Digital Leaders vs. Laggards: Drivers of Digital Maturity in the German Financial Services Sector

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Abstract

Summary of the Objectives:
Given the rising spending on digital transformation globally, and the existing digital frontier gap across industries, controlled management of the drivers of digital maturity is of key interest to elevate a company's position. This is because the latter supports digital leadership and thus a competitive and sustainable advantage in the market. For financial services, this is a particular need as a clear driver for this gap has not yet been identified.

This dissertation aims at understanding the degree of influencing factors on digital maturity by identifying high impact attributes, particularly for financial services. The paper reveals granular attributes on which an organisation should concentrate when targeting a successful digital transformation, that ideally leads to a high level of digital maturity. For this purpose, expert interviews and an industry survey within Germany were performed as a mixed methodological approach. To determine the most impactful attributes, multiple factors have been gathered and their relationship with digital maturity was investigated qualitatively and statistically. As a combined result, agility, culture, digital priority, a digital vision, savviness, skill development, and a leadership vision were attributes deemed to have a high impact on digital maturity and the difference between leaders and laggards. For a successful consideration of the factors, it is vital to adapt organisational structures and the organisational culture in accordance with the classified attributes. Future research should focus on comparing critical attributes between leading and lagging industries to arrive at a general overview of the drivers of digital maturity.

Keywords:
Digital Maturity, Financial Services, Digital Leadership, Digital Transformation

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Sumário

Resumo do Objetivo:

Dado o aumento dos gastos na transformação digital a mundialmente e a lacuna existente entre as indústrias, a gestão controlada dos motores da maturidade digital é fulcral para elevar a posição da empresa. Isto porque esta última apoia a liderança digital e, portanto, cria uma vantagem competitiva e sustentável no mercado. Para os serviços financeiros, esta é uma necessidade particular porque um motor claro ainda não foi identificado para esta lacuna.

Esta dissertação visa compreender o grau de influência dos fatores de maturidade digital através da identificação de atributos de alto impacto, particularmente para serviços financeiros. O artigo revela atributos detalhadamente sobre os quais uma organização deve concentrar-se ao visar uma transformação digital bem-sucedida que idealmente conduzem a um elevado nível de maturidade digital. Para este efeito, foram realizadas entrevistas a peritos e um inquérito à indústria na Alemanha, como abordagem metodológica conjunta. Para determinar os atributos mais impactantes, foram recolhidos múltiplos fatores e a sua relação com a maturidade digital foi investigada qualitativa e estatisticamente. Como resultado combinado, agilidade, cultura, prioridade digital, uma visão digital, sabedoria, desenvolvimento de competências e uma visão de liderança foram atributos considerados como tendo um elevado impacto na maturidade digital, e a diferença entre líderes e seguidores. Para uma consideração bem-sucedida dos fatores, é vital adaptar as estruturas e as culturas organizacionais de acordo com os atributos classificados. A investigação futura deve concentrar-se na comparação de atributos críticos entre indústrias líderes e seguidoras para se chegar a uma visão geral dos motores.

Palavras-Chave:

Maturidade Digital, Serviços Financeiros, Liderança Digital, Transformação Digital

Título:

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List of Abbreviations

AI	**A**rtificial **I**ntelligence
BaFin	**B**undes**a**nstalt für **Fin**anzdienstleistungsaufsicht
B2B	**B**usiness-**to**-**B**usiness
B2C	**B**usiness-**to**-**C**onsumer
c.p.	**C**eteris **P**aribus
ERP	**E**nterprise **R**esource **P**lanning
E2E	**E**nd-**to**-**e**nd
F2F	**F**ace-**to**-**f**ace
HC	**H**eteroskedasticity-**c**onsistent
H	**H**ypothesis
ICT	**I**nformation and **C**ommunication **T**echnology
Inc.	**I**ncorporated
IT	**I**nformation **T**echnology
KPI	**K**ey **P**erformance **I**ndicator
M&A	**M**ergers **&** **A**cquisitions
MIT	**M**assachusetts **I**nstitute of **T**echnology
OLS	**O**rdinary **L**east **S**quares
PaaS	**P**latform-**a**s-**a**-**S**ervice
QCA	**Q**ualitative **C**omparative **A**nalysis
SaaS	**S**oftware-**a**s-**a**-**S**ervice
VIF	**V**ariance **I**nflation **F**actor

1 Introduction

1.1 Problem Statement and Research Question

‘When digital transformation is done right, it’s like a caterpillar turning into a butterfly, but when done wrong, all you have is a really fast caterpillar’, is a metaphor from George Westerman, a principal research scientist at the Massachusetts Institute of Technology (MIT) Sloan initiative on the digital economy (Aggarwal, 2021), that underlines the so-called transformer’s dilemma. This present challenge in the business landscape illustrates the partly unfulfilled alignment between continuous value capture and embedding digital business models (Frankenberg et al., 2019). Indeed, not even 30.0% of incumbents succeed in overcoming this dilemma while approximately 70.0% of them face corresponding deficiencies (McKinsey & Company, 2018, p.2). Moreover, 7.0% of successful incumbents added that performance improved only for a short time without long-term impact. Considering a global spending of digital transformation technologies and services of $1.3 trillion in 2020, which is expected to rise to $2.3 trillion in 2024 (Mlitz, 2021), it is crucial to investigate the differentiators between digital leaders and laggards. Looking at the example of financial services in particular banking, the ten biggest banks by assets were from Europe or the United States in 2010. Today, most of these leading banks come from Asia. This is not only because of the rise of Asia or the aftermaths of the financial crisis but also because peers from the East cope with digital disruption in a superior way (OECD, 2020, p.7).

The differentiating stages that holistically illustrate the level of digital transformation are referred to as the digital maturity of an organisation (Teichert, 2019, p.1675). Digital maturity is an interplay of numerous attributes. Consequently, the research study on hand aims at answering the following research question: Which attributes have a high impact on digital maturity?

1.2 Academic and Managerial Relevance

State of the art research predominantly concentrates on finding a definition for digital maturity and appropriate models or measurement tools of the concept. Attributes of digital maturity are presented but their specific impact on the spheres of digital maturity lack valuable consideration (Nadkarni & Prügl, 2021, p.241; Teichert, 2019, p.1673). Besides, existing research majorly

concentrates on general drivers and in a few cases on specific industries, i.e., telecommunications, manufacturing, hospitals, or the newspaper industry. Evidence and feasible recommendations for financial services are scarce, which is apart from healthcare and government one of the biggest sectors in need to become more digital whilst being strongly influenced by regulations and reforms (Johnson, 2019). To close this gap in academic research, the dissertation aims at determining the attributes that promote digital maturity accounting for the specificities of financial services.

To overcome profitability traps caused by digital disruption and the distance to incumbent peers, realizing corporate practices to catch up and to drive one's digital maturity is critical for affected organisations (McKinsey Global Institute, 2019). Corresponding awareness was already created by the COVID-19 pandemic, which increased the median of the general digital maturity level in different industries from 0.5 to 0.6 out of 1.0. Nevertheless, the gap to the top players is still substantial (Deloitte Digital, 2021, p.3). As illustrated in *Figure 1,* the gap to the digital frontier in financial services is measured at 29.7% without a clear significant driver determined for this sector.

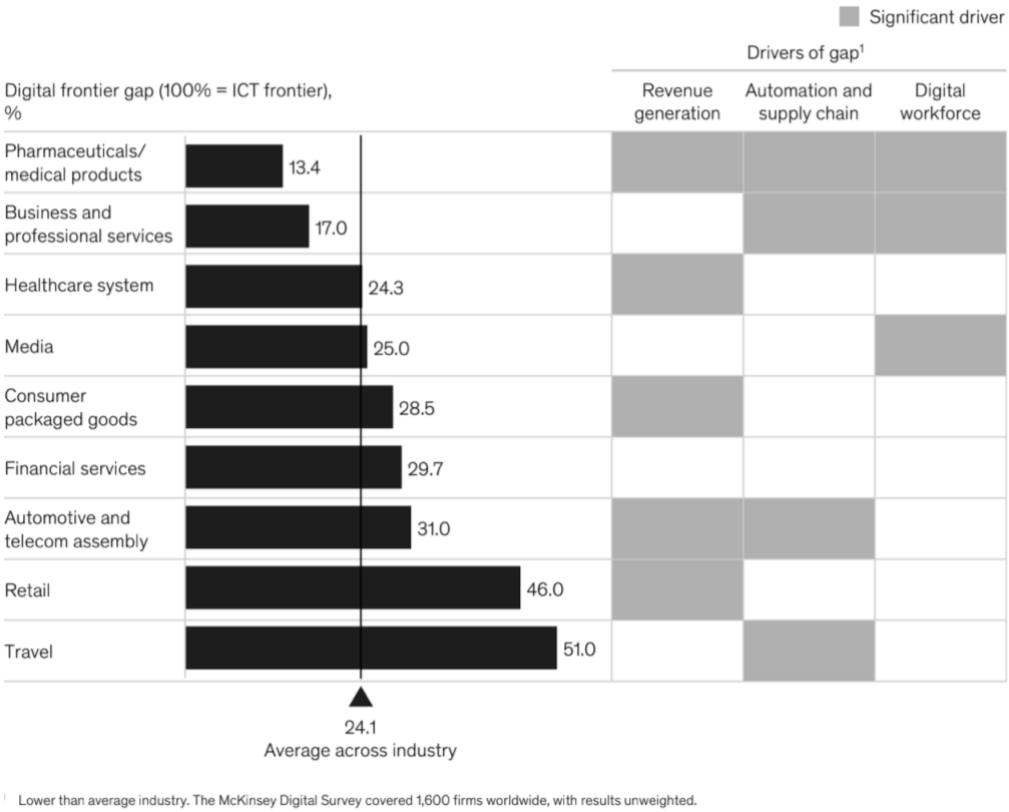

Figure 1: The gap to the digital frontier remains large across industries (McKinsey Global Institute, 2019)

Hence, the dissertation focuses on more detailed insights regarding the drivers of the gap between digital leaders and laggards. The importance to become a digital leader is emphasised through the nature of digital economies, which are often known as winner-takes-all because of dynamic scaling and network effects (Bughin et al., 2018).

1.3 Research Scope and Structure

Overall, the present research study concentrates on the financial services sector with a closer look at mid (>$50.0 million revenue) and larger (>$1.0 billion revenue) enterprises (Gartner, 2021) in Germany. In addition, organisations that have implemented digitisation projects, either successfully or less successfully, as well as their differences are further explored. This classification supports the identification of successful and less successful cases that function as a basis for comparing attributes that have an impact on digital maturity for the industry in question. Furthermore, the average of each digital maturity component is used to measure the relation of various factors to the variable of interest.

The dissertation on hand is divided into five parts. After this first introduction chapter, the theoretical framework, as well as scientific insights on digital maturity, financial services, and their intersection, are demonstrated. Additionally, existing models and results from previous empirical studies are shown. Subsequently, the methodology and the chosen research design are outlined in the third chapter. The fourth chapter analyses the qualitative component, the expert interviews, and the quantitative component, the industry survey. Moreover, the results are presented and discussed in this chapter. Afterwards, the conclusion is examined including managerial consequences and academic limitations. Finally, suggestions for future research are proposed for the completeness of the present study.

2 Literature Review

2.1 Digital Maturity

2.1.1 The Concept of Digital Maturity considering Digital Transformation

As a result of digital transformation activities, most of the value creation and capture in companies is redistributed along the value chain in new ways (Nadkari & Prügl, 2021, p.250). In short, the nature of businesses is questioned and ultimately changed. In many cases, the outcome is a multi-layered business model through which products or services are offered within one layer, but the value is captured through another layer. For instance, Alphabet Incorporated (Inc). offers its operating system 'Android' free of charge but creates value through the control of advertising streams and resulting data on every affected phone (Nadkari & Prügl, 2021, p.250). Other examples, concentrate on or combine value creation by means of co-creation with customers, partners, or value networks. Integrating these divergent levels of new and old becomes of central interest when implementing and designing digital concepts that create new sources of value (Fichman et al., 2014, p.347; Henriette et al., 2015, p.13).

Digital maturity is not an end state but rather a process or an ongoing application of digital technologies and capabilities. It consists of progressive stages along with the integration of new and old business initiatives initiated by digital transformation (Chanias & Hess, 2016, p.4). Additionally, it reflects the ability to take advantage of digital transformation by adding value to the organisation to remain on a competitive level (Kane et al., 2015, p.5). The goal is to innovate business models that bring the organisation sustainably to the next level of digital maturity and thus to new spheres of value creation (Rader, 2019, p.28). For this purpose, not only information technology (IT) engagements but also sociotechnical capabilities in terms of management, processes, people, culture, and organisational structure are considered (Chanias & Hess, 2016, p.8; Kane et al., 2015, p.4; Rader, 2019, p.29; Tilson et al., 2010, p.754). These approaches can be adopted by other industries with appropriate leadership that know how to drive digital maturity (Westerman et al., 2012a, p.2; Westerman et al., 2014).

2.1.2 Digital Maturity Models

Several digital maturity models have been established, aiming to further define the concept. One approach considers digital intensity, through customer engagement and internal operations,

multiplied by transformation management intensity, through vision, governance, engagement, and IT-business relationships. The results are the four types depicted in *Figure 2.* The first group are **digital beginners,** often unaware of opportunities and thus they have low investments in digitisation. They are often mature in traditional investments in terms of e-commerce or enterprise resource planning (ERP), though. The next group are **digital fashionistas**, who create value with digital applications but fail to implement them with a long-term vision considering synergies. Thus, motivation is present but the ability to successfully implement the change is not given. **Digital conservatives** fear innovation and rely on their past success. Their sceptical and careful attitude allows them to manage investments well, but valuable opportunities are being missed through prudence. Lastly, the **digiratis** score high on both dimensions. By understanding that a transformative vision, governance, and engagement are crucial for respective investments, opportunities, and value creations, the digiratis continuously drive their competitive advantage. Hence, they focus on a multi-excellence approach. Apart from that, a higher digital intensity positively impacts revenue, and a higher transformation management intensity has a positive effect on profit and market value (Westerman et al., 2021, pp.3-7; World Economic Forum, 2016, p.38).

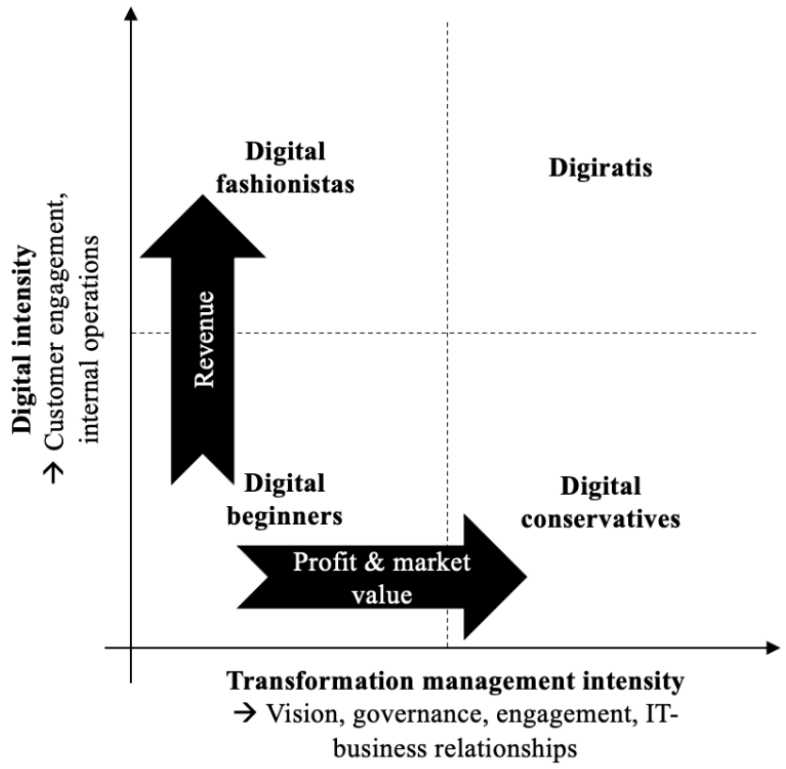

Figure 2: Types of digital maturity (adapted from Westerman et al., 2021)

Other models consider similar approaches by considering digital impact with digital readiness or capabilities in a matrix (Remane et al., 2017, pp.7-8). Moreover, there are models considering four dimensions: culture, technology, organisation, and insights. The latter is referring to data and strategy. Depending on the score of each dimension the digital maturity level can be classified as differentiators, collaborators, adopters, or sceptics, like the model from Westerman et al. (2012a) (Gill & Van Boskirk, 2016, pp.3-4). Despite these matrices being simple and clear, they are often criticized for being dependent on expert opinions and subjective observations (Aslanova & Kulichkina, 2020, p.444).

In contrast, the following digital maturity model considers nine different dimensions within a house structure: information and communication technology (ICT) operations, and development as the foundation; culture and expertise, transformation management, and product innovation as walls; strategy, organisation, process digitisation, and collaboration as the core; and customer experience as the roof of digital maturity (Berghaus et al., 2016, p.8). Advantages of this approach are the consideration of all organisational levels, as well as its basis on an industry-wide survey. However, this model does also not consider the specific influences of each cornerstone on digital maturity apart from putting a few factors into the core of the model (Aslanova & Kulichkina, 2020, p.444). Taking the mentioned capabilities and drivers into account, most models and research studies consider the following attributes as important: **strategy, leadership, market, operations, people and expertise, culture, governance,** and **technology** (Rossmann, 2018, pp.6-7).

In addition, when looking again at the value chain of the company and its connection to digital maturity, there is a kind of domino model considering most of the discussed factors within it. Firstly, the available **inputs** or resources have an impact on the **strategy.** Then, the **culture, tasks, people**, and **structure** are influenced by strategy leading to **outputs**. Depending on the continuous feedback and learning or adaptation based on the outputs, the strategy gets further influenced and shaped. To reach the next step of digital maturity in this concept, the focus must be on embracing risks in the company's culture, deepening skills, having a clear plus agile structure, and offering the workforce suitable as well as tailored work instead of general tasks (Kane et al., 2016, pp.14-15). Including digital components within the organisational core and cultivating the appropriate structure plus culture, support the digitisation process and the degree of digital maturity. For this reason, it is essential to target respective talents (Kane et al., 2017, p.16; World Economic Forum, 2016, p.26). With regards to the detailed measurement of digital

maturity, the wide-ranging perception of the definition of digital maturity and models within academia makes the measurement cumbersome and subject to specific industries, expert opinions, and peer comparisons (Thordsen et al., 2020, p.366).

2.1.3 Factors influencing Digital Maturity

Going through current industry-specific research regarding influencing factors of digital maturity, the primary tools used were Google Scholar, Elsevier, and Research Gate. The main keywords were 'digital maturity', 'financial services', 'maturity models' and 'digital transformation'. Recent articles with high citations or from reputable journals were chosen (n = 32). Afterwards, the titles were screened for suitability to the dissertation topic (n = 18) and then whether the abstract mentioned relevant results for influencing factors in relation to digital maturity or digital success (n = 7). This led to the seven sources in *Table 1* that are restricted to manufacturing, newspaper, hospitals, and telecommunications.

