scenario S-11, ranked first, is considered the most consistent scenario as shown in **Figure 7**. Compared with it, scenario S-15 differs the most from it. Specifically, these two scenarios vary in the selection of nine projections.

According to the calculation results, the differentiation of the scenarios depends largely on the definition of the descriptors Blockchain, Social change, and Customer interaction. **Appendix C** – Differences within the scenarios I, presents the full spectrum of scenarios with their respective evaluation results. Further, it shows clearly the number of varying projections across the 14 scenarios. Moreover, **Appendix D** – Differences within the scenarios II, shows the precise variations in the selection of individual projections.

Several observations were derived from the results. Firstly, it can be stated that the scenarios S-11 (Rank 1) and S-12 (Rank 2) are very similar. Both have an identical CS of 158 and CA of 1.86, and differ solely in the selection of the descriptor demographic change. This suggests that they can be regarded as one scenario. Furthermore, scenario S-20 (Rank 4) and S-19 (Rank 5) with an equal CS of 117, CA of 1.39, and a difference in only one descriptor can be seen as an identical scenario. Thirdly, scenario S-15 (Rank 12) and S-13 (Rank 14) display the same CS of 64 and differ only in the selection of one descriptor. Acknowledging these similarities, a final number of 11 future scenarios could be assumed.

In the end, two scenarios were selected for further explanation, the most consistent scenario S-11 and S-15, which differs the most. This selection was made to illustrate two opposing future developments for the German banking sector. The detailed description of the selected scenarios is presented in the subsequent sections.

4.4.1 Scenario S-11 – Digital disruption

The selected scenario S-11 has a CS of 158 and thus is the most consistent scenario. '*Digital disruption*' was chosen as the title for this scenario, as it reflects the specific characteristics. Alternative working titles for this scenario were '*Banking, please disrupt yourself*', '*Adapt or Die*', or '*Technology first, banking second*'.

The scenario S-11 is characterized by a profound and disruptive change in the German banking sector by 2030. Incumbents will lose considerable market share to innovative, agile, and more customer centric FinTechs. Their market volume in various banking segments will increase significantly in the next decade. The development towards an open financial ecosystem system is well underway in this scenario. The traditional business model of incumbents, based on a vertical value chain, is under strong pressure and they will struggle to respond to innovative FinTech applications. BigTechs will also play a role in the new market, but competition will mainly result from FinTechs. Hence, banks face a disintermediation of their value chain. These profound changes are primarily driven by technological change as well as shifting lifestyles and values of clients.

The technological change will continue to fuel financial innovation in the next decade. A high speed of development and adaptation of new technologies is clearly evident. The scenario assumes that the Blockchain technology will revolutionize the banking industry entirely. The technology will be implemented in various fields of applications in banking such as KYC, risk assessment or payments and will allow for efficiency gains. In this context, the implementation of the DLT initiates an expansion for digital currencies. Direct peer-to-peer payments without the need of intermediaries will disrupt the evolution of currencies. On this matter it can be expected that a CBDC or more precisely a digital euro will be introduced in Europe until 2030. In addition, the growth rates for advanced payment methods such as contactless transactions will show high growth rates. Apart from this, banks will fully seize the opportunities of advanced technologies such as AI, BD, and Cloud-Computing. This notion will change the dynamics of how banks operate in Germany. Firstly, FS providers will use AI and BD for personalization, automation, innovative value proposition, and better decision-making. In particular, the ability to derive insights from large amounts of data will facilitate innovation. In essence, AI enabled automation such as RPA will enhance speed and efficiency of core banking processes and will be key to overcome profitability challenges. Secondly, banks are more and more seeking to outsource their obsolete, costly, complex, and product-centric legacy IT

systems to the cloud. This allows incumbents to achieve higher agility, scalability, and to integrate services by TPP. However, the identification and control of risks are no longer within the organizational boundaries of banks.

The regulatory environment will also undergo a profound change. In the course of the digitization, financial regulations will also adapt. A regulatory framework that facilitates financial innovation is anticipated, which is the fundamental basis for a '*Digital disruption*' scenario. Policy makers understand the vast potential of FinTech and will initiate digitized regulatory reforms to ensure that the banking sector is capable of keeping up with rapid technological changes. This regulatory development is closely related to more effective measures to protect consumers in the open and digital banking environment. The way data is generated, collected, stored, and used will fundamentally change due to the digitization. Hence, consumer privacy and data collection will become a very important topic. A flexible, adaptive, and forward looking regulatory framework will be implemented in this dynamic and digitalized setting.

The market structure will also be affected by this change. The high level of consolidation will lead to fewer credit institutions and a higher concentration of bigger banks by 2030. Due to growing competition and profitability challenges, incumbents are forced to merge in order to make use of economies of scale and scope. Increasing digitalization will also disproportionately increase the cost synergy potential of mergers. The creation of a European Banking Union potentially acts as a supporting factor. The structural cost and profitability issue of German banks will lead to the deployment of cost cutting strategies. This could lead to a lack of vital investments in new technologies to remain competitive. In addition, cost cutting strategies will particularly entail the rationalization of branch networks and reduction of staff expenses. A continuing low-interest rate environment and higher capital requirements will also pressure the core interest margin of banks and deteriorate their condition. An expected stagnation of the German economy will further cloud the prospects for incumbent banks.

The social shift will influence the way people want to communicate and interact with their bank. The values of modern consumers, particularly from the generations Y and Z will dominate in this scenario. Their affinity towards new technologies leads to faster adoption and high use of technological solutions. In this regard, a digital interaction between banks and customers will replace the traditional face-to-face contact. In addition, online or mobile banking will be adopted to a great extent. Further, increasing use of Robo-advisory solutions can be anticipated in Germany. Moreover, modern consumers will demand a seamless customer experience and integration between digital and physical channels. Their greater willingness to share data in order to receive personalized experiences and services will result in an integration of data-driven personalized banking by 2030. An end-to-end personalization on a larger scale will be enabled through AI and BD solutions. This allows banks to derive client insights and create a personalized experience or service over the complete user journey at the right time and through the most suitable channel.

The shift in values will also influence the importance of sustainability in the banking sector. This scenario foresees a promotion of Green Banking practices in the financial sector in Germany. This trend is in particular associated with the increased use of innovative technologies, which enable green banking practices. The steady growth in sustainable investments is a first indicator for this development. The banking sector will ultimately receive a greener coat over the next ten years and will contribute to a more sustainable economy.

To sum up, the *'Digital disruption'* scenario is characterized by a rapid and disruptive change in the financial sector in Germany. Technologically embedded banking is all about delivering a tailored customer experience in real-time through digital channels. More precisely, the future of banking in the new era is based on technology. In essence, banking will no longer be something where people go, but what people do.

4.4.2 Scenario S-15 – High Tech meets High Touch

The scenario S-15 has a CS of 64 and is thus classified on rank twelve. The PP of 58 is also the second highest among all scenarios. The title of this scenario is *'High Tech meets High Touch'*. Alternative working titles for this scenario were *'The transformation is lagging behind'* or *'Same but different'*.

Digital technologies are also omnipresent in scenario S-15, but the German incumbent banks will retain their competitive position by actively managing and driving change. In contrast to the *'Digital disruption'* scenario, incumbents recognize their deficits in imitating and developing innovative IT solutions and will thus cooperate with FinTechs to promote innovation. These value-creating strategic partnerships allow German banks to leverage the potential of new technologies and remain relevant. In that regard, German banks also embrace the paradigm shift presented by the concept of Open Banking. The process of sharing and augmenting data with TPPs enables banks to advance their existing services. Moreover, it offers them the opportunity to pursue growth strategies and create new revenue sources. This strategic orientation allows banks to seize the digitalization and boost growth in order to attain higher profitability levels. In this shared ecosystem, incumbents will respond to new and agile market players through collaboration. FinTechs will strengthen their position in specific niches, but will ultimately not dominate the banking market in Germany.

The technological change will substantially shape the German banking sector until 2030. However, the change will not be as significant as in scenario S-11. The AI and BD technology will play an integral role within the financial system of tomorrow. In conjunction with growth strategies, AI will help to tailor products on a large scale, optimize lead generation, and customer acquisition activities. Complex and slow processes within banks and with customers are thus a thing of the past. Outsourcing their legacy IT infrastructure to the cloud will enable banks to successfully collaborate with TPP. Reduced complexity and costs will further increase their competitiveness. Nevertheless, this scenario assumes that the Blockchain technology will not prevail in the future. This is mainly due to

technical and implementation challenges that cannot be fully overcome. In this respect, digital currencies will not prevail in Germany either. The current hype bubble around digital currencies such as Bitcoin or Ethereum will likely burst because of their weaknesses and threats. These include high fluctuations in value, slow transaction rate, lack of transparency, and low customer trust, which will support their downfall. Finally, traditional currencies and the use of cash will remain dominant according to this future scenario.

In this second scenario, further consolidation is also inevitable in the market. As in the first scenario, the fragmented German banking sector will experience a substantial decline in the number of market participants. The banking environment will continue to be characterized by low interest rates due to the ECBs policy rates. Nevertheless, the economic outlook for Germany is more optimistic. The economy is expected to grow at a moderate pace with GDP growth of more than one percent in the coming years.

The scenario presupposes a regulatory environment that fosters financial innovation and consumer protection, as in the *'Digital disruption'* scenario. Therefore, the regulatory framework will be adjusted to ensure an equal playing field between incumbents and new market entrants to foster financial innovation. The recently revised PSD II has been a first step into this direction. However, the extent of innovation promotion will not be as distinct as in the first scenario. Besides more effective consumer protection measures, banks will most likely face stricter capital requirements. This is based on the future realization of Basel III reforms, which implicate increasing output floors and LRs. For the most part, larger banks will be more affected by these reforms than small and medium-sized banks.

Another major difference between the two selected scenarios lies in the development of customer behavior and requirements. This scenario assumes that traditional and conservative consumers will predominate the German banking sector in 2030. Hence, face-to-face interaction, personal advice and

support will remain important for building trust. The lower confidence in the use of new technologies leads to reduced acceptance of digital channels. Therefore, it is unlikely that digital distribution channels will completely substitute analog channels such as branches. Regardless of this, branch concepts will undergo a fundamental transformation, but will likely remain a significant customer interaction touch point. They will enable an improved customer experience by integrating digital technologies without losing personal customer contact. Hence, banks need to reconsider their customer approach and product offering. Moreover, banks have to rethink how to attract and retain qualified employees due to an aging population. In 2030, the share of older people (≥ 67 years) will certainly increase and the labor force potential is about to decrease considerably.

In conclusion, there will be a coexistence between the digital and the analog world in the German banking sector by 2030. Despite the technological advances and digital life, the analog, physical world will remain important as an element of trust.

5 Implications for the strategies of German banks

The requirements and changes described in the chapter beforehand make clear that incumbent banks must deal with new, above all technical, social, and environmental developments at an early stage and anchor them strategically. This chapter will therefore outline strategies based on these implications and changes to successfully address future challenges. Scenario S-11 – *'Digital disruption'* constitutes as the fundamental starting point for the analysis of the implications for the strategies of German banks. Thus, the strategy is primarily targeted towards modern customers, who have already been described in more detail. This is due to the findings in the underlying scenario, which assume that technology driven consumers will be dominant in the German banking sector by 2030. This customer type is therefore selected as the strategic customer for this strategy, as they have the greatest influence on which products and services are in demand (Johnson et al. 2009). The presented strategy can be termed as *'Strategy 2030'*. Moreover, **Figure 8** illustrates the strategic concept and interrelation of the underlying pillars.

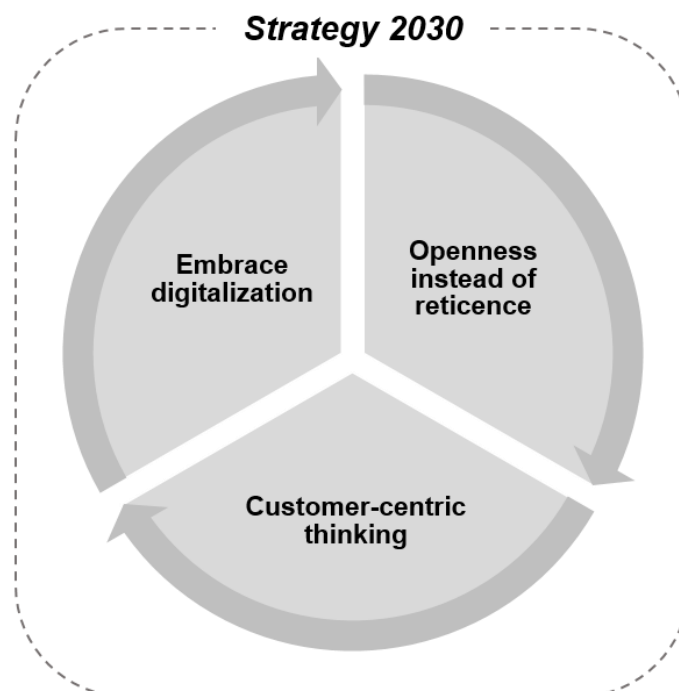


Figure 8: 'Strategy 2030' for German banks

The strategy is based on three pillars, namely embrace digitalization, openness instead of reticence, and customer-centric thinking. The individual strategic pillars are described in greater detail hereafter. In this respect, key enablers for the successful realization of all strategic initiatives are outlined.

