Digital Transformation in the Financial Services Sector: New Business Models and Value Creation

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Abstract

This cumulative dissertation contributes to the field of digital transformation in the financial services sector by providing a synthesis of a set of peer-reviewed scientific articles aimed toward advancing the understanding of the value of innovation in the digital transformation of business models in the financial services sector. With this aim in mind, this dissertation focuses on three main research topics related to the field of digital transformation in financial services, whereby the first research topic addresses the digital transformation of the financial system driven by the integration of business and process innovations. To support the subsequent implementation of strategic responses based on the complexity and scope of the digital transformation required in the financial services industry, a holistic analysis of the macroeconomic and sector-specific influencing factors underlying the digital transformation in the financial services industry is presented. Furthermore, since the integration of innovations in primary or secondary business processes leads to both positive and negative consequential impacts, the ambivalent effect of the integration of digital innovations on advisory work in traditional financial institutions are further examined. The second research topic addresses the structural transformation of the financial sector inherent to the consolidation and long-term sustainability of financial technology (FinTech) companies, through the identification and empirical classification of the success factors intrinsic to the different FinTech business models. Subsequently, given that the incorporation of digital innovations into business processes not only challenges how traditional financial service providers capture and generate business value, but also how they engage with their customers to deliver value, the third research topic first explores, from a technological perspective, the digitalization of the customer interface leveraged by digital communication innovations such as chatbots, and subsequently examines the implementation of chatbots within the context of the financial industry.

Keywords: Digital Transformation, Financial Services Sector, FinTech, Business Models, Human Computer Interaction, Chatbots

Zusammenfassung

Diese kumulative Dissertation zielt darauf ab, einen Beitrag zum Bereich der digitalen Transformation im Finanzdienstleistungssektor zu leisten, indem sie eine Synthese einer Reihe von begutachteten wissenschaftlichen Artikeln liefert, die darauf abzielen, das Verständnis für den Wert von Innovationen bei der digitalen Transformation von Geschäftsmodellen im Finanzdienstleistungssektor zu fördern. Mit diesem Ziel vor Augen konzentriert sich diese Dissertation auf drei Hauptforschungsthemen im Bereich der digitalen Transformation im Finanzdienstleistungssektor. Das erste Forschungsthema befasst sich mit der digitalen Transformation des Finanzsystems, die durch die Integration von Geschäfts- und Prozessinnovationen vorangetrieben wird. Um die anschließende Umsetzung strategischer Maßnahmen zu unterstützen, die auf der Komplexität und dem Umfang der in der Finanzdienstleistungsbranche erforderlichen digitalen Transformation basieren, wird in dieser Arbeit eine ganzheitliche Analyse der branchenspezifischen Einflussfaktoren für die digitale Transformation in der Finanzdienstleistungsbranche vorgestellt. Da die Integration von Innovationen in primäre und sekundäre Geschäftsprozesse sowohl zu positiven als auch zu negativen Folgewirkungen führt, werden außerdem die ambivalenten Auswirkungen der Integration digitaler Innovationen auf die Beratungsarbeit in traditionellen Finanzinstituten näher untersucht. Das zweite Forschungsthema befasst sich mit dem strukturellen Wandel des Finanzsektors, der mit der Konsolidierung und langfristigen Nachhaltigkeit von Finanztechnologieunternehmen (FinTech) einhergeht, indem die Erfolgsfaktoren der verschiedenen FinTech-Geschäftsmodelle identifiziert und empirisch klassifiziert werden. Da die Einbindung digitaler Innovationen in die Geschäftsprozesse nicht nur die Art und Weise in Frage stellt, wie traditionelle Finanzdienstleister Geschäftswerte erfassen und generieren, sondern auch, wie sie mit ihren Kunden in Kontakt treten, um Werte zu schaffen, untersucht das dritte Forschungsthema zunächst aus technologischer Sicht die Digitalisierung der Kundenschnittstelle, die durch digitale Kommunikationsinnovationen wie Chatbots ermöglicht wird, und untersucht anschließend die Implementierung von Chatbots im Kontext der Finanzbranche.

Schlagworte: Digitale Transformation, Finanzdienstleistungssektor, FinTech, Geschäftsmodelle, Mensch-Computer-Interaktion, Chatbots

Management Summary

Digital transformation is – and will continue to be – a key challenge to all industries because almost all areas of our social and economic environments are affected by the growing trend of global digitalization, which has far-reaching consequences, even for established companies. However, the effects of the digital strategies to be implemented and the associated innovation challenges and opportunities are context- and industry-dependent.