Author	Year	Research field	Country	Sector	Sample size	Method	Results / influencing factors
Canetta et al.	2018	Digital maturity & models	CH	Manufacturing	-	Qualitative fusion of existing models	**Possible impact:** strategy, processes, technologies, products, services, people
Gökalp & Martinez	2021	Digital transformation, maturity model	UK	Chemicals & machine manufacturing	5 experts	Expert interviews	**Positive:** end-to-end integration of engineering across value chain, innovative business processes, continuous adaptation, self-optimisation, horizontal/vertical integration via value networks/systems, data analytics
Karimi & Walter	2015	Dynamic capabilities	US	Newspaper	158 responses	Web survey	**Positive:** capabilities that change, extend, or adapt the firm's resources, processes, and values = better response to digitisation
Mettler & Pinto	2018	Digital maturity & models, health	CH	Hospitals	35 hospitals	Exploratory descriptive, path analysis	**Positive:** bound to perception of health professionals, investment in hardware and software; **no significance:** investment in personal development, enhancement of operations and maintenance services
Remane et al.	2017	Digital maturity & models	DE	Traditional industries	327 managers	Survey	**Positive:** ICT competencies of employees, IT budget, firm size
Valdez-de-Leon	2016	Digital maturity & models	UK	Telecom	8 experts	Expert interviews	**Possible impact:** strategy, organisation, customer, ecosystem, operations, technology, innovation
Schwer et al.	2018	Digital maturity & measurement	CH & CZ	-	305 sources	Literature review	The measurement of factors needs to consider different enterprise levels: strategy, business, application, technology, physical, implementation/migration

Table 1: Synopsis of sector-specific digital maturity factors (own representation)

Other than that, components of digital culture such as digital leadership, ethics and governance, or continuous learning and development have been positively correlated with digital maturity

in a multiple-industry case study (Weritz et al., 2020, pp.4-5). Additionally, a clear digital strategy is also positively connected to digital maturity. This digital strategy ideally considers building needed skills, developing digital leaders, and fostering digitisation as a cultural norm (Kane et al., 2015, pp.3-4). These points also help to attract appropriate talents. As a result, companies that address cultural transformation and agility at the same time as digital transformation, report a breakthrough performance in comparison to those ignoring it (The Boston Consulting Group, Inc., 2018, pp.2-3).

2.2 The Financial Services Sector

2.2.1 Industry Characteristics

The 2007-2009 financial crisis helped to pave the way for reforms in regulations that minimise systemic risk, insolvency, and liquidity issues. Nevertheless, financial services are still highly regulated, which has an impact on their agility, flexibility, and their organisational structure. The latter is often characterised by old firms. Apart from this, physical branches, revenue streams from traditional services, homogenous products, and high market power through large conglomerates further characterise the industry (Chiorazzo et al., 2018, p.238; Dehnert, 2020, p.1072). One goal within financial services is to prevent another crisis through financial ratios, improved market positions, and the proactive management of dynamic markets with changing socioeconomic factors. For this purpose, digital transformation can be seen as an opportunity (Nicoletti, 2016, p.1). Within Germany, the Federal Institute for Financial Services Supervision has recognised the need to further adapt regulations as a digital enabler and thus aims to optimise reforms until 2025 (BaFin, 2018, pp.7-8).

Having an industry focused on product types such as payment, financing, investment, asset or risk management and insurance, the biggest players in financial services are banks and insurances catering to both the business-to-business (B2B) and business-to-consumer (B2C) markets (Dehnert, 2020, pp.1072-1074). Banks pioneered and slowly continue their digital development with, e.g., self-service, electronic payment, or online banking options. In comparison, insurances are less developed regarding products, processes, organisations, and business models (Nicoletti, 2016, p.2). Nonetheless, both sub-sectors and other incumbents in the sector, such as investment institutions, brokers, audit, assurance, tax, or accounting have not yet fully exploited their digital potential (Nicoletti, 2016, p.3).

2.2.2 Digitisation Trends

Drivers of digitisation in financial services are technologies such as artificial intelligence (AI), machine learning, big data, cloud or quantum computing, cryptocurrencies, blockchains, and the need for cyber security. Introducing cost-effective digital means, intelligent networks, and automated tools for consumers or partners is needed to cater to contemporary market demand and to secure survival (Machkour & Abriane, 2020, p.502; Mehdiabadi et al., 2020, p.22; Palmié et al., 2019, p.8; Zhou et al., 2021, p.1). This market demand is also targeted by non-financial firms or new entrants, i.e., BigTech from the United States or China, and FinTech, that create a multiplier effect in the industry by integrating technologies and data with either platform-as-a-service (PaaS) or software-as-a-service (SaaS) (Chang et al., 2020, p.120165). These trends change the way of value creation, value proposition, and customer interaction in the industry (BaFin, 2018, p.3; Dehnert, 2020, p.1074). Essentially, it can be seen as an opportunity to grow but at the same time as a threat to existing business (Maracine et al., 2020, p.303).

All in all, it is stated that the above-mentioned trends require a digital mindset, IT orientation, and digital identification within the industry. Furthermore, FinTech is a general driver of business model adaptions and can therefore be seen as an opportunity for traditional firms (PricewaterhouseCoopers, 2016, p.6). In case that this digital focus is incorporated throughout their core functions and capabilities - this means from board level across the workforce to each process and product - companies tend to be more successful (McKinsey & Company, 2020, p.9). Hence, the key predictions until 2025 highlight the need to challenge the status quo via touchless transactions through automation and blockchain, lean processes and a reduced operational workforce due to robotics and algorithms, real-time instead of periodic financial cycles, ERP landscapes in the cloud, data standardisations and clean-ups, as well as a rethinking of employee occupation and tasks (Deloitte, 2018, p. 6).

Complementary, recent trends from Asia suggest that ‘super’ apps with enlarged digital ecosystems offering a new product and channel mix become more important (Wötzl et al., 2021). Furthermore, digital natives will account for half of the population in 2030 and this segment is considering not only national but preferably international providers with alternative or personalised solutions, e.g., regarding sustainability. Nevertheless, senior consumers stay relevant, especially in terms of securing life standards, e.g., in Japan financial services are

extended by medical treatments. Apart from this, an ongoing and growing female economic empowerment creates new potential for tailored solutions that further support this development (Wötzl et al., 2021).

2.2.3 Digital Maturity in the Financial Services Sector

Specific research on digital maturity within financial services and in-depth or detailed attributes leading to success is scarce. Nevertheless, there are other measures such as digital capabilities, digital configurations, or performance implications used to evaluate digital success (Dehnert, 2020, pp.1073; Zhou et al., 2021, p.1). *Figure 3* depicts that firms, concentrating on value creation instead of only customer interaction within their digital transformation efforts, score higher on digital maturity and consequently competitive advantage. Accordingly, their overall performance can be evaluated as superior.

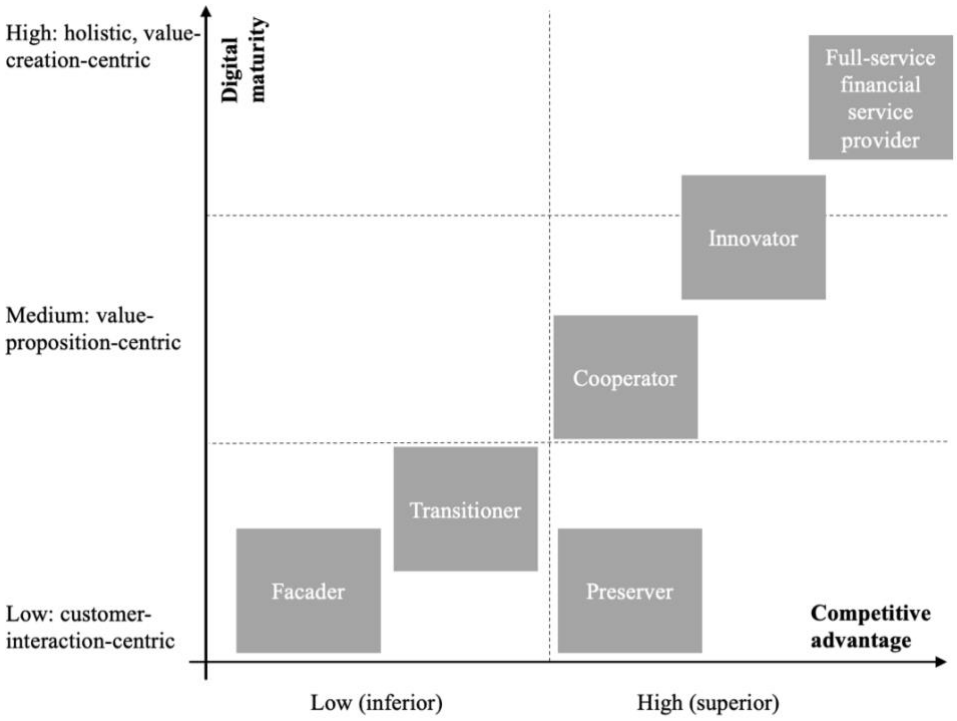

Figure 3: Digital maturity findings in financial services (Dehnert, 2020)

Furthermore, their levels of success are varied due to differences in external drivers, perceived benefits, internal attitude, corporate attitude, and usage of technology (Pramanik et al., 2019, p.330). This can be influenced by developing a digital core regarding processes and products (Dehnert, 2020, pp.1096-1100). Another decelerator is inertia within the company, in particular the workforce and culture. It can be alleviated by strong entrepreneurial orientation, but

traditional elements of financial services such as firm assets or organisational legitimacy can further reinforce it (Zhou et al., 2021, p.12). The impact that each of the mentioned factors has on the position within any digital maturity model is not sufficiently and significantly reported on.

Looking at discussed digital maturity models, one study investigated more than 400 large companies within 15 industries and concluded the following: Companies in banking are on their way to become digirati but need to mature more, especially with regards to digital teams, marketing communications, customer integration, collaboration, and architecture (Westerman et al., 2012b, p.9). Even though companies in insurance are looking for innovation, they are often slowed down by regulations, organisational legacies, and risk-averse attitudes. Thus, they are still in the digital conservative's field due to insufficient performance management, governance, architecture, marketing communication, agility, and experience design (Westerman et al., 2012b, p.9).

Another study with almost 700 participants from different industries figured that the biggest digital maturity difference, in the case of banking and insurance, occurs in the customer experience, digitisation of processes, product innovation, and internal collaboration fields (Berghaus et al., 2016, pp.48-56). This is often a result of the chosen digitisation strategy. For instance, for companies in banking and insurance, a strategic focus on innovation and IT is less common than a focus on bottom-up strategies. The latter strongly considers the bundling of existing initiatives and activities for the formulation of a strategy instead of creating an initiative that counts to the organisation. This is also a result of the presence of large corporate groups in those fields that make a more agile approach hard to execute and thus digital maturity harder to thrive (Berghaus et al., 2016, pp.48-56). Given that mainly companies in banking and insurance have been scrutinised, there are no conclusions for the financial services sector available.

3 Methodology

3.1 Research Design

The essence of the explorative research study at hand is to understand attributes that influence digital maturity and the respective effect that they have within an organisation. Additionally, the study is conducted in, and thus valid for, the German financial services sector. By conducting and analysing qualitative plus quantitative research methods, the following research question is answered: Which attributes have a high impact on digital maturity?

To achieve this research goal, primary and secondary sources of data were considered. Firstly, the secondary data consisted of qualitative data collected through existing literature, journal articles, company publications, and empirical studies. This was the basis for the understanding of the main concepts - digital maturity, the financial services sector, and their intersection. Then, these secondary data insights were used to create a structure for primary data collection consisting of a qualitative and quantitative component. With regards to the qualitative part, semi-structured expert interviews amongst industry executives were performed to gather knowledge and insights based on experience. The quantitative aspect of the dissertation scrutinised the inputs of industry professionals. Participants evaluated the digital maturity level of their organisation indirectly as well as possible influencing attributes, by means of an online survey. The qualitative and quantitative methods helped to identify attributes from a top-down and majorly bottom-up perspective respectively, whilst combining qualitative and quantitative research components. After having identified the set of attributes that influence digital maturity, the results were ranked from high, medium to low/no impact/degree of influence on digital maturity, highlighting critical attributes to be appraised by organisations.

3.2 Data Collection

3.2.1 Primary Data Collection - Qualitative Data via Expert Interviews

Semi-structured interviews are a qualitative interviewing method designed to grasp implicit and specific expert knowledge in a certain field. Therefore, a topical guide of open-ended questions is the basis of this method, giving the expert the chance for unbiased inputs. In a second step, more detailed and guided remarks were given whilst considering the insights from the literature

review (Kallio et al., 2015, p.2962). The goal is to circumvent a strict question-answer approach that may hinder the interviewees' thoughts (Döringer, 2021, pp.265-267). Hence, the qualitative component of the research is less dictated than the quantitative one, to further enlarge the pool of insights to be analysed. *Table 2* provides information on the profiles of the experts, their background, and criteria for eligibility. Each of the experts comes from and works in Germany, because of which the interviews were held in German. Experts were contacted through personal networks and social media. The interview guideline can be reviewed in *Appendix 1*.

ID	Company role	Company type	'20 revenue	Criteria for Eligibility
A	Head of Innovation & Digitisation	Banking	€145-150 billion	Experience within different traditional banks (15+ years)
B	Head of Innovation & Digitisation	Banking	€25-30 billion	Experience in banking (20+ years)
C	Head of Projects & Processes	Banking	€1-5 billion	Experience in banking & consulting (20+ years)
D	Manager	Big four consulting	€40-45 billion	Experience across Big four & asset management (~10 years)
E	Manager	Management consulting	€150-350 million	Experience in insurance & consulting (+10 years)
F	Head of Projects & Young Consumers	Inhouse consulting	€1-5 billion	Experience in banking & consulting (20+ years)
G	Head of Strategy & Operations	FinTech	€100-300 million	Experience in trading & FinTech's (~10 years)
H	Managing Director	Management consulting	€50-100 million	Experience in insurance & tax advisory (~10 years)

Table 2: Expert interviewee profiles (own representation)

To draw appropriate conclusions of the given inputs (*Appendix 2*), a qualitative comparative analysis (QCA) is performed to examine the shared content via an inductive coding approach (Mayring & Fenzl, 2019, pp.634-635). The benefit is that by providing insights on the coding process and resulting categories (*Appendix 3*), other researchers who apply the same process would obtain the same result. In addition, this approach excludes bias from the researcher's side since the categories are formed throughout the process and not before as in a deductive approach

(Mayring, 2015, p.370). For this approach, the interviews have been transcribed in an in-depth summary format with wording close to the original based on comprehensive notes taken during the interviews (*Appendix 2*). Due to data protection and anonymity, an interview recording was not desired by the interviewees. Afterwards, the content was uploaded to the tool MAXQDA, used to create categories systematically.

3.2.2 Primary Data Collection - Quantitative Data via Survey

The quantitative component of the study consisted of an online survey amongst employed industry professionals in Germany (*Appendix 4*). Factors that have been identified through secondary data collection are evaluated by the sample. It is important to consider companies where digitisation is successful or less successful, to identify the most relevant drivers for the success or failure of digitisation efforts and respective digital maturity. The comparison between the groups emphasises influencing factors:

- **Group A:** Organisations that experienced **successful** digitisation efforts that added value and can thus be classified as more digitally mature than incumbent peers.
- **Group B:** Organisations that experienced **less successful** digitisation efforts that did not add much value and can thus be classified as less digitally mature than incumbent peers.
- **Digital maturity score:** Average of all digital maturity assessment questions per observation indicating the degree of digital maturity.

Firstly, questions that secure the eligibility of the participant appeared in the survey. This means that if no digitisation activities were performed in the firm or the employment status, country, company size or industry were not relevant, the response was disregarded. Apart from these organisational questions for scoping purposes, the participants were required to evaluate certain digital maturity drivers in view of their organisation. Since it cannot be expected that everyone knows what digital maturity is and what it entails, the first part of the survey included questions determining the status of their employer by means of perceived success and value creation through digitisation efforts. This evaluation has thereafter been used to create a success variable distinguishing Groups A & B, as well as an average variable that measures the success across the four questions or variables respectively. The second part of the survey investigated the level and thus the effect of specific components in view of strategy, people & culture, leadership, expertise & training, technology, and operational processes - categories formed as per the

secondary data collection. The last part of the survey asked for demographic information. The survey was launched in German and incorporates nominal, ordinal, interval, and ratio values, and thus continuous and discrete data, offering a broad spectrum for analyses. For most of the questions, a 7-point Likert scale is used enabling the evaluation of the degree of agreement as well as the importance of certain factors. A 7-point Likert scale is more reliable than a 5-point Likert scale in producing solid results because it is often unlikely that the extreme options are chosen, enabling a clearer insight into the individual impressions (Sreejesh et al., 2014, pp.137-138). Qualtrics is used as the survey coding plus data storage tool, and by means of R and Microsoft Excel, the data was statistically processed to generate numerical outputs and graphical illustrations. Due to the lack of a distribution database, the target group of this survey was created through spontaneous, random, convenience, and snowballing sampling. This method of non-probability sampling considers sending the survey to the researcher's network, which then sends the survey to their network, and so on (Sreejesh et al., 2014, p.265). In addition, the survey was posted on several social media platforms to increase the response rate and the snowballing effect. Within a running time of three weeks between 08/11/2021 and 30/11/2021, 150 responses have been generated, from which 124 are complete and valid.

3.2.3 Secondary Data Collection - Qualitative Data via Journals, Articles and Literature

To derive a clear picture of the concept of digital maturity, respective models, and precedent research, multiple journal articles, reputable consulting, and public institution reports, as well as academic literature, were considered. Furthermore, insights on the financial services sector and respective trends or findings related to digital maturity were contemplated through the same means. To select mainly high-quality sources, reputable journal platforms have been used by taking the ranking of journals and previous citations into account. In addition, other reports and articles have been only considered when they were published by a renowned university, business school, or consulting company. The goal was to create a solid foundation for the understanding of the topic and structure of the research design. This foundation was tested in the survey, and partly within the interviews. The intention was to validate them and to examine their influence.

4 Analysis & Discussion

4.1 Analysis of Primary Data Collection - Qualitative Data via Expert Interviews

After having performed the explorative QCA, a total of 48 codes with 227 corresponding snippets have been identified (*Appendix 3)*. The codes have been further clustered into 22 drivers and 14 barriers of digital maturity depending on the question asked. In addition, interviewees were required to identify differences between digital leaders and laggards within the industry. These statements have been classified into 11 differentiating factors. The findings in *Tables 3* to *5*, illustrate the number of snippets per code and per interviewee respectively. A colour gradient highlights the number of snippets according to their frequency per interviewee (A-H). Furthermore, the sum of snippets per code is represented in ascending order. *Table 3* depicts the drivers of digital maturity, as identified within the interviews.

Drivers	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Σ**
Data excellence	0	0	0	1	0	0	0	0	**1**
KPI measurement	0	0	0	0	2	0	0	0	**2**
IT & business cooperation	0	0	0	0	1	0	0	1	**2**
Regulations	0	0	0	1	1	0	0	0	**2**
Customer churn	0	2	0	0	0	0	0	0	**2**
F2F digital trainings	1	1	0	0	0	0	0	0	**2**
Transparent & simple processes	0	1	1	0	0	0	0	1	**3**
Digitally skilled employees	2	0	0	0	0	1	0	0	**3**
External cooperation's	1	1	0	0	1	0	0	0	**3**
Openness	1	1	0	0	0	1	0	0	**3**
Cost/margin pressure	0	2	1	1	0	0	0	0	**4**
Leadership engagement	0	0	0	0	2	2	0	0	**4**
Trends vs. consumer needs analysis	1	1	1	0	0	1	0	0	**4**
Organisational communication	1	0	1	1	1	0	0	0	**4**
Clear added value	0	1	1	1	1	0	1	0	**5**
Digital initiatives	0	4	0	1	1	0	0	0	**6**
Holistic orientation	0	0	2	2	1	1	0	1	**7**
Digital goals for leaders	0	2	1	1	3	0	0	0	**7**
Standardisation	2	1	2	1	1	0	0	0	**7**
Priority setting	1	1	2	0	1	1	0	1	**7**
Agility	4	0	0	0	1	1	0	1	**7**
Innovation/digitisation teams	1	2	4	0	0	0	2	3	**12**
Σ	**15**	**20**	**16**	**10**	**17**	**8**	**3**	**8**	**97**

Table 3: Drivers of digital maturity (output from MAXDA)

The drivers have been mentioned to have a positive influence on digital maturity and the success of digitisation in terms of value capture. Looking at the drivers labelled as **data excellence,** related to clean data and the quality of data, having **key performance indicator** (**KPI) measurements** for digitisation efforts, **IT & business cooperation**, **regulations**, **customer churn** and **face-to-face (F2F) digital trainings,** they have the lowest number of snippets with one and two. The next factors with a count of three to five snippets are **transparent & simple processes**, **digitally skilled employees**, **external cooperation's** through mergers & acquisitions (M&A) or consultants, **openness**, **cost/margin pressure**, **leadership engagement**, **trends vs. consumer needs analysis** to make sure that new products or processes are desired, **organisational communication,** and a **clear added value** of digitisation measures. These are followed by a few snippets with a sum of six and seven which are one of the highest counts: **Digital initiatives** to drive motivation and innovation within the organisation, **holistic orientation** considering a digital strategy for all business units or departments, **digital goals for leaders** to exclude a conflict of interest, **standardisation** of processes, **priority setting** for digitisation in the firm, and **agility** not only within IT but throughout the organisation. The code with the highest number of snippets across interviewees is the implementation of **innovation/digitisation teams** within the company, whose main task is to identify opportunities, sponsor projects, and actively drive digitisation in the company.