5.1 Embrace digitalization

In order to compete in a digital banking world, embracing the digitalization is more than just a necessity, it is a game changer. According to the '*Digital disruption*' scenario, technology will be an integral part of the banking world in the future and will promote financial innovation. Hence, German banks must adopt and drive forward the digital transformation with greater determination. The consistent implementation of the digitalization is the backbone of '*Strategy 2030*' for German banks and forms the basis for the realization of the other two pillars.

In this context, the following factors will be of particular importance. Firstly, the central factor to enhance digitalization is to further develop the legacy IT infrastructure. A successful transformation can only succeed if a contemporary core banking system is in place (Strietzel et al. 2018). As IT expenses of banks accumulate to 15% to 25% of annual costs and are notably higher than in other industry sectors, moving away from the legacy IT is a key driver for long-term cost savings (Citi GPS 2018). This measure ensures real-time processing, standardization of API interfaces, and reduced complexity for banks (Dorschel 2018; Citi GPS 2018; Herrmann and Heinke 2018). However, this measure requires large initial investments (Citi GPS 2018), but is indispensable to accelerate the digital transformation (Herrmann and Heinke 2018). In this regard, outsourcing the IT infrastructure is faster and cheaper than complex and costly in-house development. Moreover, moving the IT system to the cloud allows banks to focus on their core competencies instead. When making this decision, banks must simultaneously take the fact into account that the ability to identify and control IT-related risks no longer lies within the institutional boundaries (Röseler and Steinbrecher 2019).

Secondly, as banks have access to an abundance of customer data, they need to use and monetize this data. In general, this data contains valuable insights and creates an information advantage for incumbents (Khanna and Martins 2018). Moreover, banks' ability to better capture, analyze, and leverage data creates a significant competitive advantage. In order to monetize the information, German banks must necessarily implement AI and BD technologies. This implies an application primarily along four dimensions, namely automation, personalization, decision-making, and innovative value-proposition (Arslanian and Fischer 2019a; World Economic Forum 2018b). This contributes in many ways to the performance of incumbent banks. AI enabled automation in the form of RPA allows for significant operation cost reductions and increases overall efficiency (Arslanian and Fischer 2019a; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). In general, complete digitalization and automation of banking processes can potentially cut costs by 25% to 35% (Koch et al. 2019). Moreover, the combination of data analytics and the access to large data volumes facilitates the creation of innovation, expertise, and added value for banks (Jubraj et al. 2018; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). Finally, a data-driven business model possibly results in top-line growth, lower customer churn, optimized customer acquisition, and enhanced decision-making (Lau and Leimer 2018; Arslanian and Fischer 2019a; Koch et al. 2019).

Thirdly, new technologies change the dynamics of how banks work according to the '*Digital disruption*' scenario. Thus, German banks need to integrate new technology applications into their strategy. Specifically, the Blockchain technology possesses unique features that potentially penetrate all core processes of banks (Reuse et al. 2019). According to a survey by PwC, almost two-thirds of the surveyed bank executives in Germany believe Blockchain will impact their business model until 2027. Nevertheless, in 75% of the banks the Blockchain technology is not yet part of their strategic orientation. Additionally, only two percent invest more than 50,000 euros per year in this technology (PwC 2017a). Against the background of the '*Digital disruption*' scenario, which implies that Blockchain will revolutionize the financial market by 2030, this strategic

orientation is not sustainable. This leads to a urgently needed change in the strategic orientation of German banks, which must deliberately anchor the technology at an early stage (Reuse et al. 2019). The fields of application in banking are numerous and include for instance payments, crypto currencies, KYC, risk assessment, compliance, etc. (Higginson et al. 2019; Rosati and Čuk 2019; Reuse et al. 2019). In this regard, the strategic options for German banks range from in-house development to cooperation with or acquisition of FinTechs (Reuse et al. 2019).

The key enabler for these strategic initiatives aforementioned is the selection of experts and suitable personnel. Hence, German banks need to establish an appropriate human resource strategy. The main goal for incumbent banks will be to attract and hire differentiated talent with technology competency. (King 2019; Koch et al. 2019). This will be key to establish digital concepts and processes in an extended spectrum. Ultimately, only those financial institutions will survive that succeed in transforming their strategy and business model to reap the benefits of digitization and new technologies.

5.2 Openness instead of reticence

The second strategic layer of '*Strategy 2030*' constitutes openness instead of reticence for German banks. This implicates that incumbent banks must open up to a digital, open, and decentralized banking ecosystem. According to the '*Digital disruption*' scenario, the trend towards platform banking and a digital ecosystem is clearly evident. The introduction of the PSD II was a first mandatory measure for banks to open up and rethink their product and distribution strategies. Banks need to understand the valuable business opportunities Open Banking presents and consequently adapt their business model (Botta et al. 2018; Doyle et al. 2017; Monitor Deloitte 2018). The opportunities of sharing and augmenting customer data with TPPs through APIs are manifold and include advancement of existing products and services, development of new offerings, better understanding of client behavior, expansion of market share, and increase in revenue. Beyond that,

increased speed of innovation, lower time to market, and greater scalability complement the array of opportunities for incumbents (Botta et al. 2018; Bramberger 2019a; Doyle et al. 2017). In order to seize these opportunities, it is of utmost importance to embrace the paradigm shift represented by Open Banking. Hence, the engagement in strategic partnerships or collaborations with FinTechs and TPPs is key for incumbents moving forward (Junghanns and Niebudek 2019; King 2019). Existing market players must make strategic decisions about which business partners they want to collaborate with in order to create added value, either by complementing existing offerings or by creating new ones (Doyle et al. 2017).

In particular, there are two key enablers of successful interoperability. Firstly, APIs are the essential access point for the integration of TPP services into the existing IT system of banks. This step requires to build an open, agile, and flexible IT infrastructure. Obsolete IT systems limit the potential of strategic partnerships as the banking ecosystem is evolving (Arslanian and Fischer 2019b). Secondly, in order to achieve prosperous collaboration with agile FinTechs and TPPs, banks themselves need to adapt a more agile and flexible way of working. This requires profound interventions in established structures and processes. As a result, it is essential to redesign organizational structures, encourage internal collaboration, and place innovation at the heart of the bank. These measures require comprehensive change processes and a rethinking at the core of the banks (King 2019; Deloitte 2019; Doyle et al. 2017). This will particularly be more challenging for bigger banks, but necessary to thrive in times of rapid changes.

In the end, the strategic orientation of today determines the role of banks in the open and modular banking world of tomorrow. In conclusion, openness instead of reticence provides banks with a clear competitive edge and allows them to make a significant leap forward in the digital transformation.

5.3 Customer-centric thinking

Changing customer demand and interaction will pose considerable challenges for established banks in Germany. The growing threat of a disintermediation of the value chain in the '*Digital disruption*' scenario intensifies the battle for customers. In order to win this battle and stay ahead of competition, customer-centric thinking is key for incumbent banks (Komulainen and Saraniemi 2019). Banks have to rethink how banking will be integrated into people's lives as well as identify and understand what future customers may demand (King 2019). In fact, the customers of tomorrow ask for a seamless digital banking experience according to the developed '*Digital disruption*' scenario.

Hence, German banks need to move away from their traditional product-centric to a more customer-centric business model. In detail, this contains the creation of a tailored customer experience, service, delivery, and communication. Banks' ability to capture, analyze, and leverage data allows to realize a holistic customized banking experience through multiple channels to all customer groups (Desmangles et al. 2018; Brodski et al. 2019; Sinn and Thobe 2019). In particular, the full implementation of technologies such as AI and BD as well as Data analytics acts as a catalyst for this strategic alignment. Moreover, internal changes including breaching of data silos are required to achieve personalization on a large scale (Brodski et al. 2019). At the core of this strategic level is the realization of customer-oriented distribution and advisory processes for both corporate and private clients (Koch et al. 2019). The seamless integration between interconnected channels is of great importance in this regard (Gera et al. 2019; Stewart et al. 2019). In an ever more digitalized and dynamic banking world, German banks must adjust their distribution model to reinforce their market position (Stewart et al. 2019). Ultimately, banks have to provide their customers with banking experiences, services, and channels which cover present and future needs.

In general, banks' ability to deliver a superior and customized customer experience supports growth and fosters customer loyalty. The precise effect can

amount to an 30 to 40% increase in sales in certain product categories and reduce customer migration by 10 to 30% (Koch et al. 2019; Desmangles et al. 2018). A positive side effect of these measures is the revitalization of the general popularity of banks.

The following **Table 10** summarizes the key strategic initiatives and respective enablers of the presented '*Strategy 2030*'.

Table 10: Summary of the strategic initiatives of the '*Strategy 2030*'

Strategic pillars	Embrace digitalization	Openness instead of reticence	Customer-centric thinking
Strategic initiatives	Modernization of legacy IT infrastructure to ensure real-time processing, adequate API interfaces, and complexity reduction.	Open up to a digital and decentralized banking ecosystem.	Move to a customer-centric business model.
	Monetization of customer data to facilitate value and innovation creation.	Rethink the product and distribution strategies in an open banking world.	Provide a seamless digital banking experience through multiple channels.
	Automation of core banking processes (e.g. RPA) to increase efficiency.	Platform banking approach to integrate services by TPPs.	Offer personalized customer experience, service, delivery, and communication.
	Integration of Blockchain technology into business model.	Engagement in strategic partnerships or collaborations with FinTechs or TPPs.	Customer-oriented distribution and advisory processes.
Enablers	Appropriate human resource strategy to attract and retain differentiated talent.	API readiness for integration of TPP services into existing IT.	Full implementation of AI and BD to capture, analyze, and leverage data.
		Adaptation of a flexible and agile way of working.	Breaching of data silos within the organization.
		Redesign of the organizational structure.	
		Placing innovation at the heart of the bank.	

In conclusion, the presented '*Strategy 2030*' with its three underlying pillars aims to ensure the sustainability of the strategic alignment of German banks in the next ten years. This long-term strategic plan for German banks includes particularly the formulation of general strategic goals and the determination of initiatives in order to achieve those.

However, the explicit allocation of resources is not included, as this must be done specifically for every individual bank and would go beyond the scope of this thesis. Each German bank must decide individually how to mobilize resources in order to execute the strategic initiatives identified. Finally, the implementation of the strategic measures will certainly enable German banks to substantially increase their profitability and secure their long-term competitive position. At the present time, which is of paramount importance, only incumbents who are determined to take action are likely to thrive in the light of these changes.

6 Summary

In summary, this thesis examined the future of the German banking sector on the basis of current influencing factors. The unique German banking sector, which mainly consists of private banks, cooperative banks, and savings banks, is currently facing a series of unprecedented external challenges. In addition, internal profitability issues and structural cost problems intensify the pressure on banks to act. Consequently, the banking landscape is undergoing a paradigm shift and the future is highly uncertain. In times of change and uncertainty, the scenario planning method allows to cope with these aspects. Scenario planning for strategic foresight permits to create coherent future scenarios and to assess the interactions between external driving factors. Thus, the concept of scenario planning served as the underlying method for this research. In the course of this thesis, potential future scenarios for the German banking sector by 2030 were generated and investigated. The creation of the future scenarios was carried out with the help of the scenario software INKA 4.