In view of the foregoing aspects, the objective of this cumulative dissertation titled “Digital Transformation in The Financial Services Sector: New Business Models and Value Mechanisms” is to contribute to addressing the holistic shift in the value mechanisms of traditional business models in the financial services sector by analyzing the underlying conditions, implications, and challenges surrounding the introduction of digital innovations. With this objective in mind, the dissertation is structured into three main parts related to the overarching theme of digital transformation.

The first part, titled “Digital Business Transformation in Financial Services” (Chapter 3), focuses on the digital transformation of the financial system enabled by the introduction of innovations at the business and process levels. Financial service providers encounter significant challenges that affect their core business processes, especially given the high rate of change of digital transformation. The transformational focus and respective strategic changes to be implemented by companies depend on the nature of the topical challenges to be overcome at a holistic sector level. Therefore, the factors underlying the digital transformation must first be empirically identified as a baseline in which a PEST (Political, Economic, Social, and Technological) analysis conjoined with Porter’s Five Forces model is applied. As illustrated in Figure 1, the composite model approach provides a holistic and systematic overview of the influencing factors and structural challenges underlying the digital transformation of financial services, both at the macroeconomic level and in the context of the insurance and banking sectors as independent units of analysis.

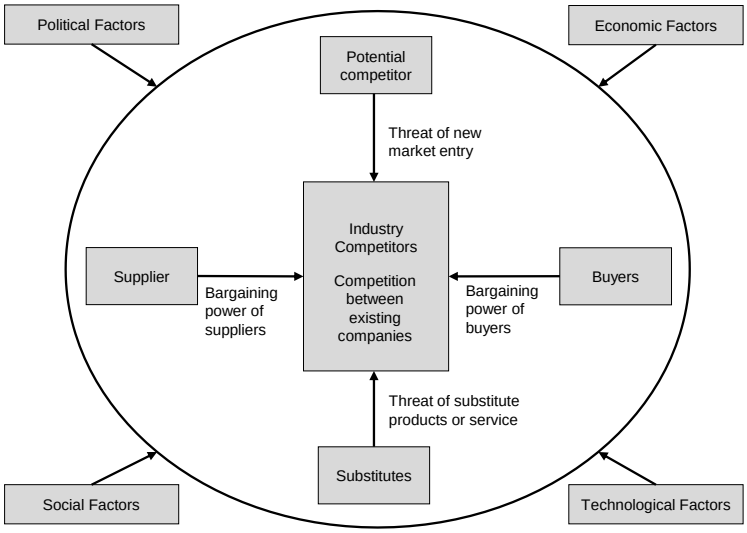


Figure 1: Representation of a combination of Porter's five forces (meso-level) and PEST analysis (macro-level) adapted from Porter (1980), Aguilar (1967) and Gupta (2013) by Werth et al. (2020, p.160)

The model results show that, despite their structural differences (e.g., in terms of liability structure and scale of operations), both the insurance and banking sectors face the same topical challenges at the macroeconomic level with different time lags. However, the speed at which the digital transformation unfolds, as well as the impact of social factors and the bargaining power of buyers, is comparatively greater in the banking sector. The significant influence of social factors related to social-cultural changes and altered consumer expectations exerts pressure on financial incumbents to incorporate new digital channels. To empower new customer-oriented digital services and interfaces, the innovative focus of financial incumbents is currently in a phase of evolutionary digital transformation that is mainly centered on upgrading and integrating front and back-office processes. This in turn potentially entails a transition in the structure of employee tasks and responsibilities within business processes. To determine the ambivalent impact of implementing front-office technological innovations on business processes in financial services, a multiple case study analysis was developed based on the Technology-Organization-Environment framework as a theoretical structure, in the form depicted in Figure 2.