Regarding barriers to digital maturity, *Table 4* highlights related factors that have been associated with negative effects on digital maturity. The lowest number of snippets has **employer branding**, **reactive not proactive** digitisation measures, **complex processes**, **data security compliance**, **organisational agility** in terms of not being existent, and **managerial readiness**. The next segment with four to six snippets, and thus a moderate barrier to digital maturity, is a lack of **IT resources**, **outdated IT structures** and **organisational structures** that are too complex. More substantial barriers are not having a **digital priority**, seeing **digitisation as a competitor to the successful business** instead of a business or growth opportunity, missing **employee involvement/co-innovation** in development phases, and regulations. The biggest barrier with a snippet count of 23, across seven out of eight interviewees, is the **organisational culture & mindset**.

Barriers	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Σ**
Employer branding	0	0	0	0	0	1	0	0	**1**
Reactive not proactive	0	1	0	0	1	0	0	1	**3**

Complex processes	2	1	0	0	0	0	0	0	**3**
Data security compliance	1	1	0	0	0	1	0	0	**3**
Organisational agility	3	0	0	0	0	0	0	0	**3**
Managerial readiness	1	2	0	0	0	1	0	0	**4**
IT resources	0	0	1	1	2	0	1	0	**5**
Outdated IT structures	1	1	0	0	2	0	1	0	**5**
Organisational structures	1	1	0	0	1	0	1	2	**6**
Digital priority	0	3	1	0	1	1	2	1	**9**
Digitisation = competitor	0	2	1	0	2	1	2	1	**9**
Employee involvement/co-innovation	2	2	1	1	1	1	1	1	**10**
Regulations	2	4	1	0	0	1	1	1	**10**
Organisational culture & mindset	3	5	2	2	0	5	5	1	**23**
Σ	**16**	**23**	**7**	**4**	**10**	**12**	**14**	**8**	**94**

Table 4: Barriers of digital maturity (output from MAXQDA)

With reference to the differentiating factors between leaders and laggards, the lowest number of snippets has **digital processes**, the creation of **new value chains**, **short time-to-market** times, **platform orientation,** and **connected value chains**. A moderate influence is given by **disruptive pressure** from competitors, having a **digital culture**, having **less complexity and more agility,** and considering **new employee profiles**. The biggest distinguishing factor identified was the **automation** of processes and considering not only **digital maturity but also organisational maturity**. For instance, four interviewees (C, E, F, H) mentioned that digital companies have better digital processes, digital interfaces and products, or services. However, traditional companies, especially in banking, have more mature processes in terms of regulations, data security, and risk. This emphasises the importance of both digital and mature processes.

Differentiating factors	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**Σ**
Digital processes	0	0	0	0	0	1	0	0	**1**
New value chains	1	0	0	0	0	0	0	0	**1**
Short time-to-market	0	0	0	0	0	0	2	0	**2**
Platform orientation	2	0	0	0	0	0	0	0	**2**
Connected value chains	1	0	0	1	0	0	0	0	**2**
Disruptive pressure	0	0	0	0	2	0	0	1	**3**
Digital culture	0	0	2	1	0	0	0	0	**3**
Less complexity, more agility	0	1	0	1	0	0	2	0	**4**
New employee profiles	0	0	0	1	1	1	0	1	**4**
Automation	1	0	0	1	2	1	0	0	**5**
Digital vs. organisational maturity	0	0	1	0	1	3	0	4	**9**

Σ	**5**	**1**	**3**	**5**	**6**	**6**	**4**	**6**	**36**

Table 5: Differentiating factors between leaders and laggards (output from MAXQDA)

Considering the factors with the highest number of snippets and their overlap with drivers, barriers and differentiating factors, the following factors are the most prevalent. **Priority setting, digital goals for leaders, employee involvement/co-innovation,** and having **innovation/digitisation teams** underline that digitisation needs to be handled as a central topic through all organisational spheres. This goes hand in hand with the **holistic view** and that **digitisation is not a competitor to the successful business** but rather a complement or improvement. Besides, the biggest barrier is **organisational culture & mindset** that can be a barrier to **agility**. In addition, the **standardisation** of processes as a prerequisite for **automation** influences digital maturity as well. Other distinctive observations include **regulations** that have been seen, from a few interviewees with a background in private equity, consulting, and hedge funds, as a driver of digital maturity and from others, in banking or insurance, as a barrier or hurdle. Furthermore, in contrast to the literature review, **IT resources** and **outdated IT structures** have been identified as barriers in the process. Moreover, **agility** and **organisational agility** have been identified as a driver but at the same time, it was clear that it is not yet existing throughout most companies.

Apart from that, when putting all established codes into a code map within MAXQDA, clusters of factors are generated. This selection is based on the number of snippets, the number of interviewees, the connection between interviewees' statements and their intersection. Thus, the most important factors are identified and highlighted by this method. Besides, codes that do not have any relations with other codes are ignored and removed by this function in MAXQDA. The benefit is that this automated method is unbiased by solely considering the codes and snippets. Additionally, similar and overlapping codes are closer together on the map. These clusters are demonstrated in the following in *Figure 4* as **standardisation & simplification**, **agility & culture**, **digital priority,** and **digital incentives**. The findings from the code map are in accordance with the previously discussed findings for drivers, barriers, and differentiating factors. This is particularly true for the ones with a high number of snippets.

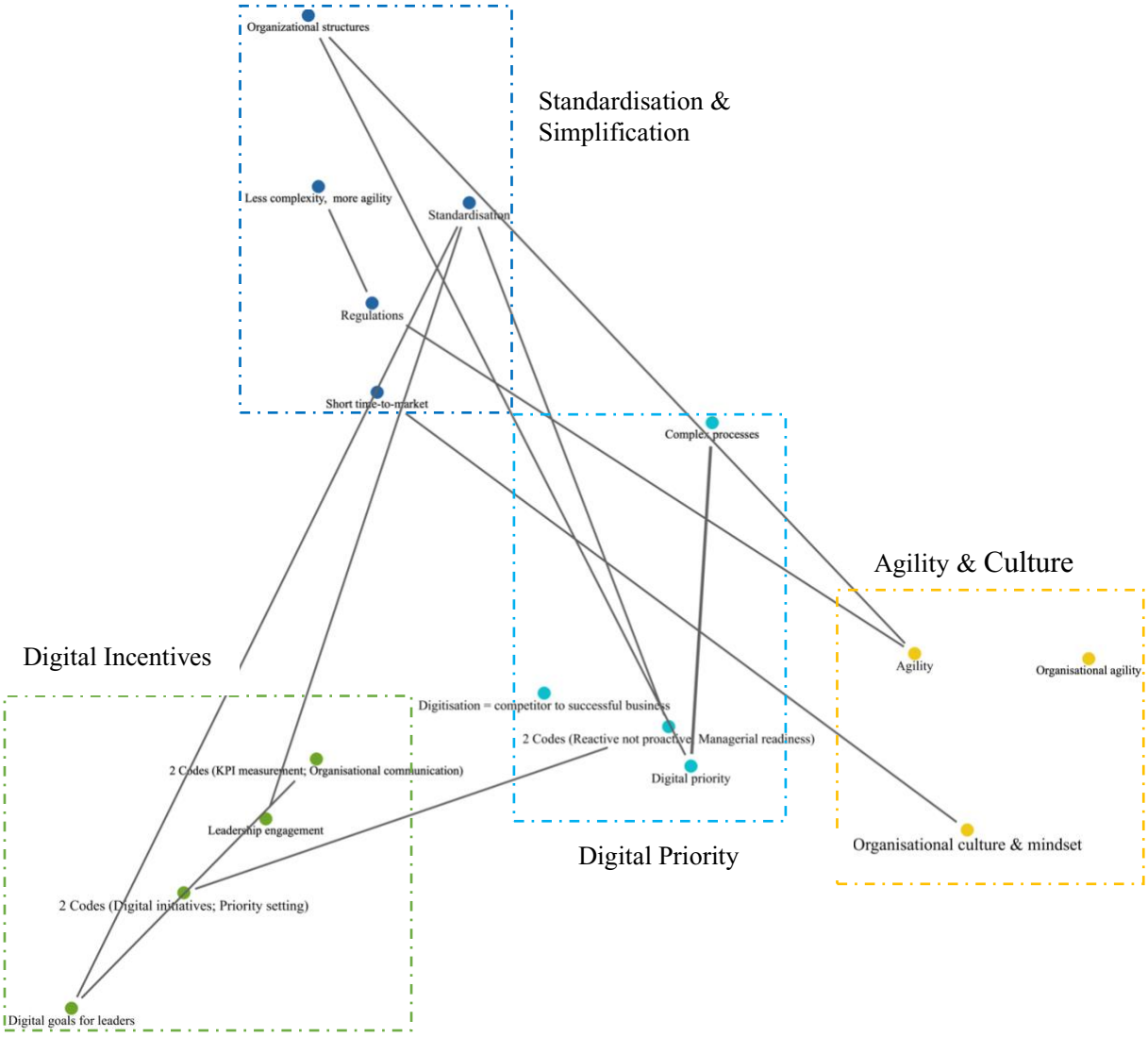

Figure 4: Code map (output from MAXQDA)

4.2 Analysis of Primary Data Collection - Quantitative Data via Survey

4.2.1 Descriptive Statistics & Bivariate Analysis

With regards to the sample profile, all 124 respondents are employed in an organisation implementing digitisation measures in Germany. The mean company affiliation is 6.4 years with a standard deviation of 8.0 indicating that a few respondents are more than 14.0 years in the company with a maximum observation of 42.0 years. In addition, 37.9% of respondents work for a medium-sized company (>$50.0 million revenue) and 62.1% work for a large company (>$1.0 billion revenue) (Gartner, 2021). The main sub-sectors are banking (46.8%), insurance (16.9%), and consulting (11.3%). Furthermore, most respondents have a bachelor's degree (32.3%) or a master's degree (48.4%) and they work mainly in strategy/project

management (25.8%), finance/legal (25.8%) or management (13.7%). The sample consists of 44.4% women and 55.6% men who are predominantly in the age groups of 25-34 (46.0%) and ≤18-24 (25.0%). Hence, the sample consists to a big share of millennials (1981-1996) and gen z (1997-2012) (Gabrielova & Buchko, 2021, pp.489-490). Complementary relative frequencies and summary statistics for categorical variables are available within *Appendix 5*.

The respondents' experiences and assessments in their company were measured using four questions. The first three questions assess the added value of digitisation in the company and the fourth question asks directly whether the company is a digital leader in their opinion. As confirmed in the expert interviews, each factor assessed in the questions contributes roughly equally to the digital maturity level. For this reason, the average of the four values was combined into a new consolidated variable with a mean of 5.4 and a standard deviation of 1.2 (*Table 6*) underlining that there are more digitally mature observations. Moreover, the applied Likert scales are odd and therefore considered interval rather than ordinal scales, for which the average rather than the sum was used (Pimentol, 2019, p.185).

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
DM1_AV_self	124	5.234	1.822	1	4	7	7
DM2_AV_other	124	5.605	1.447	1	5	7	7
DM3_AV_customer	124	6.226	1.242	1	6	7	7
DM4_leadership	124	4.468	1.727	1	3	6	7
DM1234_average	124	5.383	1.153	2	4.8	6.2	7
S_digital_vision	124	5.589	1.385	1	5	7	7
S_transformation	124	5.629	1.451	1	5	7	7
S_risk_appetite	124	4.476	1.713	1	3	6	7
S_agility	124	5.081	1.606	1	4	6	7
S_E2E_strategy	124	5.137	1.610	1	4	6	7
PC_ideation_focus	124	5.581	1.493	1	5	7	7
PC_cultural_transformation	124	5.194	1.714	1	4	7	7
PC_savviness	124	5.460	1.206	2	5	6	7
PC_autonomous_workstyle	124	5.935	1.280	2	5	7	7
L_employee_collab	124	5.460	1.439	2	5	7	7
L_leadership_vision	124	4.944	1.736	1	4	6	7
L_leadership_engagement	124	5.347	1.613	1	5	6.2	7
L_leadership_mindset	124	5.339	1.652	1	4.8	7	7
ET_digital_skills	124	5.048	1.497	1	5	6	7
ET_skill_development	124	4.887	1.604	1	3.8	6	7
ET_talent_attraction	124	4.008	1.575	1	3	5	7
ET_reflection	124	4.137	1.768	1	3	6	7
T_ecosystem	124	5.427	1.404	1	5	7	7
T_integration_automation	124	5.185	1.548	1	4	6	7
T_IT_infrastructure	124	4.911	1.758	1	4	6	7
T_data_driven	124	4.758	1.736	1	3	6	7
OP_prototyping	124	4.605	1.710	1	3	6	7
OP_reinvention	124	5.169	1.480	2	5	6	7
OP_regulations	124	4.952	1.705	1	4	6	7
OP_delivery_excellence	124	4.621	1.474	1	3	6	7
Affiliation	124	6.353	8.032	0	1	7.2	42

Abbreviations of grouped variables:
DM = Digital maturity
S = Strategy
PC = People & Culture
L = Leadership
ET = Expertise & training
T = Technology
OP = Operational processes

Table 6: Summary statistics for non-categorical variables (output from R)

When using 7-point Likert scales, the averages per question are often slightly higher, which is a significant difference affecting the output of statistical analyses. This is because respondents are usually biased and therefore try to answer questions in an expected way or according to social desirability leading to distributions that are not random anymore (Pimentol, 2019, pp.183-184). Accordingly, the collected data contain a positive bias towards higher digital maturity, making some observations appear more digitally mature than they are. This is especially true for the first three questions regarding personal involvement and the customer benefit of digitisation. When looking at the digital leadership assessment of the firm with a mean of 4.5, the mean is lower in comparison to the previous questions. This is a good example of the social desirability bias that led respondents to a better assessment of their actions but a more realistic estimate for overall statements regarding their organisation. To balance this bias across questions, the average value of 5.3 is used as a threshold instead of the middle of the 7-point Likert scale to distinguish Group A from Group B. This threshold is a proven value within a 7-point Likert scale that reduces biased inputs up to the first value of the positive side (‘agree’) (Pimentel, 2019, p.189). This means that averages up to 5.3 are included in the less successful group to adjust biased answers. Consequently, for Group A, only the intervals representing the strongest agreement from 5.4 to 7.0 are used. The expected result is to minimise the discussed bias and to obtain better results. Subsequently, 54.0% of the respondents form the successful case as Group A and 46.0% of the respondents form the less successful case as Group B as a basis for comparative analyses.

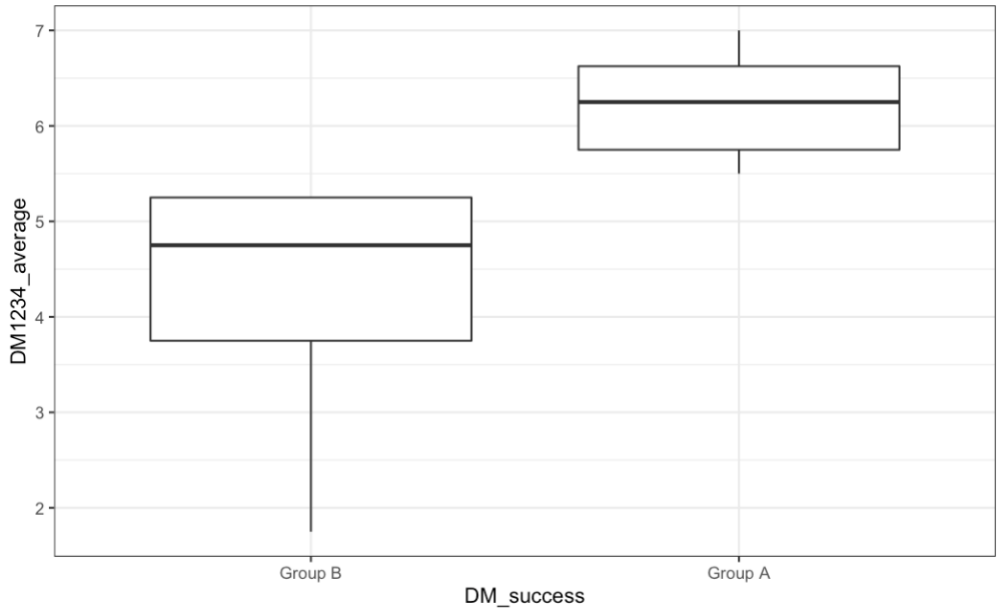

Figure 5: Boxplots for Groups A & B regarding the average of digital maturity (output from R)

Figure 5 shows two boxplots for the average of digital maturity and the variable indicating digital maturity success. Both groups have different medians, first and third quartiles, and whisker lengths that highlight the minimum and maximum values. In addition, there are no outliers. The boxplots illustrate the groups' characteristics by highlighting that both groups are sufficiently different as a prerequisite for the subsequent analyses.

The mean differences of factors between Groups A and B for each of the influencing factors were determined using two-sample t-tests (Wooldridge, 2016, pp.114-115). The individual t-tests for which the means are significantly unequal (Hypothesis 1 = H1) with values closest to zero can be found in *Appendix 5*. This method is used to determine which factors most distinguish the groups from each other. In the following, an example is given based on the factor digital vision and its interpretation. For this purpose, the following hypotheses are used:

$$H_0 : \mu_A = \mu_B$$

$$H_1 : \mu_A \neq \mu_B$$

If the p-value is smaller than 0.05, H0 is rejected and H1 is assumed. Consequently, the means are significantly unequal for the factor digital vision with a p-value close to zero (*Figure 6*), emphasising its relevance for either being a leading incumbent or a peer who is less digitally mature. The same conditions hold as well for all other factors. Nevertheless, the following factors are closest to zero and have thus a stronger result: **digital vision** related to the company orientation**, cultural transformation** and **skill development** within the organisation**,** digital **savviness** amongst employees**,** and the **leadership vision** anticipated by leaders.

```
        Welch Two Sample t-test

data:  dt.data[DM_success == "1", S_digital_vision] and dt.data[DM_success == "0", S_digital_vision]
t = 6.6934, df = 111.81, p-value = 9.081e-10
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 1.018450 1.874977
sample estimates:
mean of x mean of y
 6.253731  4.807018
```

Figure 6: Two-sample t-test for digital vision (output from R)

Moreover, the correlation matrix in *Appendix 5* illustrates that almost all variables have a medium correlation with the digital maturity score. This is mostly a result of the presence of Likert scales. Therefore, it does not make sense to choose variables from the correlation matrix and thus an unrestricted regression model was created by following the generic to specific approach. The correlations were performed using Spearman's rho since the data were mainly Likert-scale (Murray, 2013, p.262). Furthermore, a normal distribution of the digital maturity score was checked as a prerequisite for ordinary least squares (OLS) regression analyses (*Appendix 5*) (Wooldridge, 2016, pp.10-106).