The coherent future scenarios for the German banking sector were systematically developed from the contemporary situation. In this regard, a diligent literature review, which included more than 250 relevant literature sources, was carried out in the period from September 2019 to February 2020. This served to collect secondary data on the research subject from a significant number of sources. The literature research was conducted along five pre-determined areas of influence, namely Technological, Economic, Regulatory, Social, and Environmental. These areas were derived from the dimensions of a PESTLE analysis, which served as strategic framework for the identification and categorization of external influencing factors. In this regard, 19 key drivers of change for the German banking sector were identified. These 19 key drivers of change within the five corresponding areas of influence were: (1) Technological: FinTechs, Blockchain, Artificial Intelligence and Big Data, Open Banking, IT infrastructure; (2) Economic: Interest rate, Evolution of currencies, Strategic positioning, Economic outlook Germany, Competitive situation, Banking sector

structure; (3) Regulatory: Capital, Consumer protection and transparency, Financial innovation; (4) Social: Demographic change, Customer interaction, Personalization, Social change; (5) Environmental: Green Banking. Subsequently, these key drivers of change were formulated pursuant to the specified structure in INKA 4, including relevance and future projections with their respective probability of occurrence. Moreover, the relationship between all projections, under the assumption they occur at the same time, was assessed and incorporated into the consistency matrix. This step determined the consistency of the generated scenarios and was based on the author's judgment according to the thorough literature review conducted.

Building on this basis, 14 final scenarios were generated using the scenario software INKA 4. The objective of the constructed scenarios was to outline possible and plausible future projections for the German banking sector. Two scenarios were selected and explained in greater detail to illustrate two opposing future developments for the German banking sector until 2030. These two scenarios were termed '*Digital disruption*' and '*High Tech meets High Touch*'. Firstly, the scenario S-11 – '*Digital disruption*' assumed disruptive changes in the banking sector by 2030. The shift to a more open, digital, and greener financial system is clearly visible. Consequently, the market position of incumbents will be under severe pressure from new market entrants. Furthermore, innovative FS will be created through the growing adoption of new technologies such as AI, Blockchain, and Cloud-Computing. Digital technologies will be at the core of the banking revolution by 2030. In this respect, regulatory requirements will presumably also adapt to the new world of banking and will not pose an impediment. This anticipated change is closely linked to the changing needs and requirements of future customers. Physical branches and traditional face-to-face interaction will be replaced by digital interaction through multiple channels.

Secondly, the scenario S-15 – '*High Tech meets High Touch*' also anticipated technological changes, but to a smaller extent. Incumbent banks will maintain their market supremacy in this scenario. The concept of Open Banking and the

opportunities for cooperation with agile and innovative FinTechs strengthen their role. However, the Blockchain technology and the associated digital currencies will probably not overcome technical barriers to implementation by 2030. In this context, the evolution of customer behavior and requirements will particularly play a role. The scenario expects that traditional and more conservative consumers who favor face-to-face interactions, personal advice, and are less confident in using technology will remain dominant. Hence, digital channels and communication will not completely supersede analog channels. Finally, the scenario *'High Tech meets High Touch'* assumes a German banking system based on a coexistence between digital and conventional in 2030.

On the basis of the most consistent *'Digital disruption'* scenario, implications for the strategies of German banks were derived. The so-called *'Strategy 2030'* with its three underlying pillars embrace digitalization, openness instead of reticence, and customer-centric thinking, aimed to ensure the sustainability of the strategic alignment of German banks in the next ten years. The first pillar primarily comprised the modernization of the legacy IT infrastructure, monetization of customer data, the automation of core banking processes, and the integration of Blockchain into the business model. The second pillar openness instead of reticence encompassed the process of opening up, rethinking of the product and distribution strategies, platform banking approach, and engagement in strategic partnerships with FinTechs or TPPs. In particular, API readiness and the adaption of a flexible, agile way of working act as enabler. Thirdly, customer-centric thinking contained the move to a customer-centric business model as well as the delivery of a seamless, personalized customer experience and service through multiple channels. The full implementation of AI and BD to capture, analyze, and leverage data is considered a key enabler for this strategic pillar.

In summary, the results of this thesis consisted of 14 scenarios that serve as a conceptual basis for German banks to scrutinize their strategic direction and optimally position themselves for the future.

7 Conclusion and limitations

In this thesis, the aim was to assess three specific research questions. First of all, the objective was to investigate the major drivers of change, which currently influence the German banking sector. The results of this investigation showed that 19 key drivers of change will determine how the German financial system will look like in 2030. The future of German banks will be shaped by these unprecedented factors that are turning the banking world upside down. In particular, the driving factors from the technological, regulatory, and environmental dimensions presented a high relevance of influence. The distinct tendencies in the literature indicated various development possibilities of the individual factors.

The second and main purpose of the present thesis was to create plausible future scenarios for the German banking sector by 2030. In general, the findings showed a definite indication that the German banking sector will undergo massive changes until 2030. The findings indicated especially that profound technological and social changes will occur. Both of the two selected scenarios assume that the technological change will substantially shape the German banking sector. New digital technologies and financial innovations will play a crucial role in the banking environment of the future. The perspective of whether this change will be disruptive or incremental, and the role of established banks in this process, diverges across the two scenarios. On the one hand, German incumbents will potentially lose their supremacy to more agile and innovative market entrants. On the other hand, incumbents will maintain their competitive position by actively managing and driving change. The decisive factor for this divergent development will be how the social change unfolds. The associated requirements and demands of future customers will have a decisive impact on the prospects of the German banking sector of tomorrow. At the same time, regulatory requirements will continue to increase over the next decade. They aim to ensure an equal playing field between incumbents and new market entrants in order to foster innovation and consumer protection. Moreover, both scenarios foresee an

increase in the importance of sustainability within banking. This shift will entail a rise in Green Banking practices in the next decade in Germany. To conclude, the results of this thesis indicate a clear trend towards an open, digital, and decentralized banking system in Germany by 2030.

Finally, the thesis set out to assess how German banks should prepare and position themselves to cope with the future scenarios. The investigation of plausible future scenarios for the German banking sector by 2030 has shown that a change in the strategic direction of banks is indispensable. Based on the implications of the most consistent scenario, the thesis has formulated sustainable strategies for German incumbent banks. In detail, the developed '*Strategy 2030*' is based on three strategic pillars and recommends a number of precise strategic initiatives. Hence, the present findings of this thesis help German banks to analyze and prepare for the anticipated future challenges.

In conclusion, it can be stated that the objectives of this work, formulated against the background of the research questions, were achieved. Taken together, the findings contributed in several ways to the understanding of possible futures for the German banking sector in 2030. The work provided one of the first comprehensive assessments of current driving factors for German banks. In addition, the essential value of this thesis lies in the generation of a holistic and plausible picture of the future for German banks. These findings complement the growing literature on the general understanding of the uncertain future of German banks. Moreover, the thesis has provided deeper insights into how incumbent banks can prepare and should act within the next years. This information should therefore stimulate strategic thinking and may be of assistance to German bank executives to rethink their strategic focus. Overall, the findings of this research contain considerable managerial implications for German banks.

Prior to this thesis, it was difficult to make predictions about how the sector will evolve. In that regard, the method of scenario planning provided a powerful tool to create a picture of the future environment and assess the interactions between

external influencing factors. The scenario planning technique used for this thesis may therefore also be applied to other banking sectors in the world. In conclusion, the findings of this thesis enable German banks to pursue a promising path at the present crossroads and regain their significance.

In spite of the fact that the present thesis shed new light on possible futures of the German banking sector, there were clearly some limitations. Firstly, it cannot be excluded that the constructed scenarios were impacted by subjectivity as well as individual beliefs and values. The probability of occurrence and the relationship assessment in the consistency matrix was based on the subjective judgment of the author supported by the extensive literature review. This aspect of scenario planning is frequently seen as a general point of criticism. Some even consider it as “art” or “imperfect tool” (Mintzberg 1994; Hamel 2002). However, Cairns and Wright argue that scenario thinking certainly is a creative process involving emotions, subjectivity, and intuition on the one hand, but also objectivity and rationality on the other hand (Cairns and Wright 2018). The aspect of subjectivity could lead to differences in results. Hence, the generated scenarios cannot be considered as a precise prediction or forecast for the future of the German banking sector by 2030.

Secondly, the thesis was not designed to take unpredictable trend-breaking events into consideration. As already indicated in section 3.3, one step of the scenario building technique is to identify trend-breaking events and analyze their impact on the scenario development. These trend-breaking events have generally a low probability of occurrence, but a high impact intensity or range. Examples of this are the September 11 terrorist attacks, the 2004 Indian Ocean earthquake and tsunami, or the recent case of the worldwide corona pandemic. In particular, the current corona pandemic has far-reaching implications for the future of German banks. However, the analysis of these trend-breaking events in a scenario project is optional, due to its highly speculative nature (Geschka and Schwarz-Geschka 2012; Institut für Mobilitätsforschung 2005). Therefore, trend-breaking events were not addressed in this thesis. The scope of this thesis was

limited in terms of the available literature and information until end of February 2020.

Thirdly, the findings of this study are only partially transferable to banking sectors of other countries, as the literature research was conducted with a special focus on German banks. Fourthly, the sustainable strategies outlined in chapter five, for the most part, are not adjusted to the different types of banks in Germany. Thus, the strategy forms a general point of reference. When implementing the strategy, it must be adapted to the specific characteristics of each individual bank.

In spite of its limitations, the thesis certainly adds to the understanding of key drivers of change influencing German banks and can therefore be regarded as valid estimations. Despite its exploratory nature, this thesis offers considerable insights into the future of the German banking sector. Furthermore, it establishes a basis for thorough thinking regarding the future strategic direction of German banks. As the environment is constantly changing and evolving, further research on the current subject is required. Therefore, this thesis will serve as a sound basis for future research. Furthermore, it is recommended to repeat a similar study for the German banking sector after a certain time. For instance, a repetition of a comparable study is advisable once the precise consequences of the corona pandemic for the German banking sector are foreseeable. As the environment and the banking landscape in Germany are undergoing dynamic change and new information will become available, new visions of the future can be generated for the financial system of tomorrow.

Referring back to the opening quotation from Mahatma Gandhi: “The future depends on what you do today”, German banks need to realize that the time to act is now in order to positively shape their future in a new banking world.

Appendix

Appendix A – List of final descriptors

No.	1.1
Descriptor Name	FinTechs
Influence Area	Technological
Relevance	3.0
Current Situation	<p>FinTech is considered the groundbreaking and disrupting innovation transforming the financial sector substantially (Lee and Shin 2018; Gimpel et al. 2018). Numerous forces have led to the rapid FinTech movement, namely technological change, sharing economy, emergence of non-banks and start-ups, changing customer behavior, and favorable regulatory implications (Alt et al. 2018; Lee and Shin 2018; Thakor 2019). FinTechs make use of advancements in technology to deliver financial solutions in order to serve the new requirements of customers (Anand and Mantrala 2019). The emergence of FinTechs with innovative business models applies pressure, and potentially disintermediates traditional financial service provider (Tanda and Schena 2019b; Lee and Shin 2018). On the one hand, this shift threatens the traditional business model of established banks, but on the other hand also provides opportunities (Omarini 2018).</p>
Specification A	FinTechs dominate the banking sector
Description	The digital disruption of the banking sector diminishes the relevance and status of incumbents. Innovative and agile

	FinTech entrants will dominate the German banking sector in 2030.
Reason	The digitally disrupted scenario implies that incumbents, pressured from regulations and profitability, will lose to the new market players (Skan et al. 2015). FinTechs are more innovative, lean, and agile. They fulfill client expectations using cutting-edge technology, customer centricity, agile processes, and accelerated innovation cycles (Drummer et al. 2016). Technology enabled innovations by FinTechs will challenge the business model and status of incumbents in this projection (Klus et al. 2019). Gimpel et al. argue that they will be the main innovation driver in the sector and will have a promising future (Gimpel et al. 2018). Dorfleitner et al. provided a forecast for specific FinTech segments in Germany by 2025. In a real case scenario, the market volume for crowdlending and other loans could increase from 330 million in 2015 to 7 billion euros in 2025. The market volume of payments could increase from 17 billion in 2015 to 420 billion euros in 2025 (Dorfleitner et al. 2017b). Altogether, incumbents will struggle in responding to innovative and value-creating FinTech applications (Gomber et al. 2018). Further, the FinTech market will undergo adjustments and mature in a typical industry sector (Gomber et al. 2018).
Probability	35%
Specification B	Coopetition
Description	Incumbent banks will respond to the revolutionary changes caused by FinTechs through coopetition rather than competition. In this projection, both parties choose to collaborate with each other in order to combine their strengths (Anand and Mantrala 2019).