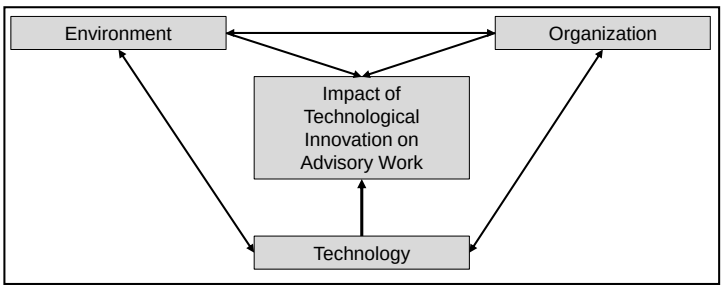


Figure 2: Technology-Organization-Environment framework based on DePietro et al. (1990) as adapted by Eden et al. (2022, p. 76)

The assessment uses advisory work as the unit of analysis and comprises two front-office digital transformation projects in this context that were implemented in two different financial services companies located in Germany. From an interpretivist perspective, semi-structured interviews were conducted with key project stakeholders to identify social constructs in the form of rationales, opinions, and lessons learned involving innovation opportunities and challenges at the technical, organizational, and environmental levels. Thereby, a set of 13 ambivalent influencing factors in the context of the implementation of technological innovations in advisory work were identified. Furthermore, a series of propositions summarizing the changes in advisory work and the implications for financial service providers in connection with the identified influencing factors are provided. The identified changes involve the need for transforming the back-office digital capabilities and innovation speed of the financial services to align with new front-end technological implementations. From a practical standpoint, the introduction of digital innovations also has a significantly ambivalent impact on the employees' perception of the visibility and control of workflow processes, which in turn challenges the internal acceptance of new technical solutions. Hence, the early involvement of internal users in the transformation process is crucial to prevent potential acceptance constraints after the restructuring of processes through digital innovations.

Part two of the dissertation, denominated "Digital Business Model Innovation in Financial Services" (Chapter 4) addresses the structural transformation within the financial sector characterized by the emergence and proliferation of new market competitors leveraging digital technologies through innovation-driven business models. These market entrants, commonly referred to as financial technology (FinTech) companies, have gradually positioned themselves across various segments of the financial services value chain. However, despite the extensive assimilation of cutting-edge technologies that characterize FinTech companies, many of them have high cash burn rates and fail to establish business models that are both successful and sustainable over the long term. Hence, for investors and FinTech founders in particular, the identification of the key value drives inherent to FinTech companies and based on their business models is of paramount importance, both in economic and strategic terms. Nonetheless, in the academic literature, the empirical knowledge concerning the success factors of FinTech companies through the lens of the business model theory is limited.

To empirically determine which business model components have the most significant impact on the success of FinTech ventures, 221 FinTech companies were examined by applying a FinTech business model taxonomy as a baseline classification framework, and using total funding as a proxy measure for the potential success of FinTech companies. Through the taxonomy, the analyzed FinTech companies were categorized along six business model dimensions and 45 characteristics after which a multiple linear regression analysis model was

developed to determine which taxonomic characteristics are significant for FinTech success. Based on this, the FinTech business model component “Product/service offering” was identified as the most influential determinant of Fintech venture success, when success is defined in terms of aggregated funding. While the results underline the fundamental relevance of product value and innovation in a unidimensional view of FinTech success, given the multidisciplinary nature of FinTech, integrative knowledge on critical success factors (CSFs) for FinTech is needed. To achieve differentiation and identification of the distinctive CSFs of the FinTech companies evaluated against those established in the scientific literature for business models in a general context, a qualitative analysis using grounded theory techniques is provided. As a basis for the analysis, semi-structured interviews with venture capitalists, as well as with chief executive officers and managers of FinTech companies, are used as the primary method for gathering qualitative data on the practitioners’ view concerning the CSFs for the survival of FinTech companies. Further, a review of the literature on business model success and venture capital investment criteria provides a joint view of the factors related to general venture success. Through an inductive analysis, 15 CSFs for FinTech companies were synthesized, nine of which are systemic, while others that are more linked with technological, regulatory, and strategic capabilities, are specific to FinTech ventures, as shown in Figure 3.