4.2.2 Regression Analysis

A generic to specific approach was chosen for the regression modelling. This means that in a first step, separate models were created against the digital maturity score for each factor category (strategy, people & culture, leadership, expertise & training, technology, and operational processes) to investigate the influence of similar factors. Apart from this, all possible influencing factors were used as regressors against the average digital maturity score:

$$y_i = DigitalMaturityAverage = \beta_0 + \alpha_1 Factor + OtherFactors + u_i$$

Afterwards, factors with p-values up to a maximum significance level of 10% were selected for a second round to eventually identify the factors with the biggest influence. The corresponding regression tables are in *Appendix 5*. Moreover, the variance inflation factor (VIF) was investigated for models with more than one regressor. The resulting VIF values are within the maximum tolerance value of 10.0 (Wooldridge, 2016, p.86) with VIF values between 1.3 and 2.8 (*Appendix 5*). Consequently, multicollinearity can be excluded complying with another prerequisite for OLS regression analyses (Wooldridge, 2016, p.83). Then, the eight different models were tested for heteroscedasticity, the variance change in the residuals, using the Breusch-Pagan test (*Appendix 5*) to assess their suitability for OLS regression analyses (Wooldridge, 2016, pp.251-252). Because heteroscedasticity was found for all models, robust standard errors were applied to all of them (Wooldridge, 2016, p.244) with a heteroskedasticity-consistent (HC) estimator of three which is most suitable for small sample sizes (Zeileis, 2004, p.4). Subsequently, for the final holistic model (model eight), the factors from the category models at a significance level of 1%, after the robust standard errors, were chosen (*Table 7)*.

	Dependent variable:							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
S_digital_vision	0.510***						0.158	0.181*
	(0.089)						(0.116)	(0.107)
PC_cultural_transformation		0.262**					0.024	
		(0.062)					(0.095)	
PC_savviness		0.365***					0.187*	0.199**
		(0.091)					(0.099)	(0.093)
L_leadership_vision			0.301***				0.108	0.144**
			(0.064)				(0.092)	(0.069)
L_leadership_mindset			0.204**				0.067	
			(0.062)				(0.071)	
ET_digital_skills				0.199*			0.022	
				(0.101)			(0.098)	
ET_skill_development				0.224***			0.141	0.164**
				(0.080)			(0.095)	(0.067)
ET_reflection				0.148**			0.030	
				(0.062)			(0.072)	
T_ecosystem					0.193**		0.031	
					(0.077)		(0.069)	
T_data_driven					0.242**		-0.002	
					(0.070)		(0.074)	
OP_prototyping						0.139**	-0.008	
						(0.066)	(0.059)	
OP_reinvention						0.145*	-0.067	
						(0.084)	(0.085)	
OP_delivery_excellence						0.232***	0.093	0.089*
						(0.087)	(0.060)	(0.053)
Constant	2.535***	2.030***	2.804***	2.673***	3.187***	2.921***	1.335**	1.358***
	(0.541)	(0.556)	(0.344)	(0.402)	(0.407)	(0.417)	(0.549)	(0.496)
Note:							*p<0.1; **p<0.05; ***p<0.01	

Table 7: Multiple regression models with robust standard errors (output from R)

In terms of strategy, a stronger **digital vision** within a company increases, on average and ceteris paribus (c.p.), the average digital maturity score by 0.510 points at a significance level of 1%. Regarding people & culture, a stronger **cultural transformation** and **savviness** within a company, increase on average and all other things being equal, the average digital maturity score by respectively 0.262 and 0.365 points at a significance level of 5% and 1%. Looking at leadership, a stronger **leadership vision** and **leadership mindset** within a company increase, on average and c.p., the average digital maturity score by 0.301 and 0.204 points at a significance level of 1% and 5%. For expertise & training, better **digital skills, skill development,** and **reflection** within a company increase, on average and c.p., the average digital maturity score by respectively 0.199, 0.224 and 0.148 points at a significance level of 10%, 1% and 5%. For technology, a stronger **ecosystem** and being more **data-driven** within a company increase, on average and c.p., the average digital maturity score by respectively 0.193

and 0.242 points at a significance level of 5%. Regarding operational processes, better **prototyping, reinvention,** and **delivery excellence** within a company increase, on average and all other variables constant, the average digital maturity score by respectively 0.139, 0.145 and 0.232 points at a significance level of 5%, 10% and 1%.

In addition to the category models, a broader model with all category factors was explored as well as a model that included all factors with a p-value at a significance level of 1% from the category models with robust standard errors. This was done because digital maturity is an interplay of various, non-related factors. Therefore, the final holistic models better reflect the real conditions. Looking at the last and final model that produced significant results, a higher **savviness, leadership vision** and **skill development** increase, on average and c.p., the average digital maturity score by 0.199, 0.144 and 0.164 points at a significance level of 5%. **Digital vision** and **delivery excellence** increase the average digital maturity score by 0.181 and 0.089 points at a significance level of 10% holding all other variables constant.

4.3 Discussion of Findings

The findings of the analyses contain insights gained from the qualitative secondary data analysis through the literature review, the qualitative primary data analysis by means of the semi-structured expert interviews, and the quantitative primary data analysis via an industry survey amongst professionals of the industry in question. A comparative table with the findings of each section can be reviewed in *Table 8*. The selection within *Table 8* does not imply that other factors under investigation do not have any impact at all on the degree of digital maturity within financial services. *Table 8* only emphasises the ones with the strongest degree of influence on digital maturity, aligned with the target of the analysis on hand.

Looking at the findings from the secondary data in chapters 2.1.3 and 2.2.3, the illustrated studies lack holistic views, quantitative verification, and the evaluation of the degree of influence. Nevertheless, it can be construed as the reference point for subsequent research designs, methods, and comparisons. Shared points within secondary data are strategy, processes, and human resources. Almost all studies highlight that IT or ecosystems are not the driving factors but rather agility, strategy, and a value creation focus. It needs to be underlined that those secondary data results are aligned with primary data results.

Secondary data (qualitative), manufacturing, newspaper, hospitals & telecom	**Primary data (qualitative),** financial services	**Primary data (quantitative),** financial services
Positive influence: Strategy, processes, human resources, agility **Negative influence:** Inertia	**Strong influential factors:** Standardisation & simplification, agility & culture, digital priority, digital incentives	**Strong influential factors:** **Holistic:** Digital vision, savviness, skill development, leadership vision, delivery excellence **Categorical:** Digital vision, cultural transformation, savviness, leadership vision, leadership mindset, digital skills, skill development, reflection, ecosystem, data-driven, prototyping, reinvention, delivery excellence
Differentiating: Value creations focus	**Differentiating:** Automation, digital & organisational maturity	**Differentiating:** Digital vision, cultural transformation, skill development, savviness, leadership vision

Table 8: Study results (own representation).

Regarding the results of the qualitative primary data, four factor categories were identified as the most influential to digital maturity. **Standardisation & simplification** is about processes that serve as a prerequisite for the differentiating factors of automation, as well as digital and organisational maturity, which distinguishes incumbents from one another in terms of digital maturity. **Agility & culture** is about attitude, mindset, organisational culture, the ability to be open and to adapt to new circumstances regularly. **Digital priority** is about seeing digitisation not as a competitor but as an enabler, especially within management and the company's purpose. **Digital incentives** are linked to the latter, as it is about making digitisation a central topic in the company and motivating managers and employees to participate in it.

Other factors to be considered are the ones that have been assessed through both qualitative and quantitative primary data because they are based on mutual verification. In addition, the qualitative results highlight mainly an in-depth assessment from a leader's perspective within the industry, and the quantitative results reflect majorly personal assessments of mostly non-leading employees. As a result, their intersection represents factors with more certainty.

Considering the holistic results of the quantitative primary data, the **savviness** of employees, the **leadership vision** created by leaders for specific teams, and supported **skill development** within the firm have the biggest influence on digital maturity from a people & culture, leadership as well as expertise & training point of view. In terms of strategy and operational processes, the **digital vision** related to the firm's orientation and **delivery excellence** of products or services, have the highest degree of influence on digital maturity. **Skill development** and **savviness** are in accordance with **agility & culture** from the qualitative component. **Leadership vision** and **digital vision** are related to **digital priority** from the qualitative results. This is because when digitisation is highly prioritised in a company, it should be part of the organisational vision and the leader's vision. Unlike the previously discussed factors, **delivery excellence** was eventually not included in the high impact group (*Table 9*) since it lacks mutual verification from the qualitative data.

In the following, more granular results from the medium impact group (*Table 9*) are discussed. Given the categorical results of the quantitative primary data, which are aligned with the holistic results, and in the first step from a strategic point of view, the **digital vision** was most influential on digital maturity. As for culture & people, fostering a **cultural transformation** and digital **savviness** among employees also influence digital maturity. The **leadership vision** and **leadership mindset** are additional influential factors. In terms of expertise & training, **digital skills**, **skill development,** and **reflection** regarding learning from mistakes have a positive effect. In contrast to the literature review stating that technology plays a minor role in digital maturity, technology factors such as the **ecosystem** and **data-driven** orientation have an effect as well. Looking at the last category, operational processes, the availability of **prototyping** options, **reinvention** of operations or processes, and **delivery excellence** to customers are positively related to digital maturity. From the qualitative component, **digital incentives,** and **standardisation & simplification** are included in this group because it covers technical conditions and incentivisation.

With respect to differentiating factors, the qualitative component identified **automation** and concurrent **digital plus organisational maturity** as important. The latter considers mature processes, compliance, products, and services. The quantitative component determines **digital vision, cultural transformation, skill development, savviness,** and **leadership vision** as competitive advantages with the strongest impact on the position in the sector. For most of the interviewees, identifying distinguishing features was neither easy nor very detailed. For this reason, a comparison is not feasible in this case. Nonetheless, a comparison with the other influencing factors shows that they complement the factors from the high or medium impact group. *Table 9* summarises the results discussed in tabular form and in the form of a ranking with high, medium, and low/no impact/degree of influence on digital maturity as well as differentiating factors.

High impact/ degree of influence	**Qualitative:** Agility & culture, digital priority **Quantitative:** Digital vision, savviness, skill development, leadership vision
Medium impact/ degree of influence	**Qualitative:** Digital incentives, standardisation & simplification **Quantitative:** Cultural transformation, leadership mindset, digital skills, reflection, ecosystem, data-driven, prototyping, reinvention, delivery excellence
Low/no impact/ degree of influence	All other factors that have been tested in the study have a rather low influence on digital maturity without significance level
Difference between leaders & laggards	**Qualitative:** Automation, digital & organisational maturity **Quantitative:** Digital vision, cultural transformation, skill development, savviness, leadership vision

Table 9: Degree of influencing factors (own representation).

5 Outcome & Outlook

5.1 Conclusion

'Which attributes have a high impact on digital maturity?', is the research question that this dissertation aimed to answer. Attributes that meet the criteria are referred to as drivers of digital maturity within financial services in Germany. The findings of the dissertation are consistent with the literature but reflect a more granular and detailed view of factors and their varying degrees of impact.

The first section of primary data collection considers semi-structured interviews with experts, managers, and consultants from the industry. Common denominators with quantitative insights and overlaps between interviewees include the presence of **agility** and a **culture** that is ready to drive digitisation while thriving on digitisation within the organisation. In addition, a core interest in digitisation and a **digital priority** within the organisation's strategic direction or related goals also have a major impact on digital maturity. As a complementary research measure, quantitative primary data were also collected in parallel with the interviews. Commonalities with qualitative outputs include the **savviness** of employees in terms of technologies, a driving **leadership vision**, continuous **skill development** regarding digital and technological skills, as well as a **digital vision** anchored in the identity and strategy of the company. The mentioned factors are the ones deemed to have the highest impact and the biggest intersection between the data collection methods, meaning they are present in both methods. In conclusion, **agility, culture, digital priority, savviness, leadership vision, skill development** and the **digital vision** are attributes that have a high impact on digital maturity - the answer to the research question of this dissertation. Apart from high impact attributes, medium impact attributes have been identified and are worth considering as well within respective departments (*Table 9*). Besides, the analysis identified differentiating factors between digital leaders and laggards which match the high and medium impact factors. These differentiating factors are deemed to play an important role to the leading or lagging position within the sector.

The following recommendations for action and focal points for future measures emerge from the results of this study. It becomes clear that the drivers, digital priority, and digital vision, indicate that the determinants of digital maturity must account for a larger share of the strategy and organisational goals. Accordingly, considerations should be focused on aligning the

organisation's strategy and vision with digital maturity aspects to make the topic present throughout organisational spheres. The prerequisite for this change is the recognition of digitisation as a competitive advantage and the willingness to change. Furthermore, achieving agility in structures and culture goes hand in hand with the development of digital skills and capabilities. It is, therefore, crucial to provide skill development options and training on agility plus digital topics across all hierarchy levels to raise awareness, clarify the need and strengthen understanding. This can help to redesign and remodel new processes together with employees to increase acceptance as well. Moreover, the retraining of employees who have largely performed tasks that have been changed by digitisation must be promoted, as well as the identification of new employee profiles. In addition, the establishment of departments, teams, or specific individuals to deal with this, can help to manage the conflict of interest between existing employees who are simultaneously pursuing other goals. Besides, recruiting must also be trained on the topic to take specific skills and attitudes into account when selecting applicants. Digital enablers were also examined as part of the research design. Some of the interviewees and survey participants identified regulations as hindering or promoting increased digital maturity. The different views on this factor illustrate very well the different mentalities and a culture that uses regulations either as a pretext or as a necessity to improve processes.

5.2 Limitations and Potential for Future Research

Some of the limitations regarding the execution of this study are related to the primary data gathered and its analysis. Firstly, the number of interviewees and survey respondents is limited because of the time constraints of the dissertation. Hence, the interviewees gave a small insight into their opinions regarding the industry. Besides, the analysis of the qualitative component is focused on the number of statements per interviewee as an approximation due to the lack of better data. Therefore, the degree of influence cannot be merely scrutinised by the inductive approach. Furthermore, the factor investigation within the survey included four to five factors per category but not any additional questions that further confirm the chosen factors. A simplified approach was chosen since a paid panel was not feasible within the scope of the dissertation. Therefore, a shorter questionnaire was chosen to increase the number of complete and valid responses with a low bounce rate.

Additionally, the usage of Likert scales in regression analyses is under discussion in academia since its expressiveness is questionable within numeric and statistical analyses. Researchers

argue whether it can only be seen as an ordinal or as an interval value as well when transforming the statements into numeric values (Wu & Lieung, 2017, pp.1-6). By increasing the number of points this dilemma can be weathered. Within this dissertation, a 7-point-Likert scale was selected over a 5-point-Likert scale to increase the expressiveness of the gathered data. Nevertheless, for future research in this area, a recommended scale of 11 can lead to more precise data insights (Wu & Lieung, 2017, p.5) and thus a better overview of influencing factors in digital maturity within multivariate analyses. Besides, the degree of agreement represented by Likert scales showcases subjective impressions of employees and not general or objective statements on an organisation. Each impression can be biased due to, for instance, employee satisfaction. Moreover, the questions for the digital maturity assessment have been adapted to the suitability of an employee survey and respective knowledge. Since a strict measurement detached from expert opinions is not yet available for the concept of digital maturity, the chosen approach may cover digital maturity only partially. This is subject to further research and verification. Another approach to verify factors would have been to use the findings of the qualitative primary data in the survey. This would have been less exploratory but more narrowed down and specific.

Analytical limitations aside, the interviews and survey mainly represent the banking sector, followed by insurance, consulting, and private equity. Therefore, it is questionable whether the results of the study can be applied as a point estimate to the population representing the status quo of financial services. This needs to be further investigated and verified by complementary studies in financial services and across respective sub-sectors. Furthermore, the profile of respondents is rather academic, within strategic departments and represents the two youngest generations in the workforce. It would be interesting to see whether a survey amongst employees with another qualification and generation cohort achieves different results. Apart from this, the study was conducted in Germany and may thus be also relevant for other countries such as Austria or Switzerland with close cultural proximity to Germany but not to countries with different cultures and business modalities. Thus, a comparative study across cultures could lead to additional insights across international markets.

On top of that, it would be interesting to compare other industries that lag in digital maturity versus financial services. As discussed in secondary data, healthcare and the public sector are other candidates struggling with their digitisation measures. It is assumed that the reason for that could be the highly regulated nature of these fields. Hence, analysing the differences

between these groups could lead to an additional understanding of common challenges. A study across all industries can further support the identification of drivers for leaders and laggards and their distinguishing characteristics.

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Appendix

Appendix 1 - Expert Interview Guideline in English and German

Topic	#	Question
Intro	**-**	Greetings, explanation of process & expression of thanks
General experience & understanding	**1**	What has been a point of contact in terms of digitisation or even digital maturity in your career? *(Was waren Berührungspunkte in Bezug auf Digitalisierung oder sogar den digitalen Reifegrad in Ihrer Karriere?)*
	2	What is digital maturity for you? *(Was ist der digitale Reifegrad eines Unternehmens für Sie)?* Clarification: Digital maturity is the ability to create and capture value from digitisation efforts on a constant basis *(Hinweis: Digitale Reife ist die Fähigkeit, aus den Digitalisierungsmaßnahmen kontinuierlich Werte zu schaffen und zu nutzen)*
Project-specific	**3**	When you think about one of your projects that were in the digitisation field, what were the key success factors? *(Wenn Sie an eines Ihrer Projekte im Bereich der Digitalisierung denken, was waren die wichtigsten Erfolgsfaktoren?)*
	4	Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view? *(Welche internen Fähigkeiten oder Strukturen würden den Erfolg dieser Projekte, auf die Sie sich gerade bezogen haben, verbessern? Was fehlt aus Ihrer Sicht?)*
	5	What is one or even two things that annoy you the most about your digitisation projects? *(Was sind ein oder sogar zwei Dinge, die Sie bei Digitalisierungsprojekten am meisten stören?)*
View on industry	**6**	Would you consider financial services as digitally mature? Why or why not? *(Würden Sie den Finanzsektor als digital ausgereift betrachten? Warum oder warum nicht?)*
	7	Which company/companies in the sector are leaders from your perspective and why? *(Welche Unternehmen innerhalb des Sektors führen aus Ihrer Sicht?)*
	8	Who is lagging and for which reason? *(Wer ist im Rückstand und aus welchem Grund?)*
	9	What do you think will the industry look like in five to ten years in terms of digital maturity? (*Wie wird die Branche Ihrer Meinung nach in fünf bis zehn Jahren aussehen, in Bezug auf den digitalen Reifegrad?)*
Outro	**-**	Other final remarks or questions from interviewee? Expression of thanks

Appendix 2 - Expert Interview Summaries

Interviewee ID: A | Date: 15.11.2021 | Duration: 40 min | Position: Head of Innovation & Digitisation | Company type: Banking

1. **What has been a point of contact in terms of digitisation or even digital maturity in your career?**
   - *Formal training as an information system officer within banking and after that mainly responsible for digitisation projects*
   - *Always between IT, organisation and business processes or models*
   - *Freelance consultant for banking where I realized that a few processes work in some banks but not in all*
   - *Right now, we are working on a digital maturity measurement model for banks in our group by means of a 'robo wizard' and self-assessment that create respective development roadmaps*
2. **What is digital maturity for you?**
   - *It depends whether you only focus on the technical side or IT side or whether you also consider culture or leadership*
   - *There are different frameworks that are important within the bank to become innovative*
   - *It needs to be considered more broadly with a focus on technology stacks, development processes, API strategy, integration of legacy systems*
   - *Practically, it is not enough, though, since the overall framework must work including culture, leadership, employee skills or job profiles. Thus, the best IT can only work when the overall framework is working*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**
   - *A bank needs to be able to adapt to new technologies to learn, e.g., a few years ago with blockchain, which was considered a big solution, it was firstly required to define the problem; for these things you need 'playgrounds' where specific experts can learn from technologies, test it and get a deeper understanding to consider business opportunities and adaptions*
   - *Be open and ask yourself whether you want to go the path on your own or with external help through consultants, partners, or M&A's since it is normally not just one technology or problem to be considered. Get more knowledge from cooperation's or external sides*
   - *Setting priorities due to limited resources*
   - *Agile developing methods within IT but also within other teams especially in terms of customers or products*
   - *Individual and organisational communication structures to get everyone involved*
   - *Having skilful people on board*
   - *Analysis of overlap between market trends and consumer needs*
4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**
   - *Skills within the workforce, specific skills need to be created within the workforce*
   - *Agile development often works but agile organisations not yet fully. For this, the organisational structures within banks are often a decelerator. Therefore, new structures are required.*
   - *Agile structures and a way to get there with your organisational culture plus aligned with your operational processes. From a regulatory or data security point of view this is not often an easy process within financial institutions*
   - *For us it is also right now not possible since our organisational culture is still very traditional in comparison to a FinTech*
   - *It is a longer way to go for us via numerous projects so that more people get to know agile methods, understand it as well to learn from it naturally but it is still a long way to go*
   - *Sometimes just leaders get involved in these processes, but it is quite difficult to get every employee involved*