Reason	<p>This projection is based on the view that incumbents will face challenges in imitating and developing innovative technology solutions by FinTechs (Anand and Mantrala 2019). Therefore, the cooperation scenario allows banks to access innovative technologies and capabilities (Deloitte 2018). This will enable them to strengthen their customer relationship, expand their reach, and benefit from the innovative environment (Häring 2018). According to an investigation of banks reaction to FinTech entrants, it is visible that the majority prioritizes strategic partnerships (Brandl and Hornuf 2017). According to an EBA survey, the most prevalent engagement form between banks and FinTechs are commercial partnerships (European Banking Authority 2019c). The number of collaborations between banks and FinTechs has multiplied tenfold since 2014, and two-thirds of these are of operational nature (PwC 2018). More than 80% of incumbents are seeking to partner with FinTechs in the next years, according to the PwC 2017 Global FinTech report (PwC 2017b). In conclusion, incumbents will engage with FinTech firms to achieve value-creating cooperations and realize the potential of new technologies. Possible barriers for successful cooperation could be a poor cultural fit, technology gap or regulatory soundness (King 2019; Arslanian and Fischer 2019c). Overall, the strategic response to collaborate with FinTechs is widely seen and could be coined as a “If you can’t beat them, join them” scenario (King 2019; Häring 2018).</p>
Probability	65%

No.	1.2
Descriptor Name	Blockchain
Influence Area	Technological
Relevance	3.0
Current Situation	<p>In recent years, Blockchain has raised considerable attention in the world of banking. Many experts believe the emerging technology has the potential to radically disrupt and reconfigure the existing banking industry (Rosati and Čuk 2019; Casey et al. 2018; Beinke et al. 2018; Guo and Liang 2016). Essentially, the technology provides a digital and decentralized database (Morkunas et al. 2019), which enables all sorts of peer-to-peer value transfers (Frizzo-Barker et al. 2019). Further, it does not require any intermediaries such as banks to authenticate these transactions (Frizzo-Barker et al. 2019). In general, the Blockchain has four principal characteristics, specifically anonymity, persistency, decentralization, and auditability (Zheng et al. 2017). Firstly applied in 2008 as the underlying technology of Bitcoin, it is now the core of the FinTech revolution (Rosati and Čuk 2019) and applied beyond finance (Frizzo-Barker et al. 2019).</p>
Specification A	Revolutionizing banking
Description	This projection supports the view that Blockchain possess vast potential to revolutionize the banking industry entirely by 2030.
Reason	There are several reasons for the Blockchain revolution in the German banking sector. The first major advantage of the technology is increased transparency, which allows to monitor all transactions (Korschowski et al. 2018). Called

	<p>the “trust machine” (Economist 2015), the technology can further improve security and efficiency (Frizzo-Barker et al. 2019) as well as lower entry barriers (Casey et al. 2018). The fields of applications in banking are numerous, for instance payments and remittance, digital identity (KYC), risk assessment, credit and lending, trading, smart contracts, compliance, etc. (Higginson et al. 2019; Rosati and Čuk 2019; Zheng et al. 2017). According to this scenario, Blockchain will ultimately create a fairer and safer financial sector in Germany (Casey et al. 2018).</p>
Probability	55%
Specification B	Implementation challenges hinder adoption
Description	In this projection, the use of the Blockchain technology in the German banking sector is hindered by technical, regulatory, and implementation challenges that cannot be fully overcome.
Reason	<p>The immense benefits of Blockchain are clear, however adoption challenges in the field of banking will remain. Firstly, technical challenges regarding the scalability of transactions will pose problems (Korschowski et al. 2018; Casey et al. 2018). At the moment, transactions are restricted to seven per seconds due to block mining and size. This capacity is not yet sufficient to handle millions of real-time transactions (Zheng et al. 2017; Korschowski et al. 2018). The distributed structure of Blockchain also leads to regulatory challenges, which need to be addressed by regulators (Yeoh 2017). The transition from existing business models to Blockchain-based models is currently slow (Rosati and Čuk 2019). In the strongly regulated, conservative, and profit-seeking banking sector, customer acceptance, uncertainty of the outcome, and</p>

	increased regulation burdens are decisive for the adoption of Blockchain (Rosati and Čuk 2019). In conclusion, the technology will not be able to overcome these challenges and reach its full potential by 2030 (Iansiti and Lakhani 2017).
Probability	45%

No.	1.3
Descriptor Name	Artificial Intelligence and Big Data
Influence Area	Technological
Relevance	3.0
Current Situation	Advanced technologies fundamentally impacted the world of banking over the last few years. This is particularly due to the availability of staggering data quantities and the possibility to utilize this data (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). Basically, AI is about using machines to interpret data to derive insights, identify patterns, and take action (Arslanian and Fischer 2019e). So far, AI and BD applications in the German banking sector have been modest. Typical applications were customer identification in real-time, fraud prevention or processes related to KYC (Kaya 2019b).
Specification A	Full implementation of AI and BD
Description	In this scenario, German banks will fully seize the opportunities presented by AI and BD. According to this scenario, FS provider will use the technology mainly along four key dimensions: personalization, automation, innovative value proposition, and better decision-making (Arslanian and Fischer 2019a; World Economic Forum

	2018b). The full implementation of this technology will entirely change the dynamics of how banks operate in Germany (Jubraj et al. 2018; Kaya 2019b).
Reason	<p>Firstly, the AI and BD technology will enable banks to deploy and offer personalized FS on a large scale (Arslanian and Fischer 2019a). Tailored products and services will possibly result in greater customer experience (Corea 2019) and optimized customer acquisition (Arslanian and Fischer 2019a). Secondly, AI enabled automation will enhance speed and efficiency to reduce operational cost of established banks (Arslanian and Fischer 2019a). In particular, the deployment of RPA or Chatbots allows for effectiveness and efficiency improvements in core banking processes (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). Thirdly, the combination of analytics and large data sets helps to generate deeper insights, thus facilitating innovation and value creation. This will in turn lead to product and process innovation (Jubraj et al. 2018; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). Fourthly, the advances of AI and BD in terms of accuracy of prediction will improve risk assessment, optimization of capital, identification process, detection of fraudulent activity, and overall decision-making (Kaya 2019b; Arslanian and Fischer 2019a; Lau and Leimer 2018). In conclusion, the deployment of the technologies will simplify and speed up processes within banks and with customers. This will be key to overcome profitability challenges and remain competitive in the market (Kaya 2019b; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a).</p>
Probability	75%

Specification B	Several obstacles hinder full AI and BD implementation
Description	Despite its vast potential, moderate implementation of AI technology in banking services continues. Many incumbents face various barriers in the implementation of AI and BD. The main barriers will be regulatory measures concerning data privacy, increased consumer sensitivity about sharing their personal data, lack of trust creation, data issues as well as lacking technology expertise and infrastructure (Corea 2019; Bundesanstalt für Finanzdienstleistungsaufsicht 2018a).
Reason	Firstly, the highly regulated nature of the German banking industry will hinder efficient use of the technology (Kaya 2019b). Moving forward, the regulatory framework based on an outdated financial environment fails to keep up with the advancing technology. Hence, creating high uncertainty and hinder deployment of AI and BD (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a; World Economic Forum 2018b). Secondly, increased consumer sensitivity to sharing personal data will impede adoption. The consumer interest to preserve privacy will presumably outweigh the value added of AI enabled FS (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). The recent Big Data and Trust consumer study indicates that German consumers are most sensitive about sharing financial information (Rose et al. 2018). In the long term, the lack of transparency and protection as well as misuse of data by banks can lead to adverse effects on customer trust. (Bundesanstalt für Finanzdienstleistungsaufsicht 2018a). In addition, traditional banks will continue to struggle using existing data piles to deploy AI and BD applications (World Economic Forum 2018b). Lacking

	technology expertise and IT infrastructure of incumbents will further hinder full implementation of this technology (Arslanian and Fischer 2019a; World Economic Forum 2018b).
Probability	25%

No.	1.4
Descriptor Name	Open Banking
Influence Area	Technological
Relevance	3.0
Current Situation	<p>The concept of Open Banking or API Banking is about creating equal conditions of competition between traditional banks and other firms in the market (Dietz et al. 2018). Open Banking is mainly based on the introduction of the PSD II, technical interfaces (APIs), and technological advances (Borgogno and Colangelo 2019; Doyle et al. 2017). The PSD II directive forces banks to open up their transaction and customer data to TPP (Doyle et al. 2017; Brühl and Krahen 2019). The APIs enable a fast and simple integration of this data into third-party applications (Bramberger 2019a). To sum up, Open Banking facilitates the creation of digital and open ecosystems as well as removes entry barriers for non-bank firms (FinTechs, BigTechs, etc.) to enter the banking sector (Dietz et al. 2018). This poses serious challenges and key opportunities for established banks in Germany (Botta et al. 2018).</p>
Specification A	Disintermediation of the value chain

Description	As the movement towards an open financial ecosystem is in full force, the monopoly over data of traditional banks will be broken (Citi GPS 2018). New banking sector entrants will change the dynamics of the market (Deloitte 2019). The current business model of banks, based on a vertical value chain in which they are the owners of the product, distribution, technology and customer data will be challenged (Mattila et al. 2018). Hence, established banks will face a disintermediation of their value chain, putting them under immense pressure (Citi GPS 2018).
Reason	The XS2A rule under PSD II fosters the disintermediation of the value chain (Citi GPS 2018). Post PSD II, traditional operators will likely lose the ownership of the customer interface to TPPs (Mattila et al. 2018; Doyle et al. 2017). According to several experts, traditional FS provider will increasingly inherit the role as primary service suppliers in the digital ecosystem of the future (Mattila et al. 2018; Schmitz et al. 2017; Bramberger 2019a). As a result, banks will face market share losses and eventually decreasing profit margins (Doyle et al. 2017). The increased competition will lead to further margin and cost pressures (Citi GPS 2018). Ultimately, German banks will inherit a different role within the new open financial ecosystem (Doyle et al. 2017).
Probability	45%
Specification B	Embracing Open Banking
Description	German incumbents will accept and embrace the paradigm shift presented by the Open Banking concept.
Reason	Embracing the process of opening up allows banks to cooperate with FinTechs and startups to benefit from their

	<p>competitive advantages. Hence, banks will be able to better understand client behavior (Monitor Deloitte 2018) and create innovative business models (Korschowski et al. 2017; Bramberger 2019a). The advantages of sharing and augmenting customer data with TPPs enables incumbents to advance existing products and services (Bramberger 2019a; Borgogno and Colangelo 2019). On the other hand, the open revolution affects established processes, but offers a great chance for incumbents to transform their business to an open and digital ecosystem (Monitor Deloitte 2018). This development presents an opportunity to create new revenue sources and achieve greater customer-centricity (Doyle et al. 2017). Based on these trends, banks will adopt a strategy towards BaaP (Zachariadis and Ozcan 2016; Ernst and Young 2018). In this regard, they contribute their knowledge of compliance, security or authentication to the platform and benefit from new revenue streams, technology advancements, and digital innovations (Ernst and Young 2018). In this shared ecosystem, where product and distribution are unbundled, incumbents will engage in collaboration with new entrants to maintain their relevance (Doyle et al. 2017).</p>
Probability	55%

No.	1.5
Descriptor Name	IT infrastructure
Influence Area	Technological
Relevance	3.0
Current Situation	The digital transformation of the financial sector, new customer requirements, regulations, and tight budgets put

	<p>pressure on the IT infrastructure of German banks (Freudenstein et al. 2019). In general, banks' IT expenses are considerably higher than in other industry sectors (Alt and Puschmann 2016). According to research, they accumulate to more than eight percent of total revenue and between 15% to 25% of annual costs are assigned to IT (Citi GPS 2018). Legacy IT architecture of banks have worked in the past, but reveal several challenges today, specifically lacking agility, flexibility, efficiency as well as difficult modification and connection (Citi GPS 2018; Strietzel et al. 2018; Arslanian and Fischer 2019c). In particular, German banks lag behind in terms of digital banking maturity according to the EMEA Digital Banking Maturity 2018 study (Groote et al. 2018). These developments emphasize the great discrepancy between current requirements and outdated IT systems of banks (Herrmann and Heinke 2018). Obsolete IT systems are no longer able to cope with new demands (Strietzel et al. 2018) and therefore require reconstruction measures (Herrmann and Heinke 2018; Freudenstein et al. 2019). In conclusion, the outdated, insufficient, costly, and product-centric IT infrastructure impairs the organizational ability to cope with the evolving financial ecosystem. Therefore, renovating or moving away from their legacy IT systems is key for established banks (Arslanian and Fischer 2019b). Finally, a successful transformation of the German banking sector can only succeed if an contemporary core banking system is in place (Strietzel et al. 2018).</p>
Specification A	Outsourcing to the cloud