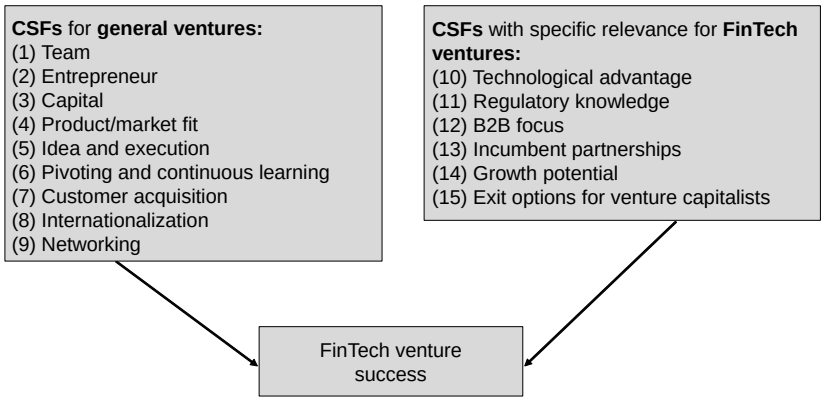


Figure 3: Critical success factors for general ventures (1-9) and with specific relevance to FinTech ventures (10-15) in line with Werth et al. (2019, p. 5)

The identified factors can be used by practitioners for benchmarking FinTech business models and dynamic competencies to reinforce the competitive position of FinTech companies in the market. However, since different FinTech segments can potentially have further idiosyncratic success factors depending on, for example, the level of market maturity, segment size, or the strength of the competition, a segment-based analysis is needed. Consequently, to determine which factors are relevant for FinTech success across diverse FinTech segments, a taxonomy-based analysis of FinTech success factors was developed. The knowledge base for the analysis was built up on the basis of 10 lateral literature reviews related to 10 FinTech business

model archetypes representing distinct segments of the FinTech industry. Figure 4 illustrates the literature review process that was applied to integrate the knowledge base for the analysis.

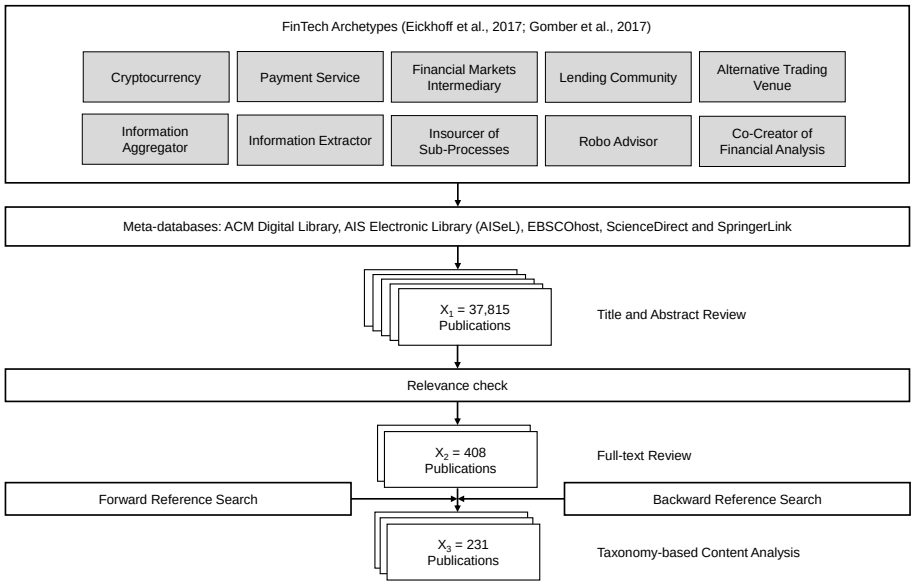


Figure 4: Literature review procedure from Werth et al. (2023, p. 5)

Through this process, a set of 231 representative scientific articles concerning FinTech success were identified that examine different unidimensional conceptualizations of success in distinct segments of the FinTech industry. The systematization of the identified scientific articles within a conceptually derived taxonomic structure resulted in the determination of 31 factors associated with FinTech success, which are listed in Table 1.

Table 1: Final taxonomic structure of the FinTech success factors of Werth et al. (2022)