- *There is the Intranet for it but the effectiveness of it is questionable: more trainings and workshops are needed for that which we are investing in as well*
- *Also, incorporating employees in our labs to get to better processes is also something where we had good experiences*

5. **What is one or even two things that annoy you the most about your digitisation projects?**
   - *Legacy structures especially in the IT where you often still have old tools with complex roots that make it more challenging to integrate these tools in new ways*
   - *Onboarding of new technologies and testing it since you need to do that in a regulatory framework*
   - *Culture - when me and my time propose new things to the management or other departments that do not have a focus on digitisation it is often too early for them which is quite a pity if you know that something needs to be done but the organisation might be only ready for it in two years*
   - *Often some people use regulations to block some things underlining that their mindset is not yet there or that they do not want to engage in innovation. Hence, I would say that culture is a bigger problem than regulations*
   - *Easier standardisation and making processes less complex*
6. **Would you consider financial services as digitally mature? Why or why not?**
   - *I think banking is doing quite well in digitisation, e.g., when they started with online banking 30 years ago but in comparison to other sectors I would say in the middle*
7. **Which company/companies in the sector are leaders from your perspective and why?**
   - *Apart from that any other capital market is leading since they have connected value chains, they have a platform orientation*
8. **Who is lagging and for which reason?**
   - *Probably insurances even though they are catching up right now with Insurtech etc.*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
   - *More digitisation of processes, automation, standardisation, and more platforms and beyond banking outside of the traditional value chain*

Interviewee ID: B | Date: 15.11.2021 | Duration: 55 min | Position: Head of Innovation & Digitisation | Company type: Banking

1. **What have been point of contacts in terms of digitisation or even digital maturity in your career?**
   - *16 years in digitisation, process optimization and innovation starting from online banking*
2. **What is digital maturity for you?**
   - *Processes that can be reflected via digital media*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**
   - *Opportunities to save costs, e.g., postage and paper; cost pressure was most effective*
   - *Transparent and easy or intuitive processes*
   - *Having a structure within the company that considers all employees in the process and having people that are only responsible for innovation*
   - *Internal initiatives to push innovation or digitisation*
   - *Digitisation as personal goals of leaders aside from sales figures*
   - *Working with externals, FinTech's etc.*
   - *Customer churn could be a factor, but it was never really the case due to scandals or data security issues. Nevertheless, there are less customers that come into the branch*
   - *Clearly identifiable added value for the employee or the customer; openness of employees*
   - *Engagement of employees and customers in the innovation process*
   - *Technical or regulatory changes and requirements*
   - *Leaders that focus on innovation and new ideas*

- *In-person workshops and trainings since everyone has and will take the time to learn; innovation labs & events where employees could directly do something*
- *Analysis of overlap between market trends and consumer needs*

4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**
   - *Only works when everyone is behind it, and it is pushed from top-down, often the management knows that there is digitisation and that something should be done for some customers that might want to have it, but it is not an internal priority or an internal mission*
   - *Digitisation was/is seen as a competitor to the traditional and already successful business*
   - *If customer do not come into the bank, I cannot really sell something, power struggles with organisation and branches*
   - *Processes that support new initiatives, creativeness, and new ideas amongst employees*
5. **What is one or even two things that annoy you the most about your digitisation projects?**
   - *Inertia, laziness, and habits; downplaying or understating digitisation within banking*
   - *Opportunities are not seen*
   - *Hierarchical and political environment; bureaucracy and regulations*
   - *Digitisation only if it's for free but it is not desired to invest in it*
   - *It is not seen by everyone that a market presence needs to be created for a segment that cannot be otherwise targeted*
   - *It is often rather a reaction than a proactive process, reactive mindset*
   - *Culture did not transform parallelly to technical opportunities, missing motivation*
   - *Better tools for project management that are integrated with all our other tools*
6. **Would you consider financial services as digitally mature? Why or why not?**
   - *Since many things can be standardised, it supports the process*
7. **Which company/companies in the sector are leaders from your perspective and why?**
   - *Smaller companies can work in more agile manners and have better structures that enable change*
8. **Who is lagging and for which reason?**
   - *Due to regulations*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
   - *It will be still a challenge to integrate all legal regulations within effective operational processes*
   - *Due to low interest rates, more costs need to be cut, digitisation could be a way for that*
   - *Winning back lost customers*

Interviewee ID: C | Date: 16.11.2021 | Duration: 40 min | Position: Head of Projects & Processes | Company type: Banking

1. **What have been point of contacts in terms of digitisation or even digital maturity in your career?**
   - *Projects in digitisation and automation, mostly for processes*
   - *Goal to implement digitisation within the business and not only within separate projects*
2. **What is digital maturity for you?**
   - *View from a customer point of view on the company*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**
   - *IT resources*
   - *Managing less topics/activities but at the same time very well*
   - *Having the customer always in the centre of the processes*
   - *Standardisation, unification, and simplification of processes before starting the project; processes more important in the first step than digitisation*
   - *The bigger picture (employees, end-to-end processes, customer) must be considered and not only technical solutions or trends*
   - *Aligned communication and conviction regarding digitisation*

- *Including employees in the process and ideation phase, if possible (skills/creativeness, time, resources) – it leads to a higher acceptance but not necessarily to a better solution or improvement*
- *Analysis of overlap between market trends and consumer needs*

4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**
   - *Processes or tools that help to investigate what the customer wants or whether digitised solutions are desired and to which extent, e.g., in terms of video consultations*
   - *Detailed assessment of the evolution or transformation of customers to exclude projects or new products that are believed to be desired, but are eventually not accepted*
   - *More customer tests, studies, and iterations*
   - *Ideally, leaders drive change and promote it within their team but often many people are not that open for change, especially if they have a long company affiliation*
5. **What is one or even two things that annoy you the most about your digitisation projects?**
   - *Too many different opinions within the workforce leading to employees striving for their own personal goals that may not be in the line with the digitisation goals*
   - *Fear of employees that their vacancy will no longer be needed; even though this is not always a reason to be afraid*
   - *Technical solutions that are ready but whilst testing we noticed that it is not completely adapted by customers, e.g., regarding chatbots*
6. **Would you consider financial services as digitally mature? Why or why not?**
   - *Banking is 'on its way', financial services is overall in the midfield*
   - *Insurance is probably a bit behind banking*
7. **Which company/companies in the sector are leaders from your perspective and why?**
   - *Difficult to answer since everyone has individual strengths, e.g., N26 is often considered as a digital leader with great usability but then they lack expertise in terms of services or risk management, here traditional banks are much better*
8. **Who is lagging and for which reason?**
   - *Overall financial services in comparison to others, e.g., logistics*
   - *Different cultures, mindsets, and attitudes*
   - *Mindset and attitude that the 'old structures' that led to our success should not be neglected*
   - *Margins and cost pressure is another reason*
   - *Regulations within financial services and the lack of looking for digital solutions for it*
   - *Regulations are often used as an excuse to 'ignore' digitisation*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
   - *I think the pace of digitisation will continue (taking two steps but going one back)*
   - *Corona was a good driver of awareness and an enabler for new solutions*

Interviewee ID: D | Date: 17.11.2021 | Duration: 35 min | Position: Manager | Company type: Big four consulting

1. **What have been point of contacts in terms of digitisation or even digital maturity in your career?**
   - *Digitisation projects for alternatives (asset management, hedge funds, private equity etc.) focused on regulations and performance/process improvement*
   - *Focus on data management and respective gap analyses*
2. **What is digital maturity for you?**
   - *Processes are automized and no longer done manually, human error minimization, back-office focus*
   - *CMMI which describes the maturity of software development*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**

- *Driven by regulatory aspects, easier to get extracts/reports for auditors*
- *Clean data*
- *Clear benefits for all stakeholders and respective communication*
- *Company strategy, vision, and entrepreneurial mindset*
- *Good project leader/sponsors on the customer-side that support the project*
- *Cost/margin pressure*

4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**
   - *Recurring and standardised processes*
   - *Thinking about the whole company and not only in silos*
   - *Buy in/acceptance of employees is the most important thing, testing/demos with employees*
5. **What is one or even two things that annoy you the most about your digitisation projects?**
   - *Not enough resources are another bottleneck, especially in terms of costs and IT resources*
6. **Would you consider financial services as digitally mature? Why or why not?**
   - *Overall, rather unsatisfying in financial services*
7. **Which company/companies in the sector are leaders from your perspective and why?**
   - *In alternatives it highly depends on resources and capital for which the biggest players are leaders, and the smaller ones are laggards*
   - *Mindset and culture are very open and happy to get digitised/automated processes since they see the value and know it will be less recurring work for them*
8. **Who is lagging and for which reason?**
   - *In banking or insurance, the mindset is still more closed than in private equity due to strategy and the overall entrepreneurial spirit; and the structures or processes are much older; they rather work in silos*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
   - *Employees will be differently used; more skilled and more complex*
   - *Back office/admin completely automized*

Interviewee ID: E | Date: 22.11.2021 | Duration: 55 min | Position: Manager | Company type: Management consulting

1. **What have been point of contacts in terms of digitisation or even digital maturity in your career?**
   - *Apart from strategy consulting mostly digitisation interfaces regarding automation or robotics; software implementation*
2. **What is digital maturity for you?**
   - *Strategic roadmap coped with processual optimization*
   - *Needs to make sense/deliver value either internally or externally for the customer*
   - *Rather essential nowadays to consider digitisation throughout all spheres, so not only from a customer point of view but also internally and throughout the back office*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**
   - *Optimized and simplified processes and ideally structures as well in the company*
   - *Tech/digital strategy with focus on innovation for the entire organisation*
   - *Clear target definition for each initiative coped with KPI's to measure the degree of digitisation within a firm; agile approached even though if agile is not fully implemented within the firm, it is important to start thinking like that and to gradually adapt to it*
   - *IT resources/capacities; good cooperation between IT and operations/business-side*
   - *Resource allocation and priority on digitisation*
   - *Employees need to be motivated from management side and correctly informed to take away any kind of fear, respective change management & communication*
   - *Considering affected stakeholders as participants of the initiative*

- *Management must fully support digitisation initiatives, e.g., always great to have a chief digital officer, CIO etc.; creates presence, importance, and another communication level*
- *Regulations can promote digitisation since more efficient processes improve compliance as well*
- *Cooperation with start ups*

4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**
   - *Mindset shift from costs to lifetime value; create understanding for the purpose and importance of digitisation*
   - *Different, contradictory, or short-time target settings; long-term is better for digitisation*
   - *Initiatives must be steered from a KPI perspective*
   - *Old IT/host systems that are less flexible*
5. **What is one or even two things that annoy you the most about your digitisation projects?**
   - *Some topics are half-heartedly approached since the status quo and things from the past still work and still create value/income; drive is missed*
   - *Again, technical resources which always leads to delays unfortunately*
   - *System administrations that are old-fashioned and complex*
6. **Would you consider financial services as digitally mature? Why or why not?**
   - *Still a lot to do but it is still more done than externally perceived*
   - *Evolutionary process that strived for self-optimization; rather reactive than proactive*
   - *More pressure from disruptors is needed*
7. **Which company/companies in the sector are leaders from your perspective and why?**
   - *Disruptors in banking are N26, Solaris or Revolut and this is something that is missing in insurance; there are companies like OttoNova that try the same but overall, the disruption in that segment is less present*
   - *TradeRepublic is highly automized and digitised internally*
8. **Who is lagging and for which reason?**
   - *Insurance is behind banking*
   - *Many start-ups have the vision, skills, strategy, and products but they lack in scaling and thus capital; hence back-office processes are often still manually performed*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
   - *Work profiles will change, less standardised processing and more skilled work required*
   - *More predictive analytics with AI but not within the core business; hybrid business model*

Interviewee ID: F | Date: 26.11.2021 | Duration: 45 min | Position: Head of Projects & Young Consumer Markets | Company type: Inhouse consulting

1. **What have been point of contacts in terms of digitisation or even digital maturity in your career?**
   - *Digitisation projects for young consumer markets*
   - *Trend analysis, app development and innovation*
   - *Change projects for employees regarding digitisation*
2. **What is digital maturity for you?**
   - *Multidimensional perspective, including employee and customer processes, agility, or communication channels*
   - *Digitisation with a goal and value creation possibilities*
   - *Expectation management between customers and organisational abilities or targets*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**
   - *Integration of employees from the beginning on*
   - *The whole team must support the project*
   - *Useful employment of employee skills*
   - *Analysis of overlap between market trends and consumer needs*

- *Agility and speed when making decisions*

4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**
    - *Open mindset of management, willingness to change especially when they are already a bit older*
    - *Younger people in management who are not close to their pension*
    - *100% support of management and willingness to take risks and start up mentality*
    - *Identification as a tech/digital company, it is not enough to only have digital products*
    - *Young people in the workforce that stimulate new products, processes, and a respective mindset*
    - *Better employer branding and image needed regarding dress codes, drive, home office and overall flexibility in the job*
    - *Bundling of resources within traditional players*
5. **What is one or even two things that annoy you the most about your digitisation projects?**
    - *Regulations and data security controlling*
    - *People who are not willing to change or have a fear related to digitisation*
    - *Future-oriented mindset with focus on innovation*
6. **Would you consider financial services as digitally mature? Why or why not?**
    - *'In the middle', effort is there but it could be more passionately*
7. **Which company/companies in the sector are leaders from your perspective and why?**
    - *N26, Klarna, Revolut, Ottonova, Solaris etc. with superior digital processes and interfaces*
8. **Who is lagging and for which reason?**
    - *The young and hip companies have a better mindset and digital capabilities; less capital and thus bigger need to evolve and develop*
    - *The old and traditional ones have thought out and 'waterproof' processes especially regarding risks, security, phishing, and central services; more capital/revenue and thus less incentives to improve*
    - *Both are leading and lagging in different areas*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
    - *Completely 'touchless'*
    - *Transformation of employee profiles*

Interviewee ID: G | Date: 26.11.2021 | Duration: 45 min | Position: Head of Strategy & Operations | Company type: FinTech

1. **What have been point of contacts in terms of digitisation or even digital maturity in your career?**
    - *Consulting for banking & IT*
    - *Interface for data, finance & strategy in a FinTech*
2. **What is digital maturity for you?**
    - *Short time-to-market from idea to realization*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**
    - *First product development and then process development and not the other way around*
    - *Focus on the customer experience*
    - *As said, short time-to-market from idea to realization*
    - *Mindset of people*
    - *Run the company vs. change the company, parallel innovation/transformation*
    - *Brining everyone together from strategy, finance, and compliance for product development to exclude a mentality of 'this is not possible'*
    - *Entrepreneurial mindset*
4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**

- *IT is not just an enabler but also a strategic added value, this must be lived/identified*
- *Strategy departments that have employees with an IT/digital background*
- *Understanding that digitisation/IT is not a hurdle but needed to be successful*

5. **What is one or even two things that annoy you the most about your digitisation projects?**
   - *IT resources*
6. **Would you consider financial services as digitally mature? Why or why not?**
   - *Core systems and structures are rather old school*
   - *In Germany it is lagging in comparison to other markets in Asia or the US*
7. **Which company/companies in the sector are leaders from your perspective and why?**
   - *FinTech's do not have the traditional mainframe/core and are thus more flexible*
   - *FinTech's can adapt quickly even when problems occur within processes or other organisational weaknesses since processes are digital; more opportunities to develop effectively within a short period of time*
8. **Who is lagging and for which reason?**
   - *Open mindset and believe*
   - *Forward thinking mindset*
   - *Seeing IT as a priority*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
   - *Customer behaviour will become even more prone to flexible digital solutions in real time or on demand*
   - *F2F will still be relevant within specific sub-sectors, e.g., investment banking or private equity*

Interviewee ID: H | Date: 26.11.2021 | Duration: 30 min | Position: Managing Director | Company type: Management consulting

1. **What have been point of contacts in terms of digitisation or even digital maturity in your career?**
   - *Educational background*
   - *Software development background*
   - *Various digitisation projects for multiple customers within management consulting*
2. **What is digital maturity for you?**
   - *Percentage of digitised processes within a company; precondition is that you have optimized processes*
3. **When you think about one of your projects that were in the digitisation field, what were the key success factors?**
   - *Business and process modelling that lead to respective plans*
   - *Agile project mindset and not waterfall; in waterfall the result was often very different*
   - *Cooperation with departments since they have another view on processes and their bottlenecks or flaws*
4. **Which internal capabilities or structures would improve the success of these projects that you just considered? What is missing from your point of view?**
   - *Transformational dilemma, people from the department that support the project are at the same time involved in their daily business, clash of interests*
   - *Should be someone who has not the biggest responsibility within the department and rather more people to share the project work, allocation of personnel*
   - *Working towards a learning from mistakes culture and constant development/optimization*
5. **What is one or even two things that annoy you the most about your digitisation projects?**
   - *The more you know about a process, the more problems you can identify and the more you only think about problems but not solutions; that's often the difference between the consultant and someone is already doing the job for a long time*
   - *Anyways, then they often have a negative mindset and try to argue why something cannot be improved or done in a different way, they do not see the 'chance'*

- *When working on a digitisation project, the project management itself could be more digital, e.g., that already starts with notes on a notebook, sometimes the technologies for these little things exist and are available but they are not used*

6. **Would you consider financial services as digitally mature? Why or why not?**
   - *No, quite an old industry with historical structures, complex regulations, and systems*
   - *They all have some digitisation efforts in some areas, but they do not consider the whole business or digitisation in a holistic way*
7. **Which company/companies in the sector are leaders from your perspective and why?**
   - *Solaris bank would be a clear leader for me, Solaris and N26 are both tech companies with a banking license and not just a traditional bank like many other that have some digitisation effort just because it is a trend or something that should be done somehow*
   - *Nevertheless, the 'tech companies' in the sector grow rapidly and work in agile ways but due to the lack of resources and structures a few things are not entirely thought through*
   - *And in traditional banks the processes work, slow and manually, but they work*
8. **Who is lagging and for which reason?**
   - *Same in insurance or other similar areas; questionable who has an advantage and whether digital maturity is more important than maturity in a company?*
   - *After each iteration the process or product will become better, but it most probably is perfect from the beginning on*
   - *So overall, both sides can learn something from the other*
9. **What do you think will the industry look like in 5 to 10 years in terms of digital maturity?**
   - *Digital products/companies have a higher PR presence right now that will force more traditional companies to innovate and reconsider their current business*
   - *Physical branches won't be completely gone; people must be trained into another direction; F2F will still be needed especially for wealth management or funding and young customer that left might come back at a later point in time*

Appendix 3 - Expert Interview Codebook and Summaries from MAXQDA

Code	Coded Segment	
Drivers\ KPIs measurement	- *KPI's to measure the degree of digitisation within a firm*	*Interviewee E: 10 - 10*
	- *Initiatives must be steered from a KPI perspective*	*Interviewee E: 21 - 21*
Drivers\ Leadership engagement	- *Employees need to be motivated from management side and correctly informed to take away any kind of fear,*	*Interviewee E: 15 - 15*
	- *Management must fully support digitisation initiatives, e.g., always great to have a chief digital officer, CIO etc.; creates presence, importance, and another communication level*	*Interviewee E: 15 - 15*
	- *willingness to change especially when they are already a bit older*	*Interviewee F: 16 - 16*
	- *Younger people in management who are not close to their pension*	*Interviewee F: 17 - 17*
Drivers\IT & business cooperation	- *good cooperation between IT and operations/business-side*	*Interviewee E: 11 - 11*
	- *Cooperation with departments since they have another view on processes and their bottlenecks or flaws*	*Interviewee H: 10 - 10*