Description	In order to overcome the limitations posed by the legacy IT infrastructure, incumbents will seek to outsource their IT system to the cloud.
Reason	<p>The legacy IT infrastructure reached the point of needlessness, and the integration within these outdated systems is costly and complex (Citi GPS 2018). Consequently, traditional FS provider will migrate their back office to the cloud and focus instead on their core competencies. Research concerning the impact of the digital transformation on sourcing strategies in the German FS sector highlights rising IT outsourcing activities in order to promote innovation. In addition, the use of cloud services is expected to increase in the foreseeable future (Demirbas et al. 2018). Generally, a broad array of services are offered by cloud service providers, like IaaS, PaaS, and SaaS (Röseler and Steinbrecher 2019; Bundesanstalt für Finanzdienstleistungsaufsicht 2019a). Overall, this entails several opportunities such as increased efficiency, agility, scalability, and lower barriers for the integration of third party services (Arslanian and Fischer 2019b; Srinivas et al. 2018). Hence, costs and complexity are expected to be reduced considerably. This will increase overall competitiveness of incumbents (Dorschel 2018). On the other hand, outsourcing contains operational risk for credit institutions (Röseler and Steinbrecher 2019). As the identification, control, and mitigation of operational risks are no longer within the organizational boundaries, the regulatory framework must be modified (Röseler and Steinbrecher 2019; Moeller 2017).</p>
Probability	65%

Specification B	Modernization of the legacy IT
Description	Responding to an outdated legacy IT infrastructure, German banks will modernize and update their core banking systems.
Reason	The crucial modernization of the legacy IT of German incumbents will be achieved through integrating new technologies and applications into their core banking systems (Arslanian and Fischer 2019b). Based on a study on technology priorities for FS firms, 23% of respondents view modernizing the legacy IT system as most important field (Srinivas et al. 2018). Modernization of the IT infrastructure will be key to achieve enhanced user experience, higher scalability, real-time processing, standardization of API interfaces, reduced complexity, and lower time-to-market (Dorschel 2018; Citi GPS 2018; Herrmann and Heinke 2018). To sum up, a holistic modernization of the legacy IT will be highly relevant for incumbents to not slow down their digital transformation journey (Herrmann and Heinke 2018). However, some incumbents might be hesitant to renovate their core banking systems, because of large initial investments, long amortization period, and execution risks (Citi GPS 2018).
Probability	35%

No.	2.1
Descriptor Name	Interest rate
Influence Area	Economic
Relevance	1.0

Current Situation	<p>Since 2008, interest rates in Germany are declining resulting in a low interest rate environment. This development is mainly due to the severe reduction of the ECB's policy rates after the financial crisis. The ECB's policy rates principally determine general interest rates in Germany (Hennecke 2017; Deutsche Bundesbank 2019a). In 2016, the ECB interest rate on the MRO was reduced to 0%, which has remained in effect until now (European Central Bank n.d.). The Governing Council decided in December 2019 to keep the ECB interest rates unchanged at their present low level (European Central Bank 2019c). The rate on the deposit facility (overnight credits to banks) stands currently at -0.50% (European Central Bank n.d.). In Germany, the long-term interest rate was reported at -0.35% in November 2019, compared to 0.31% in November 2018 (OECD 2020a). In conclusion, the ultra-low interest rate environment has been prevalent for some time.</p>
Specification A	Interest rate increase
Description	In this projection, the interest rates in Germany will slowly start to increase until 2030.
Reason	<p>An interest rate turnaround scenario could occur if economic growth and inflation rise to such an extent that a higher interest rate by the ECB is appropriate. Another scenario implies that the ECB is forced to prevent future financial crises by a restrictive monetary policy (Schafföner and Mar 2018). In general, banks grant loans (long-term) and finance themselves through deposits (short-term). This discrepancy makes them extremely vulnerable to abrupt interest rate increases (Mommel 2019). A sudden rise in interest levels could have a negative impact on the</p>

	financial system in Germany. This is mainly due to high asset prices, which could react strongly to minor interest rate changes (Deutsche Bundesbank 2019g).
Probability	25%
Specification B	Low interest rate environment continues
Description	The low interest rate environment in Germany is expected to continue in this projection due to the lasting ultra-low ECB interest policy.
Reason	<p>The ultra-low interest policy by the ECB will continue in the foreseeable future with the goal to provide monetary easing (Demiralp et al. 2017), create simpler borrowing conditions, and stimulate consumer spending and investments (European Central Bank 2019c). However, the vulnerability of the financial system in Germany towards unexpected macroeconomic developments also increases. A low policy rate results in higher risk-taking by banks and strengthens the search for yield (Deutsche Bundesbank 2019g; Heider et al. 2019). According to the OECD long-term interest rates forecast, interest rates in Germany will be at -0.33% in 2021 (OECD 2020b). Hence, interest rate risks are increasing due to the prevailing low interest rate environment. Especially, small and medium-sized banks face increased interest rate risks (Teichert 2018; Deutsche Bundesbank 2019g). In contrast, risk evaluation and prevention activities of German banks are at a very low level (Deutsche Bundesbank 2019g). The study by Heider et al. further suggests that negative policy rates effect financial stability (Heider et al. 2019). Ultimately, a continuing low interest rate environment may deteriorates the condition of the German banking sector</p>

	(Oliver Wyman 2018) and pressures the core interest margin of banks (Dombret et al. 2019).
Probability	75%

No.	2.2
Descriptor Name	Evolution of currencies
Influence Area	Economic
Relevance	1.0
Current Situation	<p>In recent years, the digitalization and advances in IT changed the monetary system profoundly (Brunnermeier et al. 2019; Fiedler et al. 2019). Digital or virtual currencies appeared since 2009 when Bitcoin was introduced (Wilson 2019; Lastra and Allen 2018). They mostly rely on the DLT (Bouveret and Haksar 2018) and refer to a digital representation of money, which are denominated in their unit of account and are issued by private organizations (He et al. 2016). Generally, they enable direct peer-to-peer money transfers without the need for intermediaries (He et al. 2016; Rangeley 2018; Fiedler et al. 2019; Bouveret and Haksar 2018; Dwyer 2015). In 2018, more than 1,600 digital currencies were in circulation (Lastra and Allen 2018; Wilson 2019) with a total market capitalization of approximately 400 billion US dollars (Schilling and Uhlig 2019; Lastra and Allen 2018). Moving forward, the future is highly uncertain and various factors will impact the evolution of currencies (Heller 2018).</p>
Specification A	Digital currencies dominate
Description	The trend towards digital currencies will continue and disrupt the future evolution of currencies. The increased

	usage of digital currencies in this projection is based on the tremendous advantages and opportunities they possess (Wilson 2019).
Reason	The major strengths of virtual currencies are direct peer-to-peer payments, the Blockchain technology, alternative investment opportunities, and reduced transaction time and cost (Wilson 2019; He et al. 2016). Additionally, they possess the potential to increase economic welfare through the exploitation of a network ecosystem (Fiedler et al. 2019). Several considerable opportunities will support the trend of increased digital currency circulation, namely the introduction of promoting regulations, the wide global reach, and the capacity to promote financial innovation (Wilson 2019). Another supporting factor will be the consideration of introducing a CBDC in Europe (Mayer 2019; Lastra and Allen 2018; Fiedler et al. 2019). This is due to the fact that a CBDC has clear advantages over a privately issued digital currency, as it allows governments to supply, monitor, and regulate it (Fiedler et al. 2019; Lastra and Allen 2018). Rangeley claims that the Blockchain technology offers the unique chance to build an innovative monetary system, which is controlled by all people and allows for free trade with everybody (Rangeley 2018). Nevertheless, regulatory and legal challenges have to be resolved and closely monitored in this scenario (Fiedler et al. 2019).
Probability	35%
Specification B	Traditional currencies remain dominant
Description	In contrast to an increased circulation scenario of digital currencies, this projection supports the view that traditional currencies will remain dominant. The hype bubble around

	digital currencies will burst due to their weaknesses and threats, which outweigh the advantages.
Reason	Key weaknesses of digital currencies are the volatility, slow transaction rate, mining problems (high production costs), low consumer protection, and lack of transparency (Wilson 2019; Bouveret and Haksar 2018; Fabris 2019; He et al. 2016). Particularly, the large fluctuations in value will be a significant barrier to increased usage (Wilson 2019). Another concern is the aggregation of user data, which supports the competitive advantage of the currency supplier and could promote monopolistic tendencies in the market (Fiedler et al. 2019). Several threats could also support the downfall of virtual currencies in the foreseeable future. These include restrictive regulatory policies, association with illicit activities, and loss of user trust (Wilson 2019). Overall, the risks and drawbacks associated with digital currencies will lead to declining use and ultimately to a continued dominant role of traditional currencies.
Probability	65%

No.	2.3
Descriptor Name	Strategic positioning
Influence Area	Economic
Relevance	1.0
Current Situation	In the last years, banks have been confronted by the ongoing digitalization, low-interest rate environment, tougher regulation, and increased competition (European Central Bank 2018b). This has led to a decline in profitability of incumbents (Deutsche Bundesbank 2019d).

Overall, the revenue pool of the German banking sector remained constant at an average of 115 billion euros between 2013 and 2016. Around 60% of this revenue pool stemmed from retail clients and almost 25% from corporate clients (Oliver Wyman 2018). However, the interest income remained below long-range average in 2018 (Deutsche Bundesbank 2019d). According to the Risk Assessment Report conducted by the EBA, the average ROE in Europe was around 7% in June 2019. German banks are located at the lower end and are not considered profitable by European standards (European Banking Authority 2019c; Oliver Wyman 2018). Between 2014 and 2017, the average ROE was 4%, compared to 4.7% between 2010 and 2013 (Koch et al. 2019). In 2018, the ROE was close to the zero line standing at 1% (Sinn and Thobe 2019). However, the ROE differs across bank segments. Savings and cooperative banks (Average ROE of 10%) achieved a higher ROE compared to private banks (Average ROE of below 1%) between 2014 and 2017 (Koch et al. 2019). Overall, the low profitability can be seen as an overcapacity indicator and questions the strategic positioning of banks (Oliver Wyman 2018). Moreover, the CIR across all segments has increased by 10% since 2010 to a current 73% (Sinn and Thobe 2019). This value is noticeably higher than in international and European comparison (European Banking Authority 2019c). High expenses for the ongoing digitalization, staff, and the implementation of new regulations put additional pressure on the cost side (Sinn and Thobe 2019; European Banking Authority 2019c). To sum up, these developments require a fundamental reconsideration of the strategic positioning

	and business model of German banks (Koch et al. 2019; Borroni and Rossi 2019).
Specification A	Growth strategies
Description	The majority of German banks will respond to these challenges by pursuing growth strategies in order to generate higher revenues.
Reason	Moving forward, the strategic positioning of German banks will depend on the current state of their respective profitability. Better performers or leaders have a tendency towards growth strategies (European Central Bank 2018b; Koch et al. 2019). According to a profitability assessment by the ECB, best performers with highest ROE followed a high-income strategy (European Central Bank 2018b). Koch et al. state that particularly cooperative banks are leading the field in terms of ROE and asset growth, followed by savings banks. They also argue that banks, which focused on growth strategies, have been more successful maintaining higher profitability. In order to become a leading bank in Germany, growth strategies seem more promising (Koch et al. 2019). Incumbents will develop a customer-centric approach and embrace the digitalization to boost growth (Sinn and Thobe 2019; Koch et al. 2019).
Probability	55%
Specification B	Cost cutting strategies
Description	German banks will deploy cost cutting strategies to overcome present profitability challenges.
Reason	The majority of German banks generally have a structural cost issue (Koch et al. 2019). Therefore, cost cutting strategies positively impact overall profitability. Low

	<p>performing banks or laggards tend to focus on cost cutting strategies (European Central Bank 2018b). The main target area to improve profitability are rising operating expenses according to an EBA report. This entails the rationalization of branch networks and reduction of staff expenses as well as other measures (European Banking Authority 2019c). In 2018, average staff costs accounted for almost 40% of operating income (Deutsche Bundesbank 2019d). Therefore, further staff reductions will be unavoidable, because personnel costs are still a major contributor to low profitability (Sinn and Thobe 2019). Eventually, cost cutting is not considered a decisive criterion alone. At the same time, banks have to maintain investments in IT and new technologies to remain competitive and achieve long-term business objectives (European Central Bank 2018b; Koch et al. 2019). In this context, research by Koch et al. showed that average ROE of banks focusing on cost cutting strategies decreased by 2%, while the average CIR increased by 3%. Finally, cost cutting strategies can be risky, as they might impact client satisfaction or service quality (Koch et al. 2019).</p>
Probability	45%