Dimensions D_i	Characteristics $C_{i,j}$		
D_1 Strategic factors	$C_{1,1}$ Corporate plan	$C_{1,2}$ Operational design	
	$C_{1,3}$ Competitive plan	$C_{1,4}$ Marketing plan	
D_2 Operational factors	$C_{2,1}$ Competency-based human resources	$C_{2,2}$ Strategic networks and alliances	
	$C_{2,3}$ Operational alignment	$C_{2,4}$ Cost-benefit dynamic of the innovation	$C_{2,5}$ Efficiency
D_3 Technological factors	$C_{3,1}$ Technology integration	$C_{3,2}$ Technology adoption	
	$C_{3,3}$ Security, privacy and transparency	$C_{3,4}$ Environmental sustainability	$C_{3,5}$ Ethical issues
D_4 Value proposition	$C_{4,1}$ Convenience/ usability	$C_{4,2}$ Customization	$C_{4,3}$ Intermediation
	$C_{4,4}$ Monetary	$C_{4,5}$ Disintermediation	$C_{4,6}$ Decision support
D_5 User factors	$C_{5,1}$ User socio-economic characteristics	$C_{5,2}$ User centricity	$C_{5,3}$ User trust
	$C_{5,4}$ User-perceived quality	$C_{5,5}$ Cost attractiveness	$C_{5,6}$ Ease of use
D_6 Economic factors	$C_{6,1}$ Financial capital	$C_{6,2}$ Cost structure	
D_7 Environmental factors	$C_{7,1}$ Industry rivalry	$C_{7,2}$ Market conditions	$C_{7,3}$ Regulation

Subsequently, descriptive statistics were used to provide insights into the effect and degree of generality of the success factors that are relevant to each FinTech archetype. Through the analysis of the relative frequency distribution of the identified factors, the factors of “cost-benefit dynamic of the innovation,” “technology adoption,” “security, privacy, and transparency,” “user

trust," "user-perceived quality," and "industry rivalry" were identified as grand challenges for the FinTech industry, in the manner depicted in Figure 5. The usefulness and applicability of the results of the taxonomy-based analysis were validated by means of expert interviews and a case-based taxonomy validation approach.

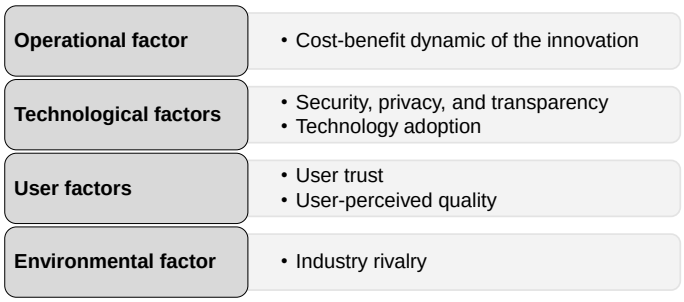


Figure 5: Grand challenges for the FinTech industry identified by Werth et al. (2023, p. 16)

The third part of the dissertation, namely "Digital Interaction and Service Innovation" (Chapter 5), addresses the overall digitalization of communication channels facilitated by digital communication innovations. Through the integration of readily available technologies, companies can digitally transform their traditional go-to-market strategies to offer omni-channel customer experiences to their customers. To accomplish this goal, companies can make use of readily available innovations in the fields of artificial intelligence and natural language processing. However, despite the potential advantages, there is still limited prescriptive knowledge to help practitioners make informed architectural decisions concerning chatbot design. To contribute to a better understanding of the diversity and complexity of the existing design elements for domain-specific chatbots, and to show the extant implementation patterns of these design elements in diverse application domains, a taxonomy of design elements for domain-specific chatbots was developed. The taxonomy is built on the basis of a review of the scientific literature on chatbot design and the empirical classification of a sample of 103 real-world chatbots belonging to 23 application domains. The final taxonomic structure comprises 17 dimensions and 49 design characteristics allocated across the thematic perspectives of interaction, intelligence, and context, in the manner depicted in Table 2.

Table 2: Final taxonomy of design elements for domain-specific chatbots conforming to Janssen et al. (2020, p. 217)