Drivers\Data excellence	-	*Clean data*	*Interviewee D: 9 - 9*
Drivers\ Regulations	-	*Driven by regulatory aspects, easier to get extracts/reports for auditors*	*Interviewee D: 8 - 8*
	-	*Regulations can promote digitisation since more efficient processes improve compliance as well*	*Interviewee E: 16 - 16*
Drivers\ Holistic orientation	-	*Goal to implement digitisation within the business and not only within separate projects*	*Interviewee C: 3 - 3*
	-	*The bigger picture (employees, end-to-end processes, customer) must be considered and not only technical solutions or trends*	*Interviewee C: 11 - 11*
	-	*Company strategy, vision,*	*Interviewee D: 11 - 11*
	-	*Thinking about the whole company and not only in silos*	*Interviewee D: 16 - 16*
	-	*Tech/digital strategy with focus on innovation for the entire organisation*	*Interviewee E: 9 - 9*
	-	*Bundling of resources within traditional players*	*Interviewee F: 22 - 22*
	-	*They all have some digitisation efforts in some areas, but they do not consider the whole business or digitisation in a holistic way*	*Interviewee H: 21 - 21*
Drivers\ Customer churn	-	*Customer churn could be a factor,*	*Interviewee B: 12 - 12*
	-	*Winning back lost customers*	*Interviewee B: 42 – 42*
Drivers\Clear added value	-	*Clearly identifiable added value for the employee or the customer*	*Interviewee B: 13 - 13*
	-	*Having the customer always in the centre of the processes*	*Interviewee C: 9 - 9)*
	-	*Clear benefits for all stakeholders*	*Interviewee D: 10 - 10*
	-	*Needs to make sense/deliver value either internally or externally for the customer*	*Interviewee E: 5 - 5*
	-	*Focus on the customer experience*	*Interviewee G: 8 - 8*
Drivers\ Digital goals for leaders	-	*Digitisation as personal goals of leaders aside from sales figures*	*Interviewee B: 10 - 10*
	-	*Leaders that focus on innovation and new ideas*	*Interviewee B: 16 – 16*
	-	*Ideally, leaders drive change and promote it within their team*	*Interviewee C: 19 - 19*
	-	*Good project leader/sponsors on the customer-side that support the project*	*Interviewee D: 12 – 12*
	-	*Clear target definition for each initiative*	*Interviewee E: 10 - 10*
	-	*Employees need to be motivated from management side and correctly informed to take away any kind of fear,*	*Interviewee E: 13 - 13*
			Interviewee E: 20 – 20

	- *Different, contradictory, or short-time target settings; long-term is better for digitisation*	
Drivers\ Digital initiatives	- *Internal initiatives to push innovation or digitisation*	*Interviewee B: 9 - 9*
	- *Leaders that focus on innovation and new ideas*	*Interviewee B: 16 - 16*
	- *events where employees could directly do something*	*Interviewee B: 17 - 17*
	- *Processes that support new initiatives, creativeness, and new ideas amongst employees*	*Interviewee B: 23 - 23*
	- *entrepreneurial mindset*	*Interviewee D: 11 - 11*
	- *Initiatives must be steered from a KPI perspective*	*Interviewee E: 21 - 21*
Drivers\ Transparent & simple processes	- *Transparent and easy or intuitive processes*	*Interviewee B: 7 - 7*
	- *simplification of processes before starting; processes more important in the first step than digitisation*	*Interviewee C: 10 - 10*
	- *precondition is that you have optimized processes*	*Interviewee H: 6 - 6*
Drivers\ Cost/margin pressure	- *Opportunities to save costs, e.g., postage and paper; cost pressure was most effective*	*Interviewee B: 6 - 6*
	- *Due to low interest rates, more costs need to be cut*	*Interviewee B: 41 - 41*
	- *Margins and cost pressure is another reason*	*Interviewee C: 33 - 33*
	- *Cost/margin pressure*	*Interviewee D: 13 - 13*
Drivers\ Standardisation	- *Easier standardisation and making processes less complex*	*Interviewee A: 33 - 33*
	- *standardisation,*	*Interviewee A: 41 - 41*
	- *Since many things can be standardised, it supports the process*	*Interviewee B: 34 - 34*
	- *Managing less topics/activities but at the same time very well*	*Interviewee C: 8 - 8*
	- *Standardisation, unification*	*Interviewee C: 10 - 10*
	- *Recurring and standardised processes*	*Interviewee D: 15 - 15*
	- *Optimized and simplified processes and ideally structures as well in the company*	*Interviewee E: 8 - 8*
Drivers\F2F digital trainings	- *more trainings and workshops are needed for that which we are investing in as well*	*Interviewee A: 26 - 26*
	- *In-person workshops and trainings since everyone has and will take the time to learn*	*Interviewee B: 17 - 17*
Drivers\ Trends vs. consumer needs analysis	- *Analysis of overlap between market trends and consumer needs*	*Interviewee A: 18 - 18*
	- *Analysis of overlap between market trends and consumer needs*	*Interviewee B: 18 - 18*

	- *Analysis of overlap between market trends and consumer needs* - *Analysis of overlap between market trends and consumer needs*	*Interviewee C: 14 - 14* *Interviewee F: 13 - 13*
Drivers\ Digitally skilled employees	- *Having skilful people on board* - *Skills within the workforce, specific skills need to be created within the workforce* - *Useful employment of employee skills*	*Interviewee A: 17 - 17* *Interviewee A: 20 - 20* *Interviewee F: 12 - 12*
Drivers\ Organisational communication	- *Individual and organisational communication structures to get everyone involved* - *Aligned communication and conviction regarding digitisation* - *respective communication* - *respective change management & communication*	*Interviewee A: 16 - 16* *Interviewee C: 12 - 12* *Interviewee D: 10 - 10* *Interviewee E: 13 - 13*
Drivers\Priority setting	- *Setting priorities due to limited resources* - *If customer do not come into the bank, I cannot really sell something, power struggles with organisation and branches* - *conviction regarding digitisation* - *Ideally, leaders drive change and promote it within their team* - *Resource allocation and priority on digitisation* - *The whole team must support the project* - *tech companies with a banking license and not just a traditional bank like many other that have some digitisation effort just because it is a trend or something that should be done somehow*	*Interviewee A: 14 - 14* *Interviewee B: 22 - 22* *Interviewee C: 12 - 12* *Interviewee C: 19 - 19* *Interviewee E: 12 - 12* *Interviewee F: 11 - 11* *Interviewee H: 23 - 23*
Drivers\External cooperation's (M&A, consultants, ...)	- *consultants, partners, or M&A's since it is normally not just one technology or problem to be considered. Get more knowledge from cooperation's or external sides* - *Working with externals, FinTech's etc* - *Cooperation with start ups*	*Interviewee A: 13 - 13* *Interviewee B: 11 - 11* *Interviewee E: 17 - 17*
Drivers\ Openness	- *Be open* - *openness of employees* - *Open mindset of management,*	*Interviewee A: 13 - 13* *Interviewee B: 13 - 13* *Interviewee F: 16 - 16*
Drivers\ Innovation/ digitisation teams	- *it was firstly required to define the problem; for these things you need 'playgrounds' where specific experts can learn from technologies, test it and get a deeper*	*Interviewee A: 12 - 12*

	understanding to consider business opportunities and adaptions	*Interviewee B: 8 - 8*
	- *having people that are only responsible for innovation*	*Interviewee B: 17 - 17*
	- *innovation labs*	
	- *Processes or tools that help to investigate what the customer wants or whether digitised solutions are desired and to which extent, e.g., in terms of video consultations*	*Interviewee C: 16 - 16*
	- *Detailed assessment of the evolution or transformation of customers to exclude projects or new products that are believed to be desired, but are eventually not accepted*	*Interviewee C: 17 - 17*
	- *More customer tests, studies, and iterations*	*Interviewee C: 18 - 18*
	- *Technical solutions that are ready but whilst testing we noticed that it is not completely adapted by customers, e.g., regarding chatbots*	*Interviewee C: 23 - 23*
	- *First product development and then process development and not the other way around*	*Interviewee G: 7 - 7*
	- *Strategy departments that have employees with an IT/digital background*	*Interviewee G: 16 - 16*
	- *Business and process modelling that lead to respective plans*	*Interviewee H: 8 - 8*
	- *The more you know about a process, the more problems you can identify and the more you only think about problems but not solutions; that's often the difference between the consultant and someone is already doing the job for a long time*	*Interviewee H: 16 - 16*
	- *After each iteration the process or product will become better,*	*Interviewee H: 28 - 28*
Drivers\Agility	- *needs to be able to adapt to new technologies to learn*	*Interviewee A: 12 - 12*
	- *Agile developing methods within IT but also within other teams especially in terms of customers or products*	*Interviewee A: 15 - 15*
	- *Agile development often works but agile organisations not yet fully.*	*Interviewee A: 21 - 21*
	- *It is a longer way to go for us via numerous projects so that more people get to know agile methods, understand it as well to learn from it naturally but it is still a long way to go*	*Interviewee A: 24 - 24*
	- *agile approached even though if agile is not fully implemented within the firm, it is important to start thinking like that and to gradually adapt to it*	*Interviewee E: 10 - 10*
	- *Agility and speed when making decisions*	*Interviewee F: 14 - 14*
		Interviewee H: 9 - 9

	- *Agile project mindset and not waterfall; in waterfall the result was often very different*	
Barriers\ Employer branding	- *Better employer branding and image needed regarding dress codes, drive, home office and overall flexibility in the job*	*Interviewee F: 21 - 21*
Barriers\IT Resources	- *IT resources*	*Interviewee C: 7 - 7*
	- *Not enough resources are another bottleneck, especially in terms of costs and IT resources*	*Interviewee D: 19 - 19*
	- *IT resources/capacities*	*Interviewee E: 11 - 11*
	- *Again, technical resources which always leads to delays unfortunately*	*Interviewee E: 25 - 25*
	- *IT resources*	*Interviewee G: 19 - 19*
Barriers\ Reactive not proactive	- *It is often rather a reaction than a proactive process, reactive mindset*	*Interviewee B: 30 - 30*
	- *Evolutionary process that strived for self-optimization; rather reactive than proactive*	*Interviewee E: 29 - 29*
	- *constant development/optimization*	*Interviewee H: 14 - 14*
Barriers\Digital priority	- *downplaying or understating digitisation within banking*	*Interviewee B: 25 - 25*
	- *Digitisation only if it's for free but it is not desired to invest in it*	*Interviewee B: 28 - 28*
	- *It is not seen by everyone that a market presence needs to be created for a segment that cannot be otherwise targeted*	*Interviewee B: 29 - 29*
	- *Too many different opinions within the workforce leading to employees striving for their own personal goals that may not be in the line with the digitisation goals*	*Interviewee C: 21 - 21*
	- *Mindset shift from costs to lifetime value*	*Interviewee E: 19 - 19*
	- *focus on innovation*	*Interviewee F: 26 - 26*
	- *IT is not just an enabler but also a strategic added value, this must be lived/identified*	*Interviewee G: 15 - 15*
	- *Seeing IT as a priority*	*Interviewee G: 29 - 29*
	- *clash of interests*	*Interviewee H: 12 - 12*
Barriers\ Digitisation = competitor to successful business	- *Digitisation was/is seen as a competitor to the traditional and already successful business*	*Interviewee B: 21 - 21*
	- *downplaying or understating digitisation within banking*	*Interviewee B: 25 - 25*

	- *Fear of employees that their vacancy will no longer be needed; even though this is not always a reason to be afraid*	*Interviewee C: 22 - 22*
	- *create understanding for the purpose and importance of digitisation*	*Interviewee E: 19 - 19*
	- *Some topics are half-heartedly approached since the status quo and things from the past still work and still create value/income; drive is missed*	*Interviewee E: 24 - 24*
	- *Identification as a tech/digital company, it is not enough to only have digital products*	*Interviewee F: 19 - 19*
	- *Run the company vs. change the company, parallel innovation/transformation*	*Interviewee G: 11 - 11*
	- *Understanding that digitisation/IT is not a hurdle but needed to be successful*	*Interviewee G: 17 - 17*
	- *Transformational dilemma, people from the department that support the project are at the same time involved in their daily business*	*Interviewee H: 12 - 12*
Barriers\ Complex processes	- *operational processes*	*Interviewee A: 22 - 22*
	- *making processes less complex*	*Interviewee A: 33 - 33*
	- *effective operational processes*	*Interviewee B: 40 - 40*
Barriers\ Managerial readiness	- *Culture - when me and my time propose new things to the management or other departments that do not have a focus on digitisation it is often too early for them which is quite a pity if you know that something needs to be done but the organisation might be only ready for it in two years*	*Interviewee A: 31 - 31*
	- *and it is pushed from top-down, often the management knows that there is digitisation and that something should be done for some customers that might want to have it, but it is not an internal priority or an internal mission*	*Interviewee B: 20 - 20*
	- *Opportunities are not seen*	*Interviewee B: 26 - 26*
	- *100% support of management and willingness to take risks and start up mentality*	*Interviewee F: 18 - 18*
Barriers\ Outdated IT structures	- *Legacy structures especially in the IT where you often still have old tools with complex roots that make it more challenging to integrate these tools in new ways*	*Interviewee A: 29 - 29*
	- *Better tools for project management that are integrated with all our other tools*	*Interviewee B: 32 - 32*
	- *Old IT/host systems that are less flexible*	*Interviewee E: 22 - 22*

	- *System administrations that are old-fashioned and complex*	*Interviewee E: 26 - 26*
	- *Core systems and structures are rather old school*	*Interviewee G: 21 - 21*
Barriers\ Employee involvement / co-innovation	- *Sometimes just leaders get involved in these processes, but it is quite difficult to get every employee involved*	*Interviewee A: 25 - 25*
	- *Also, incorporating employees in our labs to get to better processes is also something where we had good experiences*	*Interviewee A: 27 – 27*
	- *Having a structure within the company that considers all employees in the process*	*Interviewee B: 8 - 8*
	- *Engagement of employees and customers in the innovation process*	*Interviewee B: 14 - 14*
	- *Including employees in the process and ideation phase, if possible (skills/creativeness, time, resources)*	*Interviewee C: 13 - 13*
	- *testing/demos with employees*	*Interviewee D: 17 - 17*
	- *Considering affected stakeholders as participants of the initiative*	*Interviewee E: 14 - 14*
	- *Integration of employees from the beginning on*	*Interviewee F: 10 - 10*
	- *Bringing everyone together from strategy, finance, and compliance for product development*	*Interviewee G: 12 - 12*
	- *Should be someone who has not the biggest responsibility within the department and rather more people to share the project work, allocation of personnel*	*Interviewee H: 13 - 13*
Barriers\Data security compliance	- *data security*	*Interviewee A: 22 - 22*
	- *due to scandals or data security issues.*	*Interviewee B: 12 - 12*
	- *data security controlling*	*Interviewee F: 24 - 24*
Barriers\ Regulations	- *regulatory*	*Interviewee A: 22 - 22*
	- *Onboarding of new technologies and testing it since you need to do that in a regulatory framework*	*Interviewee A: 30 - 30*
	- *Technical or regulatory changes and requirements*	*Interviewee B: 15 - 15*
	- *bureaucracy and regulations*	*Interviewee B: 27 - 27*
	- *Due to regulations*	*Interviewee B: 38 - 38*
	- *to integrate all legal regulations*	*Interviewee B: 40 - 40*
	- *Regulations within financial services and the lack of looking for digital solutions for it*	*Interviewee C: 34 - 34*
	- *Regulations*	*Interviewee F: 24 - 24*
	- *In Germany it is lagging in comparison to other markets in Asia or the US*	*Interviewee G: 22 - 22*

	-	*complex regulations, and systems*	*Interviewee H: 20 - 20*
Barriers\ Organisational culture & mindset	-	*organisational culture*	*Interviewee A: 22 - 22*
	-	*our organisational culture is still very traditional in comparison to a FinTech*	*Interviewee A: 23 - 23*
	-	*Often some people use regulations to block some things underlining that their mindset is not yet there or that they do not want to engage in innovation. Hence, I would say that culture is a bigger problem than regulations*	*Interviewee A: 32 - 32*
	-	*Only works when everyone is behind it*	*Interviewee B: 20 - 20*
	-	*Inertia, laziness, and habits*	*Interviewee B: 25 - 25*
	-	*reactive mindset*	*Interviewee B: 30 - 30*
	-	*Culture did not transform parallelly to technical opportunities*	*Interviewee B: 31 - 31*
	-	*missing motivation*	*Interviewee B: 31 - 31*
	-	*many people are not that open for change, especially if they have a long company affiliation*	*Interviewee C: 19 - 19*
	-	*Mindset and attitude that the 'old structures' that led to our success should not be neglected*	*Interviewee C: 32 - 32*
	-	*Buy in/acceptance of employees is the most important thing*	*Interviewee D: 17 - 17*
	-	*In banking or insurance, the mindset is still more closed than in private equity due to strategy and the overall entrepreneurial spirit.*	*Interviewee D: 26 - 26*
	-	*100% support of management and willingness to take risks and start up mentality*	*Interviewee F: 18 - 18*
	-	*Young people in the workforce that stimulate new products, processes, and a respective mindset*	*Interviewee F: 20 - 20*
	-	*People who are not willing to change or have a fear related to digitisation*	*Interviewee F: 25 - 25*
	-	*Future-oriented mindset with focus on innovation*	*Interviewee F: 26 - 26*
	-	*effort is there but it could be more passionately*	*Interviewee F: 28 - 28*
	-	*Mindset of people*	*Interviewee G: 10 - 10*
	-	*exclude a mentality of 'this is not possible'*	*Interviewee G: 12 - 12*
	-	*Entrepreneurial mindset*	*Interviewee G: 13 - 13*
	-	*Open mindset and believe*	*Interviewee G: 27 - 27*
	-	*Forward thinking mindset*	*Interviewee G: 28 – 28*
	-	*Working towards a learning from mistakes culture*	*Interviewee H: 14 - 14*