No.	2.4
Descriptor Name	Economic outlook Germany
Influence Area	Economic
Relevance	1.0
Current Situation	After years of economic prosperity with real GDP growth of more than 2% annually (European Commission 2019a), the German economy faced a slowdown in 2019

	<p>(Deutsche Bundesbank 2019b; European Commission 2019a). Germany, a heavily export-dependent economy, has struggled with weak growth of global trade contributing to the economic slowdown (OECD 2019). The GDP rose by only 0.4% in 2019 (European Commission 2019a). At the moment, the German economy continues to more or less stagnate. However, there were initial signs at the end of 2019, which could stimulate a gradual recovery of the German economy in the future (Bundesministerium für Wirtschaft und Energie 2019).</p>
Specification A	Stagnation
Description	The German economy is expected to face stagnation over the forecast period due to structural challenges and external factors.
Reason	<p>The great export dependence with only expected moderate global trade development will pose risks to economic growth in Germany. Emerging trade disputes, protectionism, a China slowdown, and technology change could constitute additional obstacles for the growth of the German economy (OECD 2019; International Monetary Fund 2019). The budget surplus is expected to reduce to 0.6% in 2020 and 0.2% in 2021 of GDP according to the European Economic Forecast (European Commission 2019a). This underpins the expected stagnation of the German economy. The IMF further highlights a disadvantageous demographic change, imminent energy transition, and slight productivity progress as a brake on economic growth (International Monetary Fund 2019). This stagnation projection is supported by a study on long-term GDP projections. The findings suggest that a shift in economic power at a global level will happen and Germany</p>

	will fall behind in the ranking of the largest economies (Hawksworth et al. 2017).
Probability	25%
Specification B	Moderate growth
Description	In this scenario, the German economy will grow at a moderate pace in the next years.
Reason	<p>According to the OECD Economic Outlook, the GDP is expected to rise by 0.4% in 2020 and another 0.9% in 2021 (OECD 2019). The GDP projection by the Deutsche Bundesbank expects an increase to 1.2% in 2020 and 1.3% in 2021 (Deutsche Bundesbank 2019b). The European Economic Forecast expects the GDP growth to stay consistent at 1.0% in the years 2020 and 2021 (European Commission 2019a). The IMF even forecasts a growth of 1.7% in 2020 and 1.5% in 2021, which from then on steadily declines to 1.1% in 2024 (International Monetary Fund 2019). Overall, several organizations support the moderate economic growth scenario in Germany. The main reasons for this projection are solid private consumption, a helpful labor market situation (low unemployment rate and wage increases), and rise in export (International Monetary Fund 2019; Deutsche Bundesbank 2019b; European Commission 2019a). To conclude, the German economy will face weaker growth in the beginning, but gain momentum in the medium run (Deutsche Bundesbank 2019b).</p>
Probability	75%

No.	2.5
Descriptor Name	Competitive situation
Influence Area	Economic
Relevance	1.0
Current Situation	<p>As a consequence of the last financial crisis in 2008, a restructuring of the European banking sector has taken place accompanied with a market concentration increase (Guevara and Maudos 2017). In recent years, the competitive pressure in the financial market strongly increased. FinTechs and BigTechs entered the financial market with new innovative products and highly scaled processes (BearingPoint 2019; Alt and Puschmann 2016). This development largely resulted from the introduction of the PSD II, which opened the banking sector to new entrants and aimed to stimulate competition (Bramberger 2019b). In general, as suggested by several research papers, competition fosters efficiency and innovation (Vives 2019) and improves overall bank stability (Goetz 2018). Conversely, tougher competition puts pressure on the profitability of financial institutions in Germany. This could potentially lead to increased risk-taking by incumbents in both projections (Vives 2019; Financial Stability Board 2019a).</p>
Specification A	Intensified competition from BigTechs
Description	The competitive situation will intensify in this projection due to the entry of BigTechs in the German banking sector.
Reason	BigTechs such as Facebook, Amazon, Apple or Google will increase the competitive pressure on incumbents, as they possess a large customer base, data, recognition, and

	<p>greater financial resources (Tanda and Schena 2019a; Financial Stability Board 2019a, 2019b; Balz 2019; Schmaus and Heinrich 2018). This allows for rapid scalability and use of network effects of their FS, especially in payments. This is attributable to lower marginal costs of their FS compared to established banks (Financial Stability Board 2019a, 2019b). Additionally, they own advanced technology and are able to continuously invest in innovative technologies (Tanda and Schena 2019a). Many experts believe BigTechs will pose a greater threat to incumbents than FinTechs, as they possess advantages that are harder to replicate (Stulz 2019; Financial Stability Board 2019a; Citi GPS 2018). Their overall objective could entail the establishment of an integrated financial ecosystem (Citi GPS 2018). Several experts share the view that BigTechs will profoundly change the financial industry in the medium to long term (Balz 2019; Schmaus and Heinrich 2018; Stulz 2019).</p>
Probability	65%
Specification B	Intensified competition from FinTechs
Description	In contrast to Specification A, competition will intensify due to emerging FinTechs in the German banking sector.
Reason	<p>Several authors argue that FinTechs do not pose a great competitive threat to incumbent banks (Citi GPS 2018; Financial Stability Board 2019a). This mainly results from the rather cooperative and complementary relationship between FinTechs and incumbents until now. In general, FinTechs struggle with access to a necessary customer base and funding to seriously threaten traditional banks (Financial Stability Board 2019a). Few argue that FinTechs will pose a competitive threat in only some parts of the</p>

	financial system. On the other hand, FinTech competition will potentially support the financial sector in terms of innovation capabilities, efficiency, transparency, and lower costs. Generally, the competition in the German financial sector will evolve depending on how competitors and innovative technologies will be established (Buch 2018).
Probability	35%

No.	2.6
Descriptor Name	Banking sector structure
Influence Area	Economic
Relevance	1.0
Current Situation	Over the past 20 years, the total number of financial institutions has been declining (Deutsche Bundesbank 2019c). Between 2000 and 2017, the number of German banks fell by 43% to 1,600. However, the consolidation rates vary between different segments. Consolidation activities happened especially among cooperative banks (76%), followed by saving banks (15%), and private banks (6%) (Koch et al. 2019). Since the financial crisis in 2008, the yearly decline of banks stands at 2% (Sinn and Thobe 2019), resulting in leaner bank pillars (Oliver Wyman 2018). This development indicates an overcapacity in the market (Oliver Wyman 2018), as supply exceeds demand (Koch et al. 2019). Germany still has an above-average number of banks per million of bankable inhabitants. The strongly fragmented banking sector also faces other problems. Declining profits and rising costs support the problematic situation of financial institutions in Germany. Declining ROE and the rising CIR emphasize the need for

	<p>structural changes in the banking sector (Koch et al. 2019; Sinn and Thobe 2019). To sum up, consolidation through M&A is one answer to reduce overcapacity (European Central Bank 2019a). Many experts see a consolidation of Germany's financial institutions on national and European level as inevitable (Andreeva et al. 2019; Sinn and Thobe 2019; Koch et al. 2019; Oliver Wyman 2018). In both scenarios, operational risks associated with consolidation activities have to be managed with care (Andreeva et al. 2019).</p>
Specification A	Slow consolidation dynamics
Description	In this projection, the consolidation dynamics will remain slow, as there is no indication that consolidation activities will change substantially in the foreseeable future.
Reason	<p>In theory, the fragmented German banking sector shows consolidation potential, which is however not exploited in practice (Sinn and Thobe 2019; zeb 2018). The cancelled merger conversations of Deutsche Bank and Commerzbank (Storbeck et al. 2019; Deutsche Welle 2019) support this tendency (Sinn and Thobe 2019). Another reason for slow consolidation dynamics is the three pillar structure of the German banking system, as consolidation primarily used to happen horizontally (Koch et al. 2019; Sinn and Thobe 2019). The incomplete Banking Union, regulatory uncertainty, and problematic integration of IT systems will be the largest impediments to consolidation in the euro area (European Central Bank 2019a). Different national requirements and regulations will also act as barriers for cross-border consolidation (Andreeva et al. 2019). Therefore, consolidation on a European level requires a restructuring on national level</p>

	<p>first. With slow consolidation dynamics and without exploiting the synergies associated with it, German banks have only limited chances to earn their ROE in the foreseeable future (Sinn and Thobe 2019).</p>
Probability	40%
Specification B	High consolidation dynamics
Description	<p>In the course of a rapid consolidation scenario, M&A will lead to a higher concentration and fewer remaining institutions in the banking sector by 2030.</p>
Reason	<p>A study predicts that there will be a substantial decline in the total number of market participants. In concrete terms, this implies that only 150 up to 300 banks with a sustainable business model will remain in Germany by 2030 (Oliver Wyman 2018). Recent consolidation developments also indicate higher consolidation activities in the future (Koch et al. 2019). Sinn and Thobe estimate cost savings of 30 to 40% on average through consolidation (Sinn and Thobe 2019). Research on causal effects of M&A on EU bank productivity supports this by stating that M&A possesses potential to generate productivity improvements in the long-term (Aljadani and Toumi 2019). As a result of increasing digitalization, the cost synergy potential of mergers will increase disproportionately in the future (Jentzsch and Menig 2018). Another factor fostering higher consolidation is the creation of a European banking union, which will remove further barriers (Andreeva et al. 2019; Sinn and Thobe 2019). This requires political and regulatory harmonization of the European banking market (Sinn and Thobe 2019). In conclusion, higher consolidation activities allow banks to</p>

	make use of economies of scope and scale, which in turn improves overall profitability (Andreeva et al. 2019).
Probability	60%

No.	3.1
Descriptor Name	Capital
Influence Area	Regulatory
Relevance	3.0
Current Situation	<p>The Basel Framework is a complete set of prudential regulations for banks established by the BCBS (Basel Committee on Banking Supervision 2020). In 2017, the Basel III reform package has been adopted and will be phased in from 2022 onwards (European Banking Authority 2019b). The objective is to provide a base for a resilient banking sector and strengthen regulation as well as supervision (European Banking Authority 2019b). Moreover, the reforms aim to revise the RWA framework and enhance comparability of capital ratios among banks (Basel Committee on Banking Supervision 2020, 2017). The transposition into European law will take place within the revised framework of the European CRR III and CRD VI (Bundesanstalt für Finanzdienstleistungsaufsicht 2019b; Deutsche Bundesbank 2019g).</p>
Specification A	Higher capital requirements
Description	In this projection, German banks will face higher capital requirements due to the future implementation of the revised Basel III reforms.
Reason	Firstly, the capital conservation buffer increased to 2.5% in 2019 compared to 1.875% in 2018 and 1.25% in 2017.

	<p>In addition, Basel III will require a total capital share of minimum 8% of RWA at all times (Basel Committee on Banking Supervision 2017). The minimum capital requirements for German banks will increase by 22.2% on average due to the Basel III reforms. This is primarily attributable to the increasing output floor (Deutsche Bundesbank 2019f). In 2018, about 37% of German banks determined their RWA with internal measures (Deutsche Bundesbank 2019f). A more risk sensitive output floor of 50% will be implemented in 2022. Henceforth, the output floor will increase by 5% each year to 70% in 2026 and another 2.5% to 72.5% in 2027 (Basel Committee on Banking Supervision 2017). Secondly, a revised exposure definition will be implemented in January 2022 resulting in a minimum 3% LR requirement and additional leverage buffer for G-SIB (Basel Committee on Banking Supervision 2020). This implies a LR of 4.4% for German financial institutions (Deutsche Bundesbank 2019f). Overall, the Basel III reforms will have a greater impact on large and G-SIB banks than on medium- or small-sized banks (European Banking Authority 2019b). The total capital requirement for the full realization of the final Basel III reform measures will approximately amount to 14 billion euros (Deutsche Bundesbank 2019f). This projection of higher capital requirements may diminishes the prospects for German banks.</p>
Probability	90%
Specification B	Lower capital requirements
Description	Lower capital requirements will be in effect for the German banking sector in 2030.