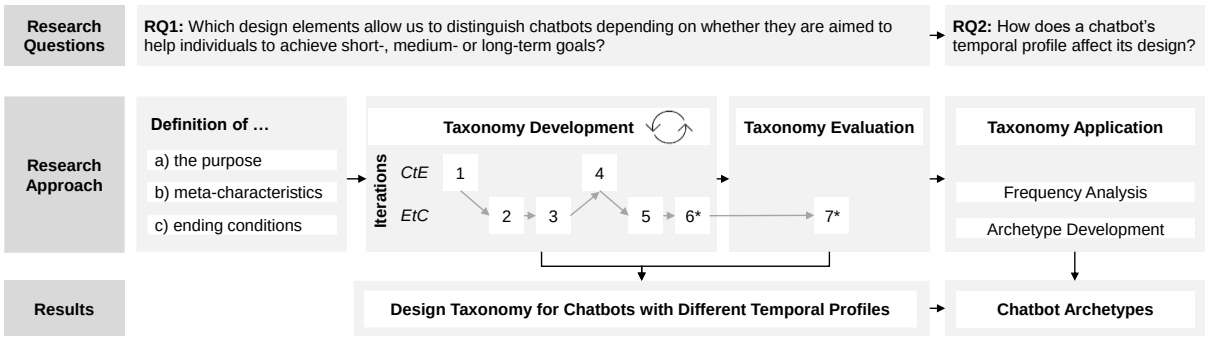
Layer 1: Perspective	Layer 2: Dimensions D_i	Layer 3: Characteristics $C_{i,j}$		
Intelligence	D_1 Intelligence framework	$C_{1,1}$ Rule-based system	$C_{1,2}$ Utility-based system	$C_{1,3}$ Model-based system
		$C_{1,4}$ Goal-based system	$C_{1,5}$ Self-learning system	
	D_2 Intelligence quotient	$C_{2,1}$ Only rule-based knowledge	$C_{2,2}$ Text understanding	$C_{2,3}$ Text understanding and further abilities
	D_3 Personality processing	$C_{3,1}$ Principal self	$C_{3,2}$ Adaptive self	
	D_4 Socio-emotional behavior	$C_{4,1}$ Not present	$C_{4,2}$ Present	
	D_5 Service integration	$C_{5,1}$ None	$C_{5,2}$ Single integration	$C_{5,3}$ Multiple integration
Interaction	D_6 Multimodality	$C_{6,1}$ Unidirectional	$C_{6,2}$ Bidirectional	
	D_7 Interaction classification	$C_{7,1}$ Graphical	$C_{7,2}$ Interactive	
	D_8 Interface personification	$C_{8,1}$ Disembodied	$C_{8,2}$ Embodied	
	D_9 User assistance design	$C_{9,1}$ Reactive assistance	$C_{9,2}$ Proactive assistance	
	D_{10} Number of participants	$C_{10,1}$ Individual human participant	$C_{10,2}$ Two or more human participants	
	D_{11} Additional human support	$C_{11,1}$ No	$C_{11,2}$ Yes	
	D_{12} Front-end user interface channel	$C_{12,1}$ App	$C_{12,2}$ Collaboration and communication tools	$C_{12,3}$ Social media
		$C_{12,4}$ Website	$C_{12,5}$ Multiple	
Context	D_{13} Chatbot role	$C_{13,1}$ Facilitator	$C_{13,2}$ Peer	$C_{13,3}$ Expert
	D_{14} Relation duration	$C_{14,1}$ Short-term relation	$C_{14,2}$ Long-term relation	
	D_{15} Application domain	$C_{15,1}$ E-customer service	$C_{15,2}$ Daily life	$C_{15,3}$ E-commerce
		$C_{15,4}$ E-learning	$C_{15,5}$ Finance	$C_{15,6}$ Work and career
	D_{16} Collaboration goal	$C_{16,1}$ Non goal-oriented	$C_{16,2}$ Goal-oriented	
	D_{17} Motivation for chatbot use	$C_{17,1}$ Productivity	$C_{17,2}$ Entertainment	
		$C_{17,3}$ Social/relational	$C_{17,4}$ Utility	

To analyze the existence of the archetypical qualities of chatbots in practice, a hierarchical clustering analysis was performed from which five chatbot archetypes were identified, namely the “goal-oriented daily chatbot,” “non-goal-oriented daily chatbot,” “utility facilitator chatbot,” “utility expert chatbot,” and “relationship-oriented chatbot”. These archetypes provide an integrated conceptualization of chatbot design elements which can be used for informing future research on this topic, as well as for the purpose of serving as a technology roadmap of chatbot design elements to facilitate the choice of alternatives in practice.