Barriers\ Organisational agility	-	*Agile development often works but agile organisations not yet fully.*	*Interviewee A: 21 - 21*
	-	*Agile structures and a way to get there with your organisational culture plus aligned with your operational processes.*	*Interviewee A: 22 - 22*
	-	*It is a longer way to go for us via numerous projects so that more people get to know agile methods, understand it as well to learn from it naturally but it is still a long way to go*	*Interviewee A: 24 - 24*
Barriers\Organisational structures	-	*organisational structures within banks are often a decelerator.*	*Interviewee A: 21 - 21*
	-	*Hierarchical and political environment*	*Interviewee B: 27 - 27*
	-	*structures as well in the company*	*Interviewee E: 8 - 8*
	-	*FinTech's do not have the traditional mainframe/core and are thus more flexible*	*Interviewee G: 24 - 24*
	-	*When working on a digitisation project, the project management itself could be more digital*	*Interviewee H: 18 - 18*
	-	*complex regulations, and systems*	*Interviewee H: 20 - 20*
Differentiating factors\New employee profiles	-	*Employees will be differently used; more skilled and more complex*	*Interviewee D: 28 - 28*
	-	*Work profiles will change, less standardised processing and more skilled work required*	*Interviewee E: 38 - 38*
	-	*Transformation of employee profiles*	*Interviewee F: 37 - 37*
	-	*people must be trained into another direction*	*Interviewee H: 32 - 32*
Differentiating factors\Short time-to-market	-	*As said, short time-to-market from idea to realization*	*Interviewee G: 9 - 9*
	-	*more opportunities to develop effectively within a short period of time*	*Interviewee G: 25 - 25*
Differentiating factors\Digital processes	-	*superior digital processes and interfaces*	*Interviewee F: 30 - 30*
Differentiating factors\Automation	-	*More digitisation of processes, automation*	*Interviewee A: 41 - 41*
	-	*Back office/admin completely automized*	*Interviewee D: 29 - 29*
	-	*highly automized and digitised internally*	*Interviewee E: 33 - 33 (*
	-	*hence back-office processes are often still manually performed*	*Interviewee E: 36 - 36*
	-	*Completely 'touchless'*	*Interviewee F: 36 - 36*
Differentiating	-	*More pressure from disruptors is needed*	*Interviewee E: 30 - 30*

factors\Disruptive pressure	- *Disruptors in banking are N26, Solaris or Revolut and this is something that is missing in insurance; there are companies like OttoNova that try the same but overall, the disruption in that segment is less present*	*Interviewee E: 32 - 32*
	- *Digital products/companies have a higher PR presence right now that will force more traditional companies to innovate and reconsider their current business*	*Interviewee H: 31 - 31*
Differentiating factors\Digital maturity vs. organisational maturity	- *N26 is often considered as a digital leader with great usability but then they lack expertise in terms of services or risk management, here traditional banks are much better*	*Interviewee C: 28 - 28*
	- *Many start-ups have the vision, skills, strategy, and products but they lack in scaling and thus capital*	*Interviewee E: 36 - 36*
	- *The young and hip companies have a better mindset and digital capabilities; less capital and thus bigger need to evolve and develop*	*Interviewee F: 32 - 32*
	- *The old and traditional ones have thought out and 'waterproof' processes especially regarding risks, security, phishing, and central services; more capital/revenue and thus less incentives to improve*	*Interviewee F: 33 - 33*
	- *Both are leading and lagging in different areas*	*Interviewee F: 34 - 34*
	- *Nevertheless, the 'tech companies' in the sector grow rapidly and work in agile ways but due to the lack of resources and structures a few things are not entirely thought through*	*Interviewee H: 24 - 24*
	- *And in traditional banks the processes work, slow and manually, but they work*	*Interviewee H: 25 - 25*
	- *Same in insurance or other similar areas; questionable who has an advantage and whether digital maturity is more important than maturity in a company?*	*Interviewee H: 27 - 27*
	- *So overall, both sides can learn something from the other*	*Interviewee H: 29 - 29*
Differentiating factors\Digital culture	- *Different cultures, mindsets, and attitudes*	*Interviewee C: 31 - 31*
	- *Regulations are often used as an excuse to 'ignore' digitisation*	*Interviewee C: 35 - 35*
	- *Mindset and culture are very open and happy to get digitised/automated processes since they see the value and know it will be less recurring work for them*	*Interviewee D: 24 - 24*
Differentiating factors\Less complexity, more agility	- *Smaller companies can work in more agile manners and have better structures that enable change*	*Interviewee B: 36 - 36*
	- *and the structures or processes are much older*	*Interviewee D: 26 - 26*

	- *FinTech's do not have the traditional mainframe/core and are thus more flexible*	*Interviewee G: 24 -24*
	- *FinTech's can adapt quickly even when problems occur within processes or other organisational weaknesses since processes are digital; more opportunities to develop effectively within a short period of time*	*Interviewee G: 25 - 25*
Differentiating factors\New value chains	- *outside of the traditional value chain*	*Interviewee A: 41 - 41*
Differentiating factors\Platform orientation	- *they have a platform orientation* - *more platforms*	*Interviewee A: 37 - 37* *Interviewee A: 41 - 41*
Differentiating factors\Connected value chains	- *capital market is leading since they have connected value chains,* - *they rather work in silos*	*Interviewee A: 37 - 37* *Interviewee D: 26 - 26*

Appendix 4 - Online Industry Survey in English and German (Qualtrics Version)

Part #1: Pre-survey

1. Employment status: Are you employed in Germany?
    - Yes / No
2. Company size: What is the business size of the company you are currently working for?
    - Small / Medium / Large
3. Sector: In what field of financial services is your current employer mainly present?
    - Banking /Insurance / Audit/accounting / Tax/assurances / Investment services / Consulting / FinTech/BigTech / Asset/wealth management / I don't work in financial services
4. Digitisation effort: Has your current employer executed digitisation efforts in the past?
    - Yes / No / I don't know

Part #2: Digital maturity assessment

5. Personal assessment

Factor	Question	7-point Likert scale
Value added #1	I have worked on digitisation projects that created an added value.	Strongly agree to strongly disagree
Value added #2	I was affected by digitisation measures that created an added value.	
Value added #3	I believe that digitisation projects in the company lead to a higher value for our customers.	

Digital Leadership	I believe that my organisation is a digital leader in its field.

Part #2: Drivers of digital maturity

6. Strategy

Factor	Question	7-point Likert scale
Digital vision	My organisation considers digitisation to achieve its vision.	Strongly agree to strongly disagree
Transformation	My organisation strives to be a tech/digital company.	
Risk appetite	My organisation is willing to take a risk to digitally develop and change.	
Agility	My organisation monitors trends and adapts its strategy in an agile manner.	
End -to-end (E2E) strategy	Digital strategies are formulated for the whole business rather than only for business units (Digital strategy = business strategy).	

7. People & Culture

Factor	Question	7-point Likert scale
Ideation focus	New ideas are appreciated and encouraged.	Strongly agree to strongly disagree
Cultural transformation	My organisation drives not only a digital but also cultural transformation.	
Savviness	I would consider myself and co-workers as digitally/technologically savvy.	
Autonomous workstyle	I feel empowered to work autonomously.	

8. Leadership

Factor	Question	7-point Likert scale
Employee collaboration	I feel that collaboration with other departments and units is encouraged by leaders.	Strongly agree to strongly disagree
Leadership vision	Leaders actively identify digital opportunities and realise digital goals.	
Leadership engagement	Leaders can drive and communicate change.	
Leadership mindset	I feel that my leader values change more than stability.	

9. Expertise & Training

Factor	Question	7-point Likert scale
Digital skills	Employees have the necessary skills to facilitate digitisation.	Strongly agree to strongly disagree
Skill development	The organisation constantly invests in the development of digital skills of their employees	

Talent attraction	New employees with digital expertise are easily found.	
Reflection	My organisation has a process in place to understand and learn from failure.	

10. Technology

Factor	Question	7-point Likert scale
Ecosystem	My organisation has systems, applications and tools in place that enable more efficient business processes.	Strongly agree to strongly disagree
Integration/ automation	My organisation uses automated and integrated tools to support operations	
IT infrastructure	We regularly update our IT infrastructure to meet changing requirements.	
Data-driven	My organisation is data focused and knows how to create value out of data.	

11. Operational processes

Factor	Question	7-point Likert scale
Prototyping	My organisation can quickly test and modify new digital products and services based on prototypes.	Strongly agree to strongly disagree
Reinvention	My organisation constantly strives to adapt its products/ services with technological trends to create new value.	
Regulations	I feel that my organisation is slowed down by legal regulations.	
Delivery excellence	The delivery of digital products and services to our customers works without issues.	

Part #2: Demographics

12. Gender: What gender do you identify as?
    - Female / Male / Other
13. Age: How old are you?
    - ≤18-24 / 25-34 / 35-44 / 45-54 / 55-64 / ≥65
14. Education: What is your highest degree achieved?
    - High school / A-levels / Apprenticeship / Professional degree / Bachelor / Master/MBA / Promotion/PhD
15. Department: In which department do you work?
    - Marketing/sales / Logistics/procurement/supply chain / Finance/legal / Customer service / Human resources / Strategy/project management / IT / Management
16. Affiliation: How long do you already work for your current employer? ____ years

View in Qualtrics

CATÓLICA LISBON
BUSINESS & ECONOMICS

Vielen Dank, dass Sie auf den Link geklickt haben! Ich schätze Ihren Beitrag zu dieser Umfrage als Vertreter der deutschen Finanzdienstleistungsbranche sehr!

Die Umfrage wird im Rahmen meiner Masterarbeit an der Católica Lisbon School of Business & Economics im Studiengang Management, Strategy & Entrepreneurship durchgeführt.

Es gibt keine richtigen oder falschen Antworten in der Umfrage. Des Weiteren möchte ich darauf hinweisen, dass die Umfrage anonym ist und keinerlei Rückschlüsse auf Ihre Person gezogen werden können. Die Umfrage dauert ca. 5 min.

Falls Sie an den Ergebnissen interessiert sein sollten, dann melden Sie sich gerne bei mir (eileenkaufmann@web.de).

→

Sind Sie zur Zeit in Deutschland beschäftigt/angestellt?

- Ja
- Nein

Wie groß ist das Unternehmen für das Sie derzeit tätig sind?

- Klein
- Mittel
- Groß

In welchem Bereich der Finanzdienstleistungen ist Ihr derzeitiger Arbeitgeber hauptsächlich tätig?

- Bankwesen
- Versicherungen
- Audit / Accounting
- Tax / Assurance
- Investment
- Consulting
- FinTech / BigTech
- Asset / Wealth Management
- Ich arbeite nicht in der genannten Branche

Ist/war Digitalisierung ein Thema bei Ihrem derzeitigen Arbeitgeber?

- Ja
- Nein
- Ich bin mir nicht sicher

→

Bitte wählen Sie Ihren Grad der Zustimmung aus. Die Aussagen beziehen sich auf Ihren Arbeitgeber.

	Stimme voll zu	Stimme zu	Stimme eher zu	Neutral / Ungewiss	Stimme eher nicht zu	Stimme nicht zu	Stimme gar nicht zu
Ich habe an Digitalisierungsprojekten gearbeitet, die einen Mehrwert geschaffen haben.	○	○	○	○	○	○	○
Ich war von Digitalisierungsmaßnahmen betroffen, die einen Mehrwert geschaffen haben.	○	○	○	○	○	○	○
Ich glaube, dass Digitalisierungsprojekte im Unternehmen zu einem Mehrwert für unsere Kunden führen.	○	○	○	○	○	○	○
Ich glaube, dass mein Unternehmen führend im digitalen Bereich ist.	○	○	○	○	○	○	○

Bitte wählen Sie Ihren Grad der Zustimmung aus. Die Aussagen beziehen sich auf PROZESSE bei Ihrem Arbeitgeber.

	Stimme voll zu	Stimme zu	Stimme eher zu	Neutral / Ungewiss	Stimme eher nicht zu	Stimme nicht zu	Stimme gar nicht zu
Neue digitale Produkte/Dienstleistungen können anhand von Prototypen schnell getestet werden.	○	○	○	○	○	○	○
Wir sind bestrebt stetig Produkte/Dienstleistungen an technologischen Trends anzupassen.	○	○	○	○	○	○	○
Wir werden durch gesetzliche Vorschriften gebremst.	○	○	○	○	○	○	○
Die Bereitstellung digitaler Produkte/Dienstleistungen für unsere Kunden funktioniert problemlos.	○	○	○	○	○	○	○

Bitte wählen Sie Ihren Grad der Zustimmung aus. Die Aussagen beziehen sich auf die LEADER bei Ihrem Arbeitgeber.

	Stimme voll zu	Stimme zu	Stimme eher zu	Neutral / Ungewiss	Stimme eher nicht zu	Stimme nicht zu	Stimme gar nicht zu
Die Zusammenarbeit mit anderen Abteilungen wird von meinem Leader gefördert.	○	○	○	○	○	○	○
Leader identifizieren aktiv digitale Chancen und setzen digitale Ziele um.	○	○	○	○	○	○	○
Leader können Veränderungen vorantreiben und vermitteln.	○	○	○	○	○	○	○
Mein Leader schätzt Veränderungen mehr als den Status Quo.	○	○	○	○	○	○	○

Bitte wählen Sie Ihren Grad der Zustimmung aus. Die Aussagen beziehen sich auf die KULTUR Ihres Arbeitgebers.

	Stimme voll zu	Stimme zu	Stimme eher zu	Neutral / Ungewiss	Stimme eher nicht zu	Stimme nicht zu	Stimme gar nicht zu
Neue Ideen sind erwünscht und werden gefördert.	○	○	○	○	○	○	○
Es wird nicht nur einen digitalen, sondern auch einen kulturellen Wandel vorangetrieben.	○	○	○	○	○	○	○
Ich und meine Kollegen sind digital/technologisch versiert.	○	○	○	○	○	○	○
Selbstständiges Arbeiten wird gefördert.	○	○	○	○	○	○	○

Bitte wählen Sie Ihren Grad der Zustimmung aus. Die Aussagen beziehen sich auf die STRATEGIE Ihres Arbeitgebers.

	Stimme voll zu	Stimme zu	Stimme eher zu	Neutral / Ungewiss	Stimme eher nicht zu	Stimme nicht zu	Stimme gar nicht zu
Digitalisierung wird im Unternehmen genutzt, um die Vision zu verwirklichen.	○	○	○	○	○	○	○
Es wird angestrebt, ein technisches/digitales Unternehmen zu sein.	○	○	○	○	○	○	○
Es werden Risiken eingegangen, um sich digital zu entwickeln.	○	○	○	○	○	○	○
Trends werden beobachtet und flexibel in die Unternehmensstrategie aufgenommen.	○	○	○	○	○	○	○
Digitale Strategien werden gesamteinheitlich und nicht nur für einzelne Bereiche formuliert (Digitale Strategie = Geschäftsstrategie).	○	○	○	○	○	○	○

Bitte wählen Sie Ihren Grad der Zustimmung aus. Die Aussagen beziehen sich auf TECHNOLOGIE bei Ihrem Arbeitgeber.

	Stimme voll zu	Stimme zu	Stimme eher zu	Neutral / Ungewiss	Stimme eher nicht zu	Stimme nicht zu	Stimme gar nicht zu
Es gibt Systeme, Anwendungen und Instrumente, die effiziente Prozesse ermöglichen.	○	○	○	○	○	○	○
Es werden automatisierte und integrierte Tools zur Unterstützung der Abläufe genutzt.	○	○	○	○	○	○	○
Die IT-Infrastruktur wird auf dem neuesten Stand gehalten.	○	○	○	○	○	○	○
Wir sind datenorientiert und wissen, wie man aus Daten Mehrwert schafft.	○	○	○	○	○	○	○

Bitte wählen Sie Ihren Grad der Zustimmung aus. Die Aussagen beziehen sich auf WEITERBILDUNG & TRAINING bei Ihrem Arbeitgeber.

	Stimme voll zu	Stimme zu	Stimme eher zu	Neutral / Ungewiss	Stimme eher nicht zu	Stimme nicht zu	Stimme gar nicht zu
Kollegen verfügen über Fähigkeiten, die die Digitalisierung erleichtern.	○	○	○	○	○	○	○
Es wird ständig in die Entwicklung digitaler Fähigkeiten investiert.	○	○	○	○	○	○	○
Neue Mitarbeiter mit digitalen Kenntnissen sind leicht zu gewinnen.	○	○	○	○	○	○	○
Es existiert ein Verfahren, um aus Misserfolgen zu lernen.	○	○	○	○	○	○	○

Fast geschafft! Welchem Geschlecht ordnen Sie sich zu?

- Weiblich
- Männlich
- Divers

Wie alt sind Sie?

- ≤18-24
- 25-34
- 35-44
- 45-54
- 55-64
- ≥65

Was ist Ihr höchster Abschluss?

- Hauptschule/Realschule
- Abitur
- Ausbildung
- Professionelle Weiterbildung (z.B. IHK)
- Bachelor
- Master/MBA
- Promotion/PhD

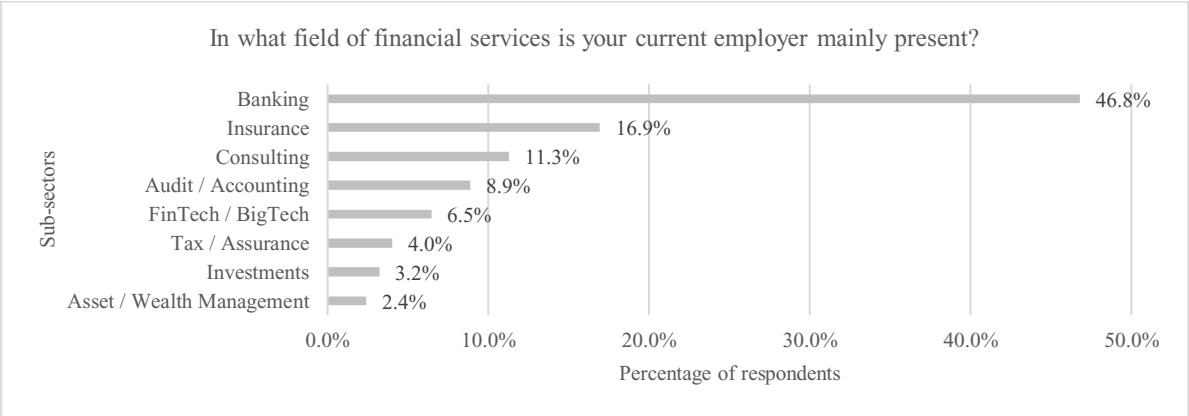
In welcher Abteilung arbeiten Sie?

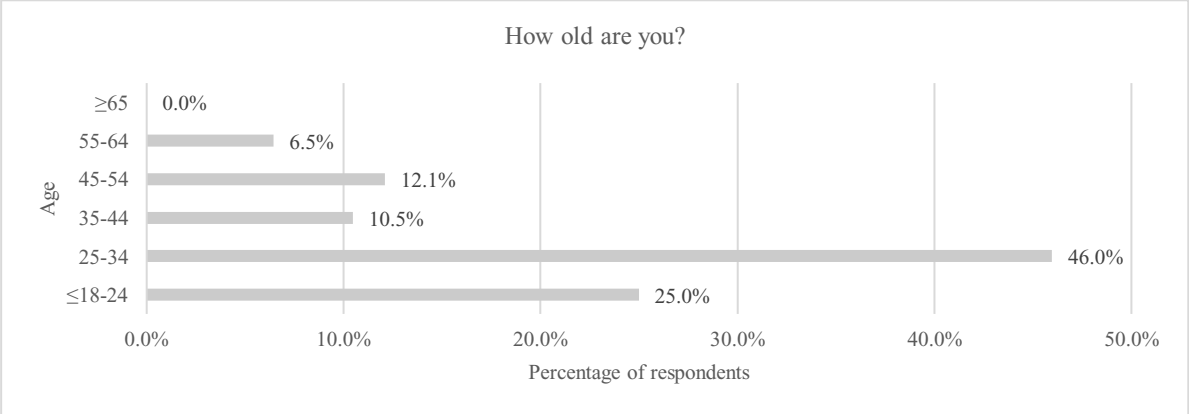
- Marketing/Sales
- Logistik/Einkauf/Supply Chain
- Finanzen/Recht
- Kundenservice
- Personal
- Strategie/Projekt Management
- IT
- Management

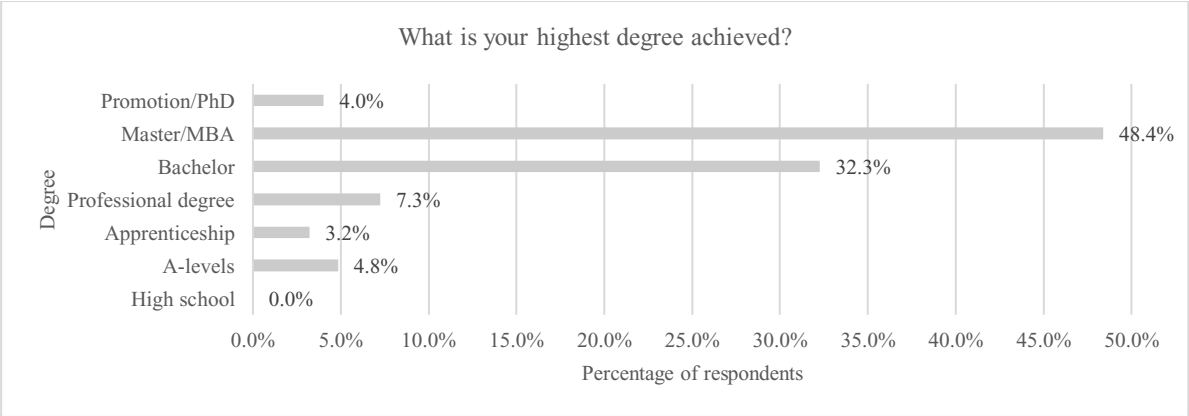
Wie lange arbeiten Sie bereits bei Ihrem Arbeitgeber (Angabe in Jahren)?