Reason	Generally, a holistic future regulatory scenario is uncertain due to the number of regulatory authorities involved. It remains unclear how a future scenario looks like and which implications it entails (Koch et al. 2017). Supporters of more liberal capital regulations argue that strict capital requirements increase the cost of bank credit and could impede economic activity (Dagher et al. 2016). A full implementation of the Basel III reforms will negatively impact the ROE of banks (Koch et al. 2017). Furthermore, Dagher et al. found out that capital requirements between 15 and 23% of RWA are sufficient to absorb potential losses in most cases of banking crisis. Additional capital requirement increases merely contain marginal effects on banking crisis prevention. Lower capital requirements provide less of an incentive for regulatory arbitrage and reduce the risk of banks transferring their activities to unregulated financial intermediaries. (Dagher et al. 2016).
Probability	10%

No.	3.2
Descriptor Name	Consumer protection and transparency
Influence Area	Regulatory
Relevance	3.0
Current Situation	Consumer data is at the core of banks' business models and affects every aspect of banking activity (Srinivas et al. 2019). The digitalization in banking is fundamentally changing the way data is generated, collected, stored, shared, and used. Therefore, effective consumer protection is becoming highly important in today's digital environment. In this regard, policy measures have to adapt

	to this changing environment (OECD 2018). The GDPR aims to protect personal data and ensures free movement of data in the EU (Koerner 2018). Further, it improves privacy rights and obligates financial institutions to report data breaches (Goethals and Imeson 2019). Moreover, the MiFID II and MiFIR aim to strengthen and harmonize consumer protection as well as increase transparency in the market (Haselmann et al. 2019; Bundesanstalt für Finanzdienstleistungsaufsicht 2019b, 2018b).
Specification A	Effective measures to protect consumer
Description	Regulatory authorities will introduce effective measures to protect financial consumers in this projection.
Reason	Consumer privacy has become a very important and complex topic in the banking sector. Financial consumers are paying closer attention on how and which data is collected (Srinivas et al. 2019). Therefore, policy makers will take action to establish appropriate financial consumer protection frameworks (OECD 2018). Appropriate approaches will entail several considerations. Firstly, regulations will be technological neutral. Secondly, potential benefits and extent of protection for financial consumers will be balanced. Thirdly, they have to maintain flexibility and adaptivity in a dynamic banking environment (OECD 2018; World Bank Group 2017). Srinivas et al. advocate for a new, extensive, flexible, and forward-looking regulatory framework to address consumer privacy and transparency (Srinivas et al. 2019). In summary, consumer protection and transparency will be effectively regulated in the increasingly digital banking environment in Germany.
Probability	65%

Specification B	Lack of appropriate consumer protection
Description	Consumer protection and transparency will be insufficiently addressed by regulators in the foreseeable future.
Reason	Financial market participants currently face an inconsistent and complicated data protection framework (Parker et al. 2020). Thus, the lack of appropriate consumer protection in the foreseeable future will be caused by certain challenges and deficits today. One challenge of regulators is to promote data generation processes and similarly privacy regulations (Srinivas et al. 2019). Secondly, Srinivas et al. argue that traditional consumer data is covered by the current regulatory framework, however data from emerging technologies is not (Srinivas et al. 2019). Data is generally extremely hard to manage as it travels quickly and grows exponentially (Parker et al. 2020). Moreover, regulatory action in the field of consumer protection and transparency was limited so far. Therefore, data protection enhancements will be unlikely in the near future (Srinivas et al. 2019). Ultimately, there will be a lack of appropriate consumer protection and transparency.
Probability	35%

No.	3.3
Descriptor Name	Financial innovation
Influence Area	Regulatory
Relevance	3.0
Current Situation	New technologies have led to revolutionary changes in the banking sector, creating new risks as well as opportunities

	<p>(Zetsche et al. 2017; Anagnostopoulos 2018). In Europe, the EBA established a FinTech roadmap in 2018 in order to monitor and engage in financial innovation. In this context, innovation facilitator initiatives were introduced (European Banking Authority 2019a; European Banking Authority and European Securities and Markets Authority 2019). The revised PSD II also represented a recent initiative to foster innovation through more competition (Brener 2019). However, potential benefits of FinTech cannot be fully realized by market players due to a fragmented, unclear or absent regulatory framework at the moment (European Commission 2019b). Policy makers have to balance between traditional regulatory aims (e.g. consumer protection and financial stability) and promotion of innovation and growth (Zetsche et al. 2017).</p>
Specification A	Regulations facilitating financial innovation
Description	The regulatory framework will be adapted to accommodate and facilitate financial innovation in the future.
Reason	<p>According to a set of regulation recommendations to promote financial innovation, the following regulatory reforms will be incorporated into the future framework. Firstly, regulations will respond to the emerging risks and opportunities related to the use of innovative technologies such as DLT, AI, and BD. Secondly, an equal playing field for incumbents and new market players will be ensured. Thirdly, regulations on data access, use, and sharing will be established. Moving forward, it is crucial that policy makers understand the vast potential of FinTech (European Commission 2019b). The future of FinTech is fundamentally shaped by the regulatory framework. Zetsche et al. argue that financial innovation needs smart</p>

	and digitized regulations (Zetsche et al. 2017). Regulators will initiate regulatory reforms to ensure that the banking sector is capable of keeping up with rapid technological changes (European Commission 2019b; European Central Bank 2019b). In order to achieve this, collaboration between incumbents, FinTechs, and regulators will be elementary to comprehend how new financial innovations are affecting the industry (Anagnostopoulos 2018).
Probability	45%
Specification B	Regulatory obstacles hinder financial innovation
Description	The regulatory framework will hinder financial innovation in this projection. Policy makers fail to implement regulatory measures to promote financial innovation in the banking sector.
Reason	First of all, there is a conflict of objectives for regulators between promoting innovation and minimizing associated risks. Regulations will play a decisive role in determining the success or failure of FinTech (Schleussner 2017). King argues that especially developed countries have regulatory systems which were built in the analog era and thus are not designed for the digital age (King 2019). Additionally, regulators will fail to implement desirable changes in the regulatory framework in order to realize the full potential of FinTech (European Commission 2019b). Finally, the over regulated market environment will slow down advantageous financial innovation (King 2019).
Probability	55%

No.	4.1
Descriptor Name	Demographic change
Influence Area	Social
Relevance	1.0
Current Situation	<p>At the end of 2018, approximately 83 million people lived in Germany. The demographic change has been well underway for several years now. In the last decades, the demographic structure in Germany has faced a declining number of younger people and simultaneously a growing number of older people due to a low birth rate and increased life expectancy. At present, every second person is older than 45 years and every fifth person is older than 66 years. In 2018, the structure of the total population by age group was as follows: 15.3 million (18.4%) children and younger people (< 20 years), 51.8 million (62.5%) people of working age ($20 \leq x < 67$ years), and 15.8 million (19.1%) older people (≥ 67 years). Since 2011, the population has grown slowly at first and then increased significantly due to considerable immigration in 2014 and 2015. Without immigration, the population in Germany would have been shrinking, because the annual number of deaths exceeds the number of births since 1972 (Statistisches Bundesamt 2019c, 2019a). Eventually, banks need to reconsider their customer relationship, customer approach, and product offerings as well as how to attract and retain qualified employees (Bauer et al. 2015; Meybom 2015; Schuster and Hastenteufel 2019).</p>
Specification A	Moderate development
Description	This scenario represents the second version of the population projection for Germany conducted by the

	<p>Statistisches Bundesamt. It is assumed that fertility, life expectancy, and migration will develop at a moderate level (Statistisches Bundesamt 2019c).</p>
Reason	<p>Firstly, the annual birth rate will amount to 1.55 children per woman. Secondly, the life expectancy will increase by 6 years for men (84.4 years) and 5 years for women (88.1 years). Thirdly, migration will decrease continuously between 2018 and 2026, and afterwards remain constant at 221,000 people (Migration average of years 1955 to 2018) per year. According to the outcome of the population projection, the population will grow until 2024 to 83.7 million people and then starting to decline. In 2030, approximately 83.3 million people are expected to live in Germany. However, the number of people of working age will decline by about 3.2 million to 48.6 million (58.3%) people in this scenario. In addition, the number of young people, below 20 years, will slightly increase until 2030 to 15.7 million (18.8%) and then eventually diminish. Finally, the number of senior citizens will certainly increase to 19 million (22.8%) in 2030 due to the current age structure (Statistisches Bundesamt 2019c, 2019b).</p>
Probability	65%
Specification B	Relatively old population
Description	<p>The scenario of a relatively old population represents the fourth version of the population projection for Germany conducted by the Statistisches Bundesamt. In this context, a lower fertility rate and a simultaneous increase in life expectancy are assumed. Additionally, the projection expects minor migration in the coming years (Statistisches Bundesamt 2019c).</p>

Reason	First of all, life expectancy will strongly increase in this projection. The average lifespan of men at birth lies at 86.2 years and 89.6 for women. Secondly, migration will decline until 2030 and then remain constant. On average, 147,000 people (Migration average of years 1955 to 1989) will migrate to Germany every year. Thirdly, fertility rate will sink to a level of 1.4 children per woman. Based on those assumptions, this scenario hypothesis a rapid ageing of the population and a steady decline after 2024. In 2030, approximately 83.1 people will live in Germany. A particular sharp rise will occur in the share of senior citizens older than 67 years. This share will compromise 19.2 million (23.2%) in 2030. Until 2040, this share is expected to grow up to 27%. Due to the aging population, the labor force potential is about to decrease by 3.4 million, the most compared to other scenarios (Statistisches Bundesamt 2019c, 2019b).
Probability	35%

No.	4.2
Descriptor Name	Customer interaction
Influence Area	Social
Relevance	1.0
Current Situation	The digitization and change in customer behavior have initiated a shift in the interaction between banks and customers (Schwarz 2019; Hellenkamp 2018c). Further, digital methods and channels are replacing traditional branch concepts as part of the procurement and service process (Schuster and Hastenteufel 2019). In this regard, the number of bank branches in Germany has been

	<p>declining sharply in the last years due to shifts in customer behavior and profitability reasons (Koch et al. 2019; Deutsche Bundesbank 2019c). From almost 60,000 bank branches in 1998, only 27,834 remained at the end of 2018. The annual decline in the years 2016 and 2017 stood at 5.9% respectively (Deutsche Bundesbank 2019c, 2020). The continuing trend towards thinning out the branch network affects all banking groups (Deutsche Bundesbank 2019c). Today, Germany still has an above average number of branches per million bankable people than other European countries (Koch et al. 2019). Simultaneously, mobile banking has seen growing importance among customers and banks. This development allows customers to choose how and through which channels they want to engage with their bank (Schuster and Hastenteufel 2019).</p>
Specification A	Personal customer interaction
Description	Personal interaction between banks and customers remains important and will be the mostly used form of interaction in 2030.
Reason	<p>Germans will continue to value face-to-face interactions for their banking activities. Around 70% of Germans visit a bank branch once per month and 27% on a weekly basis. This rate varies for certain types of individuals. Visiting rates for individuals from generation Y are lower than from generation X or baby boomers (Kaya 2019c). Several experts argue that it is unlikely that digital distribution channels will completely substitute analog channels such as branches in the near future. Ultimately, branch concepts will undergo a fundamental transformation, but most likely remain a significant customer interaction touch point.</p>

	Future branch concepts will enable an enhanced customer experience through the integration of digital technologies while maintaining personal customer contact (Hellenkamp 2018c; Kaya 2019c).
Probability	35%
Specification B	Digital customer interaction
Description	Digital interaction between banks and customers will replace the traditional face-to-face interaction. This is mainly due to advances in digital technologies and shift in customer demand.
Reason	Several reasons lead to an increased digital customer interaction with banks. Generally, online banking adoption is on the rise in Germany. In 2018, almost 60% of individuals were using online banking compared to only 35% in 2007 (Kaya 2019c). Within the online banking and self-directed customer segment greater growth is expected in the future, as the level of openness and willingness is greater than the actual level of utilization (Koch et al. 2019). Moreover, there is a clear tendency towards digitalized and automated banking advisory. Technological solutions such as Robo-advisor or Chatbots will fundamentally impact the customer interaction and advisory processes (Schuster and Hastenteufel 2019). The traditional person-to-person advisory process will be transformed into a digital person-to-computer advisory process (Jung et al. 2018). The adoption of Robo-advisor has been modest so far in Germany with more than 3.8 billion euros AUM in 2018 (Kaya 2019a). The CAGR in terms of AUM is expected to stand at 35% (2020-2023), resulting in more than 30 billion euros by 2023 (Statista n.d.). One of the risks associated with this development will

	be the loss of personal customer contact (Hellenkamp 2018c).
Probability	65%

No.	4.3
Descriptor Name	Personalization
Influence Area	Social
Relevance	1.0
Current Situation	In general, personalization can be defined as a process to deliver a tailored solution to a customer by using technology to collect customer information (Peppers and Rogers 1997; Vesanen 2007). The rise of IT and improved data collection methods enabled businesses to personalize product offerings and marketing output (Tong et al. 2012; Vesanen 2007). Service personalization in banking implies the understanding of customers' needs, preferences, and financial circumstances to serve them in a personal, direct, and relevant way (Desmangles et al. 2018).
Specification A	Integration of personalized services and experiences
Description	In this projection, data-driven personalized banking will become a reality. An advanced technological ecosystem and increased data usage will enable an end-to-end personalization on a larger scale. German banks will adapt a customer centric approach and deliver value to customers by customized experiences and services (Desmangles et al. 2018). As a result, customer relationship, satisfaction, and loyalty will foster (Tong et al. 2012; Albashrawi and Motiwalla 2019).