Furthermore, given that business-to-business (B2B) customers play a key role in the sales revenue of financial services providers and an increased focus on the B2B market is a CSF for FinTech companies, a chatbot taxonomy for B2B customer services was developed. The goal of the taxonomy is to offer a comprehensive view of the context-specific design elements and applications prevalent in chatbots deployed for B2B interactions. The taxonomy development procedure was achieved in four successive iterations, resulting in a taxonomy that describes 17 design dimensions and 45 design elements for B2B customer service chatbots. By analyzing 40 real-world chatbots in the B2B segment with this taxonomy, and using a hierarchical clustering algorithm, a cluster dendrogram was constructed to identify three archetypes of chatbots in B2B customer service, including a lead-generation chatbot, aftersales facilitator chatbot, and advertising FAQ chatbot. Through the integration of the theoretical and practical knowledge on the extant elements related to the structural and

functional design of B2B chatbots, this chatbot taxonomy can support traditional financial service providers and FinTech companies, as well as practitioners from other fields, to expand the reach of their digital strategies towards a B2B market focus in order to improve their market position. Furthermore, a set of 12 research directions is provided to facilitate future research in the emerging scientific body of knowledge on B2B chatbots.

Regardless of the application context for which chatbots are designed, they can be configured to accomplish different purposes and tasks that can be executed in different timespans depending on the nature and scope of the underlying motivation and goal orientation of the users to interact with conversational agents. The temporal profile of these interactions may occur within short, medium-, long-, or life-long single or multiple lengths of time, which in turn can be dependent or interdependent among them. However, in the scientific literature, there is a lack of systematic research on how the temporal component in the chatbot-user interactional relationship affects chatbot design. To close this gap, a taxonomy of design elements for chatbots with different temporal profiles was determined using a mixed-methods research approach, and a set of time-dependent chatbot design archetypes were identified. The applied research design is illustrated in Figure 6.



Note: CtE: conceptual-to-empirical; EtC: empirical-to-conceptual

Figure 6: Overview of the research design from Niessen et al. (2021, p. 3)

The taxonomy development process was executed over two conceptual-to-empirical and five empirical-to-conceptual iterations. In the first and fourth iterations, conceptually grounded taxonomic dimensions and characteristics were drawn from the review of studies concerning the prevailing design frameworks for chatbots, while in the five remaining iterations, an empirical classification of several samples of real-world chatbots was conducted. The last of these iterations was implemented as an applicability assessment of the taxonomy, whereby a total of 120 chatbots were analyzed throughout the taxonomy development and evaluation processes. The final taxonomy consists of 22 design dimensions and 61 time-dependent design characteristics. By applying the taxonomy and using inferential statistics to quantitatively evaluate distinctions among chatbots with different time horizons, three time-

dependent chatbot design archetypes were identified, namely ad-hoc supporters, temporary assistants, and persistent companions. A comparative overview of the structural design differences among the identified chatbot archetypes is presented in Figure 7. Academics and practitioners can use the taxonomy and derived archetypes as a conceptual framework for prototyping, tailoring, and evaluating chatbots with different temporal profiles.