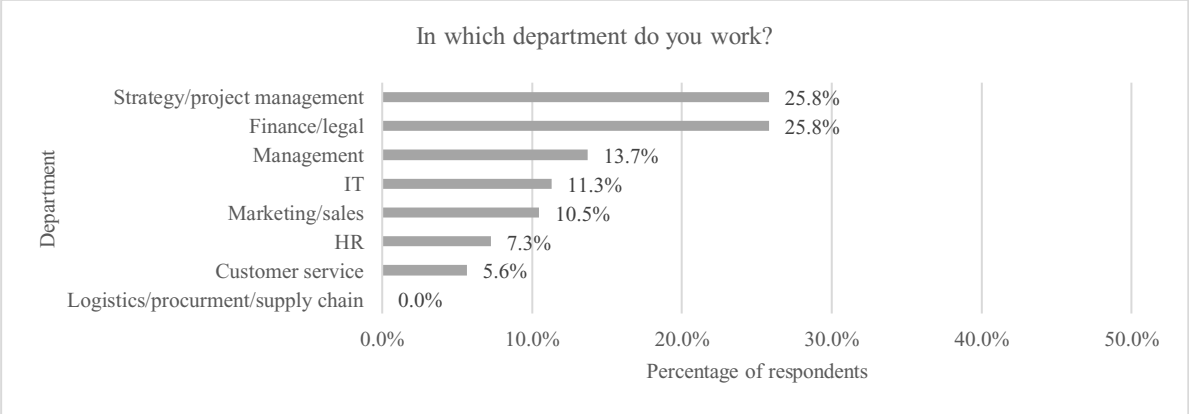
Appendix 5 - Survey Analysis Outputs from Excel & R

Frequency distributions in percentage values:









Summary statistics of all variables including frequencies, means, medians & quartiles:

```
Employment_status Company_size   Sub-sector Digitization_effort  DM1_AV_self     DM2_AV_other   DM3_AV_customer DM4_leadership  DM1234_average
1:124             2:47         1      :58   Min.   :1          Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.750
                  3:77         2      :21   1st Qu.:1          1st Qu.:4.000   1st Qu.:5.000   1st Qu.:6.000   1st Qu.:3.000   1st Qu.:4.750
                               6      :14   Median :1          Median :6.000   Median :6.000   Median :7.000   Median :5.000   Median :5.500
                               3      :11   Mean   :1          Mean   :5.234   Mean   :5.605   Mean   :6.226   Mean   :4.468   Mean   :5.383
                               7      : 8   3rd Qu.:1          3rd Qu.:7.000   3rd Qu.:7.000   3rd Qu.:7.000   3rd Qu.:6.000   3rd Qu.:6.250
                               4      : 5   Max.   :1          Max.   :7.000   Max.   :7.000   Max.   :7.000   Max.   :7.000   Max.   :7.000
                               (Other): 7
DM_success S_digital_vision S_transformation S_risk_appetite   S_agility     S_E2E_strategy  PC_ideation_focus PC_cultural_transformation
0:57       Min.   :1.000    Min.   :1.000    Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000     Min.   :1.000
1:67       1st Qu.:5.000    1st Qu.:5.000    1st Qu.:3.000   1st Qu.:4.000   1st Qu.:4.000   1st Qu.:5.000     1st Qu.:4.000
           Median :6.000    Median :6.000    Median :5.000   Median :5.000   Median :5.000   Median :6.000     Median :6.000
           Mean   :5.589    Mean   :5.629    Mean   :4.476   Mean   :5.081   Mean   :5.137   Mean   :5.581     Mean   :5.194
           3rd Qu.:7.000    3rd Qu.:7.000    3rd Qu.:6.000   3rd Qu.:6.000   3rd Qu.:6.000   3rd Qu.:7.000     3rd Qu.:7.000
           Max.   :7.000    Max.   :7.000    Max.   :7.000   Max.   :7.000   Max.   :7.000   Max.   :7.000     Max.   :7.000

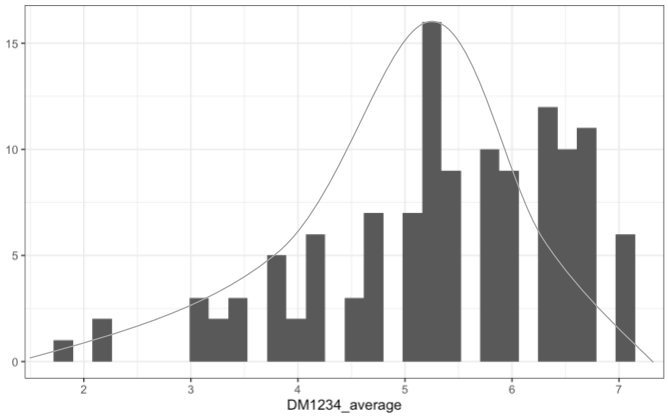
 PC_savviness  PC_autonomous_workstyle L_employee_collab L_leadership_vision L_leadership_engagement L_leadership_mindset ET_digital_skills
Min.   :2.00   Min.   :2.000           Min.   :2.00      Min.   :1.000       Min.   :1.000           Min.   :1.000        Min.   :1.000
1st Qu.:5.00   1st Qu.:5.000           1st Qu.:5.00      1st Qu.:4.000       1st Qu.:5.000           1st Qu.:4.750        1st Qu.:5.000
Median :6.00   Median :6.000           Median :6.00      Median :5.000       Median :6.000           Median :6.000        Median :5.000
Mean   :5.46   Mean   :5.935           Mean   :5.46      Mean   :4.944       Mean   :5.347           Mean   :5.339        Mean   :5.048
3rd Qu.:6.00   3rd Qu.:7.000           3rd Qu.:7.00      3rd Qu.:6.000       3rd Qu.:6.250           3rd Qu.:7.000        3rd Qu.:6.000
Max.   :7.00   Max.   :7.000           Max.   :7.00      Max.   :7.000       Max.   :7.000           Max.   :7.000        Max.   :7.000

ET_skill_development ET_talent_attraction ET_reflection    T_ecosystem    T_integration_automation T_IT_infrastructure T_data_driven   OP_prototyping
Min.   :1.000        Min.   :1.000        Min.   :1.000   Min.   :1.000   Min.   :1.000           Min.   :1.000       Min.   :1.000   Min.   :1.000
1st Qu.:3.750        1st Qu.:3.000        1st Qu.:3.000   1st Qu.:5.000   1st Qu.:4.000           1st Qu.:4.000       1st Qu.:3.000   1st Qu.:3.000
Median :5.000        Median :4.000        Median :4.000   Median :6.000   Median :6.000           Median :5.000       Median :5.000   Median :5.000
Mean   :4.887        Mean   :4.008        Mean   :4.137   Mean   :5.427   Mean   :5.185           Mean   :4.911       Mean   :4.758   Mean   :4.605
3rd Qu.:6.000        3rd Qu.:5.000        3rd Qu.:6.000   3rd Qu.:7.000   3rd Qu.:6.000           3rd Qu.:6.000       3rd Qu.:6.000   3rd Qu.:6.000
Max.   :7.000        Max.   :7.000        Max.   :7.000   Max.   :7.000   Max.   :7.000           Max.   :7.000       Max.   :7.000   Max.   :7.000

OP_reinvention  OP_regulations  OP_delivery_excellence Gender Age    Education Department  Affiliation
Min.   :2.000   Min.   :1.000  Min.   :1.000          1:55   1:31   2: 6      1:13       Min.   : 0.300
1st Qu.:5.000   1st Qu.:4.000  1st Qu.:3.000          2:69   2:57   3: 4      3:32       1st Qu.: 1.000
Median :5.000   Median :5.000  Median :5.000                 3:13   4: 9      4: 7       Median : 3.000
Mean   :5.169   Mean   :4.952  Mean   :4.621                 4:15   5:40      5: 9       Mean   : 6.353
3rd Qu.:6.000   3rd Qu.:6.000  3rd Qu.:6.000                 5: 8   6:60      6:32       3rd Qu.: 7.250
Max.   :7.000   Max.   :7.000  Max.   :7.000                        7: 5      7:14       Max.   :42.000
                                                                              8:17
```

Correlation matrix for the digital maturity average and all other possible influencing variables & histogram of the scored digital maturity average:

	DM1234_average
DM1234_average	1.000000000
S_digital_vision	0.654671695
S_transformation	0.530023857
S_risk_appetite	0.546243916
S_agility	0.569871764
S_E2E_strategy	0.537719632
PC_ideation_focus	0.491109901
PC_cultural_transformation	0.559517407
PC_savviness	0.598435238
PC_autonomous_workstyle	0.510945995
L_employee_collab	0.478963103
L_leadership_vision	0.614720744
L_leadership_engagement	0.515339273
L_leadership_mindset	0.570690423
ET_digital_skills	0.531968383
ET_skill_development	0.622523795
ET_talent_attraction	0.245810919
ET_reflection	0.485186971
T_ecosystem	0.398906713
T_integration_automation	0.401034562
T_IT_infrastructure	0.396702404
T_data_driven	0.473234802
OP_prototyping	0.443072351
OP_reinvention	0.497554376
OP_regulations	0.093829012
OP_delivery_excellence	0.461274842
Affiliation	0.008538374



T-tests for Groups A & B with unequal means and p-values closest to zero:

```
        Welch Two Sample t-test

data:  dt.data[DM_success == "1", S_digital_vision] and dt.data[DM_success == "0", S_digital_vision]
t = 6.6934, df = 111.81, p-value = 9.081e-10
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 1.018450 1.874977
sample estimates:
mean of x mean of y
 6.253731  4.807018
```

```
        Welch Two Sample t-test

data:  dt.data[DM_success == "1", PC_cultural_transformation] and dt.data[DM_success == "0", PC_cultural_transformation]
t = 5.2482, df = 104.57, p-value = 8.096e-07
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.929923 2.059341
sample estimates:
mean of x mean of y
 5.880597  4.385965
```

```
        Welch Two Sample t-test

data:  dt.data[DM_success == "1", PC_savviness] and dt.data[DM_success == "0", PC_savviness]
t = 5.4976, df = 116.09, p-value = 2.317e-07
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.6896506 1.4664112
sample estimates:
mean of x mean of y
 5.955224  4.877193
```

```
        Welch Two Sample t-test

data:  dt.data[DM_success == "1", L_leadership_vision] and dt.data[DM_success == "0", L_leadership_vision]
t = 5.2863, df = 107, p-value = 6.647e-07
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.9493617 2.0886063
sample estimates:
mean of x mean of y
 5.641791  4.122807
```

```
        Welch Two Sample t-test

data:  dt.data[DM_success == "1", ET_skill_development] and dt.data[DM_success == "0", ET_skill_development]
t = 6.5197, df = 112.63, p-value = 2.068e-09
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 1.142872 2.140710
sample estimates:
mean of x mean of y
 5.641791  4.000000
```

Multiple regression exploration per category and in total for all variables; basis for choosing variables up to a significance level of 10%:

	Dependent variable:							
	DM1234_average							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
S_digital_vision	0.330***							0.166*
	(0.089)							(0.097)
S_transformation	-0.104							-0.075
	(0.078)							(0.081)
S_risk_appetite	0.125							0.100
	(0.076)							(0.081)
S_agility	0.130							-0.037
	(0.083)							(0.089)
S_E2E_strategy	0.087							-0.037
	(0.069)							(0.072)
PC_ideation_focus		0.117						0.008
		(0.074)						(0.080)
PC_cultural_transformation		0.171***						0.019
		(0.062)						(0.076)
PC_savviness		0.309***						0.167*
		(0.079)						(0.089)
PC_autonomous_workstyle		0.129						0.037
		(0.083)						(0.093)
L_employee_collab			0.091					0.010
			(0.079)					(0.081)
L_leadership_vision			0.205**					0.046
			(0.081)					(0.091)
L_leadership_engagement			0.102					0.096
			(0.073)					(0.076)
L_leadership_mindset			0.161**					0.021
			(0.066)					(0.072)
ET_digital_skills				0.199***				0.085
				(0.068)				(0.080)
ET_skill_development				0.227***				0.165**
				(0.071)				(0.073)
ET_talent_attraction				-0.009				-0.051
				(0.056)				(0.054)
ET_reflection				0.150***				0.014
				(0.054)				(0.058)
T_ecosystem					0.190**			0.146
					(0.091)			(0.090)
T_integration_automation					0.046			-0.088
					(0.094)			(0.081)
T_IT_infrastructure					-0.065			-0.086
					(0.075)			(0.069)
T_data_driven					0.261***			0.027
					(0.077)			(0.076)
OP_prototyping						0.140**		-0.035
						(0.063)		(0.064)
OP_reinvention						0.131*		-0.026
						(0.075)		(0.076)
OP_regulations						0.041		0.072
						(0.053)		(0.048)
OP_delivery_excellence						0.241***		0.112*
						(0.070)		(0.064)
Affiliation							0.007	0.014
							(0.013)	(0.010)
Constant	2.458***	1.394***	2.470***	2.690***	3.191***	2.744***	5.339***	0.819
	(0.353)	(0.408)	(0.340)	(0.318)	(0.374)	(0.427)	(0.133)	(0.572)
Observations	124	124	124	124	124	124	124	124
R2	0.464	0.498	0.473	0.434	0.275	0.309	0.002	0.634
Adjusted R2	0.441	0.481	0.455	0.415	0.251	0.286	-0.006	0.536
Residual Std. Error	0.862 (df = 118)	0.831 (df = 119)	0.851 (df = 119)	0.882 (df = 119)	0.998 (df = 119)	0.974 (df = 119)	1.156 (df = 122)	0.785 (df = 97)
F Statistic	20.434*** (df = 5; 118)	29.485*** (df = 4; 119)	26.657*** (df = 4; 119)	22.795*** (df = 4; 119)	11.296*** (df = 4; 119)	13.330*** (df = 4; 119)	0.291 (df = 1; 122)	6.470*** (df = 26; 97)
Note:								*p<0.1; **p<0.05; ***p<0.01

Reduced multiple regression table (before robust standard errors):

	Dependent variable:							
	DM1234_average							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
S_digital_vision	0.510***						0.158**	0.140*
	(0.060)						(0.078)	(0.075)
PC_cultural_transformation		0.262***					0.024	0.008
		(0.053)					(0.068)	(0.066)
PC_savviness		0.365***					0.187**	0.190**
		(0.076)					(0.082)	(0.080)
L_leadership_vision			0.301***				0.108	0.109*
			(0.058)				(0.067)	(0.065)
L_leadership_mindset			0.204***				0.067	0.060
			(0.060)				(0.065)	(0.064)
ET_digital_skills				0.199***			0.022	0.024
				(0.068)			(0.071)	(0.068)
ET_skill_development				0.224***			0.141**	0.129*
				(0.069)			(0.067)	(0.065)
ET_reflection				0.148***			0.030	0.030
				(0.053)			(0.055)	(0.055)
T_ecosystem					0.193***		0.031	0.022
					(0.073)		(0.067)	(0.063)
T_data_driven					0.242***		-0.002	0.006
					(0.059)		(0.058)	(0.057)
OP_prototyping						0.139**	-0.008	
						(0.063)	(0.059)	
OP_reinvention						0.145**	-0.067	
						(0.072)	(0.065)	
OP_delivery_excellence						0.232***	0.093	0.081
						(0.069)	(0.060)	(0.059)
Constant	2.535***	2.030***	2.804***	2.673***	3.187***	2.921***	1.335***	1.272***
	(0.343)	(0.362)	(0.272)	(0.300)	(0.369)	(0.359)	(0.404)	(0.397)
Observations	124	124	124	124	124	124	124	124
R2	0.375	0.457	0.460	0.434	0.270	0.306	0.595	0.590
Adjusted R2	0.370	0.448	0.451	0.420	0.258	0.289	0.547	0.550
Residual Std. Error	0.915 (df = 122)	0.857 (df = 121)	0.854 (df = 121)	0.879 (df = 120)	0.993 (df = 121)	0.973 (df = 120)	0.776 (df = 110)	0.774 (df = 112)
F Statistic	73.141*** (df = 1; 122)	50.959*** (df = 2; 121)	51.521*** (df = 2; 121)	30.632*** (df = 3; 120)	22.359*** (df = 2; 121)	17.635*** (df = 3; 120)	12.409*** (df = 13; 110)	14.666*** (df = 11; 112)
Note:								*p<0.1; **p<0.05; ***p<0.01

VIF values for models with more than one regressor (2, 3, 4, 5, 6, 7, 8):

(2)
```
PC_cultural_transformation              PC_savviness
                  1.409168                  1.409168
```
, (3)
```
L_leadership_vision L_leadership_mindset
           1.679409            1.679409
```
,

(4)
```
ET_digital_skills ET_skill_development        ET_reflection
         1.650255             1.955561             1.386147
```
, (5)
```
T_ecosystem T_data_driven
   1.304519      1.304519
```
,

(6)
```
OP_prototyping         OP_reinvention OP_delivery_excellence
      1.487766               1.485425               1.326025
```
,

(7)
```
S_digital_vision PC_cultural_transformation            PC_savviness       L_leadership_vision       L_leadership_mindset         ET_digital_skills       ET_skill_development
        2.356307                  2.803837                2.001323                  2.723530                  2.365263                  2.299233                  2.354669
  ET_reflection              T_ecosystem           T_data_driven           OP_prototyping           OP_reinvention     OP_delivery_excellence
        1.962983                  1.797255                2.101229                  2.095250                  1.906556                  1.597039
```
,

(8)
```
S_digital_vision PC_cultural_transformation            PC_savviness       L_leadership_vision       L_leadership_mindset         ET_digital_skills       ET_skill_development
        2.241085                  2.639678                1.929034                  2.625995                  2.332979                  2.161177                  2.251461
  ET_reflection              T_ecosystem           T_data_driven     OP_delivery_excellence
        1.910444                  1.594363                1.990138                  1.539038
```

Breusch Pagan tests:

H0: Variance is unchanging in the residual (homoscedasticity)
H1: Variance is not unchanging in the residual (no homoscedasticity)
If the p-value is < 0.05, H0 is rejected (homoscedasticity) and H1 is assumed (heteroscedasticity).

Consequently, the below models are heteroscedastic without exception since all p-values are close to zero: Strategy, leadership, technology, operational processes, all variables model, reduced variables model, people & culture, expertise & training.

```
        studentized Breusch-Pagan test

data:  lm.strategy2
BP = 10.853, df = 1, p-value = 0.0009862
```
,
```
        studentized Breusch-Pagan test

data:  lm.leadership2
BP = 7.1912, df = 2, p-value = 0.02744
```
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        studentized Breusch-Pagan test

data:  lm.technology2
BP = 8.0418, df = 2, p-value = 0.01794
```
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        studentized Breusch-Pagan test

data:  lm.operationalprocesses2
BP = 11.014, df = 3, p-value = 0.01165
```
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        studentized Breusch-Pagan test

data:  lm.all2
BP = 30.57, df = 13, p-value = 0.003896
```
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        studentized Breusch-Pagan test

data:  lm.all3
BP = 31.334, df = 11, p-value = 0.0009747
```
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        studentized Breusch-Pagan test

data:  lm.peopleculture2
BP = 19.688, df = 2, p-value = 5.306e-05
```
,
```
        studentized Breusch-Pagan test

data:  lm.expertisetraining2
BP = 29.001, df = 3, p-value = 2.239e-06
```