Reason	<p>The scenario of data-driven service personalization in banking will be realized by collecting data about customer profiles, risk and transaction behavior or responses to offerings from all available sources (Desmangles et al. 2018). This data will be transformed into deeper insights, which enables banks to create precise 360 degree profiles of each customer in order to serve them what they truly want through multiple channels (Brodski et al. 2019; Desmangles et al. 2018). According to the Global Financial Consumer study, more than 75% of respondents are willing to disclose their personal data in order to receive bespoke offers and services (Gera et al. 2019). In conclusion, customized experiences are all about delivering a relevant experience, through the most appropriate channel, at the right time, and to all customers (Desmangles et al. 2018). Several studies highlighted the positive effect of personalization in mobile banking on customer satisfaction and loyalty (Tong et al. 2012; Wang et al. 2017; Stewart et al. 2019). Finally, banks that achieve this integration will boost their performance and competitive advantage (Brodski et al. 2019; Stewart et al. 2019; Arora et al. 2008). Desmangles et al. state that personalization improvements contribute positively to banks' overall profits and growth (Desmangles et al. 2018).</p>
Probability	60%
Specification B	One-size-fits-all approach
Description	<p>German banks will continue to lag behind in terms of personalization and continue to apply a one-size-fits-all banking approach. Only a few German banks will be using individualization as a tool to promote their services.</p>

Reason	<p>In fact, several obstacles will hinder the integration of personalized services and experiences. Firstly, legacy IT constraints will hinder the scalability of personalized services (van den Heuvel et al. 2019; Brodski et al. 2019). Significant internal changes are required to achieve mass-personalization, which primarily includes breaking up data silos and putting the customer at the center (Brodski et al. 2019). Moreover, research by Desmangles et al. showed that more than 40% of customer churn resulted from an insufficient degree of personalization. Further, individualization of products and services is considered a join-or-leave cause for the younger generation (18-34 years) of bank customers (Desmangles et al. 2018). This indicates the growing relevance of end-to-end personalization in today's digital world (Stewart et al. 2019). According to van den Heuvel et al., retail banks risk 15% to 25% of their revenue if they fail to improve customer experience, derive insights from data, and create bespoke and relevant offers. In conclusion, most incumbents struggle to fully understand what customers need and offer them a personalized and relevant service (van den Heuvel et al. 2019). Overall, this will strongly affect the relationship between banks and customers in the foreseeable future (Desmangles et al. 2018).</p>
Probability	40%

No.	4.4
Descriptor Name	Social change
Influence Area	Social
Relevance	1.0

Current Situation	Over the last years, technological developments have dramatically changed the way people inform themselves, communicate or demand products and services (Cocca 2014). The social or behavioral shift influences consumer decision-making and the way they want to engage with banks (Hellenkamp 2018c). This represents a great challenge for incumbents, as they need to adapt their way of serving the different customer segments.
Specification A	Traditionalists dominate
Description	Traditionalist consumers will dominate the German banking sector by 2030 in this projection.
Reason	The Global Financial Services Consumer study found out that traditionalists and skeptics account for over 70% of consumers in Germany. On the contrary, pioneers account for only 5%. In general, traditionalists and sceptics are less confident or even avoid using new technologies. They favor face-to-face interactions over communication through mobile devices with their bank. Furthermore, traditionalists view mobile or online banking as insecure and more than 50% are not willing to share their personal data. Overall, the mistrust in technology will lead to a low acceptance of digital communication channels (Gera et al. 2019).
Probability	35%
Specification B	Modernists dominate
Description	The majority of German consumers will embrace the new digital world. As a result, modernists will dominate the banking landscape in 2030.

Reason	<p>In general, modernists have an affinity towards technologies and desire new innovations. According to the Global Financial Services Consumer study, the vast majority of modernists use their smartphone as primary device. They demand fully personalized services and are willing to share their data in this regard (Gera et al. 2019). Moreover, these consumers expect an efficient, convenient, and easy customer experience (Clarke and Kinghorn 2018; Andriotis and Haslanger 2016). In addition, a seamless integration between digital and physical channels is demanded (Gera et al. 2019). Particularly, the generation Y and Z represent the modern consumer and are characterized as digital natives who are always online and hyper-connected (Hellenkamp 2018c; Warschun et al. 2017). A survey by PwC highlights the increasing role of digital technologies within consumer lives (PwC 2019). Modernists tend to trust their bank, but are likely to switch banks more often in search for better-value services (Gera et al. 2019). According to a survey on FinTech adoption of Germans, 31% of respondents potentially switch to FinTech provider. This is mainly due to the comfort and trust in new technologies (Jünger and Mietzner 2019). Besides, they are more ethically minded and expect banks to be more socially responsible (Gera et al. 2019; Warschun et al. 2017).</p>
Probability	65%

No.	5.1
Descriptor Name	Green Banking
Influence Area	Environmental

Relevance	3.0
Current Situation	<p>In the last years, Green Banking has become a buzzword (Lalon 2015; Zhixia et al. 2018) and is gaining further popularity (Zhelyazkova and Kitanov 2015). Green Banking ensures considerable economic development while promoting environmentally friendly practices (Lalon 2015; Meena 2013). Particularly, the Paris Climate Agreement in 2015 and the Agenda 2030 set the ground for a greener and sustainable financial industry (Schäfer 2018; Berrou et al. 2019; Schäfer 2017). Banks can make a great contribution to alleviate global environmental risks and help shape a more livable world (Garg 2015). This notion can initiate a paradigm shift in the banking sector (Dombret 2018). This has far-reaching implications for the financial sector, as it is interlinked with all economic sectors through lending and investments (Stremlau 2019). In conclusion, a green financial system contains several risks as well as great opportunities (Dombret 2018; Röseler 2019).</p>
Specification A	Promotion of Green Banking practices
Description	This projection foresees promotion of Green Banking practices in the financial sector in Germany.
Reason	<p>The promotion of Green Banking practices mainly results from several factors. First of all, the BaFin and Deutsche Bundesbank together with other ministries set the goal of turning Germany into a “Global Sustainable Finance Champion”. By integrating sustainability initiatives, the financial sector can contribute to a more sustainable economy (Holle 2019). Secondly, this projection can be supported by a steady growth in sustainable investments</p>

	<p>over the last years in Germany (European Sustainable Investment Forum 2018; Deutsche Bundesbank 2019e). Promoting Green Banking practices will entail opportunities such as access to new business areas (Dombret 2018) and enhanced reputation (Garg 2015). In particular, FinTechs and innovative technologies as Blockchain, AI, and BD have the potential to enable green practices in banking (Nassiry 2019; Dorfleitner and Braun 2019). Possible use cases are Green Robo-Advisor, Green Crowdfunding, and investments to facilitate Green Banking (Dorfleitner and Braun 2019). Improved accountability and transparency through DLT applications can also reduce greenwashing risks (Dorfleitner and Braun 2019). This will ultimately create a more efficient, stable, and greener banking sector (Holle 2019; Dombret 2018).</p>
Probability	75%
Specification B	Disregard of Green Banking practices
Description	Despite the undeniable momentum of the sustainability subject, German banks will disregard Green Banking practices in this projection.
Reason	<p>The disregard of Green Banking practices is attributable to several constraints and risks. Firstly, market momentum of Green banking practices might not be considered a priority, as there are limited incentives for investors to include sustainability factors in their investment decisions. Secondly, the costs of screening, classification, release, and monitoring pose a constraint for implementation of Green Banking practices (Migliorelli and Dessertine 2019). Thirdly, the tendency of a development towards a sustainable economy poses direct or indirect credit, market, and operational risks to banks (Röseler 2019;</p>

	<p>Dombret 2018). Market risks include drastic asset price fluctuations, long-term price increases or rating downgrades. Operational risks include reputational damages for whole industries or image loss due to failing conversion to Green Banking practices. Credit risks include the far-reaching impact on entire sectors and probability of credit defaults (Röseler 2019). Schäfer argues that the majority of banks in Germany have not integrated Green Banking practices into their business model (Schäfer 2017). Further, he claims that the vast majority of banks have disregarded sustainable business opportunities and adoption of green products or services (Schäfer 2018).</p>
Probability	25%

Appendix B – Consistency matrix

		1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	4.1	4.2	4.3	4.4	5.1	
		a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b
1.1	FinTechs																				
	a FinTechs dominate the banking sec...																				
	b Cooperation																				
1.2	Blockchain																				
	a Revolutionizing banking																				
	b Implementation challenges hinder a...																				
1.3	Artificial Intelligence and Big Data																				
	a Full implementation of AI and BD																				
	b Several obstacles hinder full AI&BD..																				
1.4	Open Banking																				
	a Disintermediation of the value chain																				
	b Embracing Open Banking																				
1.5	IT infrastructure																				
	a Outsourcing to the cloud																				
	b Modernization of the legacy IT																				
2.1	Interest rate																				
	a Interest rate increase																				
	b Low interest rate environment cont...																				
2.2	Evolution of currencies																				
	a Digital currencies dominate																				
	b Traditional currencies remain domin...																				
2.3	Strategic positioning																				
	a Growth strategies																				
	b Cost cutting strategies																				
2.4	Economic outlook Germany																				
	a Stagnation																				
	b Moderate growth																				
2.5	Competitive situation																				
	a Intensified competition from BigTe...																				
	b Intensified competition from FinTe...																				
2.6	Banking sector structure																				
	a Slow consolidation dynamics																				
	b High consolidation dynamics																				
3.1	Capital																				
	a Higher capital requirements																				
	b Lower capital requirements																				
3.2	Consumer protection and transpa..																				
	a Effective measures to protect consu...																				
	b Lack of appropriate consumer prot...																				
3.3	Financial innovation																				
	a Regulations facilitating financial inn...																				
	b Regulatory obstacles hinder financ...																				
4.1	Demographic change																				
	a Moderate development																				
	b Relatively old population																				
4.2	Customer interaction																				
	a Personal customer interaction																				
	b Digital customer interaction																				
4.3	Personalization																				
	a Integration of personalized services...																				
	b One-size-fits-all approach																				
4.4	Social change																				
	a Traditionalists dominate																				
	b Modernists dominate																				
5.1	Green banking																				
	a Promotion of green banking practic...																				
	b Disregard of green banking practices																				

Vernetzungsgrad: 43 %

Appendix C – Differences within the scenarios I

	S-11	S-12	S-9	S-20	S-19	S-10	S-8	S-7	S-17	S-18	S-16	S-15	S-14	S-13
Rang	1	2	3	4	5	6	7	8	9	10	11	12	13	14
KS	158	158	121	117	117	117	91	91	88	84	64	64	64	64
KD	1,86	1,86	1,42	1,39	1,39	1,30	1,07	1,06	1,07	0,98	0,84	0,83	0,78	0,77
WM	57	55	56	57	58	59	54	57	55	58	55	58	54	57
S-11		1	4	4	3	6	5	7	5	7	7	9	6	8
S-12	1		3	3	4	5	4	6	4	6	6	8	5	7
S-9	4	3		2	3	4	1	3	1	5	3	5	2	4
S-20	4	3	2		1	4	3	5	1	3	3	5	2	4
S-19	3	4	3	1		5	4	6	2	4	4	6	3	5
S-10	6	5	4	4	5		3	1	5	1	5	3	4	2
S-8	5	4	1	3	4	3		2	2	4	2	4	1	3
S-7	7	6	3	5	6	1	2		4	2	4	2	3	1
S-17	5	4	1	1	2	5	2	4		4	2	4	1	3
S-18	7	6	5	3	4	1	4	2	4		4	2	3	1
S-16	7	6	3	3	4	5	2	4	2	4		2	1	3
S-15	9	8	5	5	6	3	4	2	4	2	2		3	1
S-14	6	5	2	2	3	4	1	3	1	3	1	3		2
S-13	8	7	4	4	5	2	3	1	3	1	3	1	2	

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Statutory declaration

I hereby confirm this thesis with the title “The Future of the German Banking Sector” is my own work and contains no material that has been submitted previously, in whole or in part, to achieve an academic grading or is being published elsewhere. To the best of my knowledge all used sources, information, and quotations are referenced as such.

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