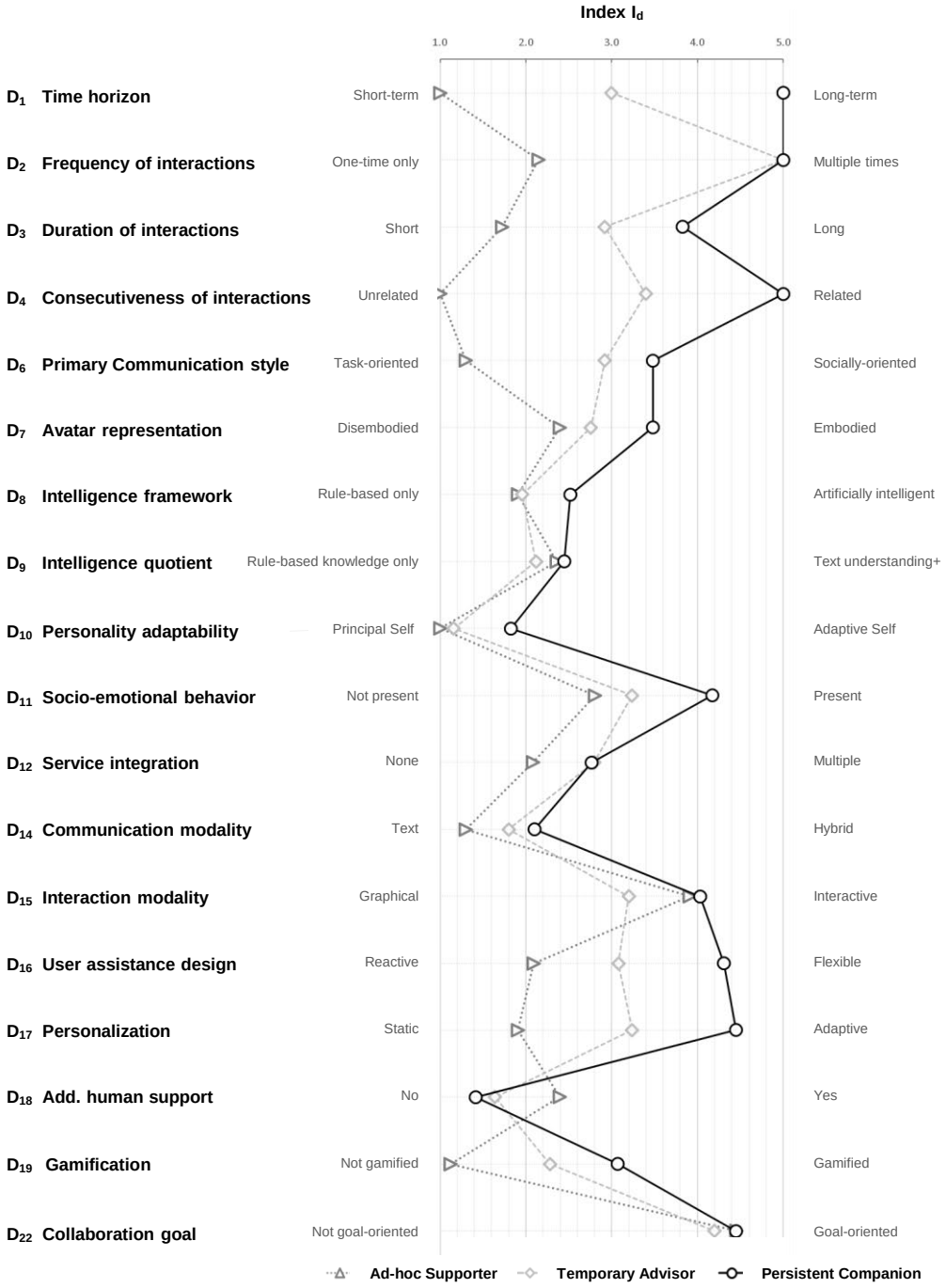


Figure 7: Design differences among time-dependent chatbot archetypes corresponding to Nissen et al. (2021, p. 7)

Recently, conversational agents (i.e., chatbots) have gained academic and practical relevance as their presence continues to expand into a wider range of application areas. In the specific case of the financial services sector, the implementation of technological innovations in the form of chatbots could play an essential role in the transformation of the traditional multi-channel service approach into an omni-channel customer experience. This could be achieved by consolidating the advantages of the ever-accessible internet and the consultant's structural linguistic communication and knowledge base to improve efficiency across the financial services value chain with new digital interfaces. However, there is still limited scientific literature on the factors driving or hindering the adoption and diffusion of chatbot technology in a financial context. To provide socio-technical insights into the factors that positively or negatively influence the adoption and diffusion of chatbots in the financial services sector, a mixed methods analysis was performed following an interpretive paradigm. The analysis applied a sequential exploratory design using the German insurance sector as a social context and area of inquiry. In the initial phase, semi-structured expert interviews were conducted with relevant stakeholders and the compiled interview data was examined using qualitative content analysis. Subsequently, in a second conjoined quantitative phase, a cross-sectional survey targeting potential chatbot users was carried out, and the results of this survey were statistically analyzed to complement the socio-technical insights gained from the initial interviews. The approach aims to provide a convergence in the understanding of the knowledge, and affective and behavioral factors behind the different ambivalent perceptions, attitudes, and beliefs that are present among industry practitioners and potential chatbot users concerning the adoption of chatbots in a financial context. One such factor, for both practitioners and potential users, is the level of trust in chatbot technology regarding the trade-off between the perceived risks and advantages.

To further examine how trust and privacy concerns – in conjunction with the perceived ease of use and usefulness – influence the intention to interact with chatbots in an insurance context, a partial least squares structural equation modeling analysis was performed. As a basis for the analysis, a conceptual model was developed and eight hypotheses were derived from the academic literature related to technology acceptance and its notional interrelationship with trust and privacy concerns. To gather empirical data for the operationalization of the theoretical constructs composing the structural equation model, a cross-sectional survey was conducted. An overview of the partial least squares results for the structural model is provided in Figure 8.

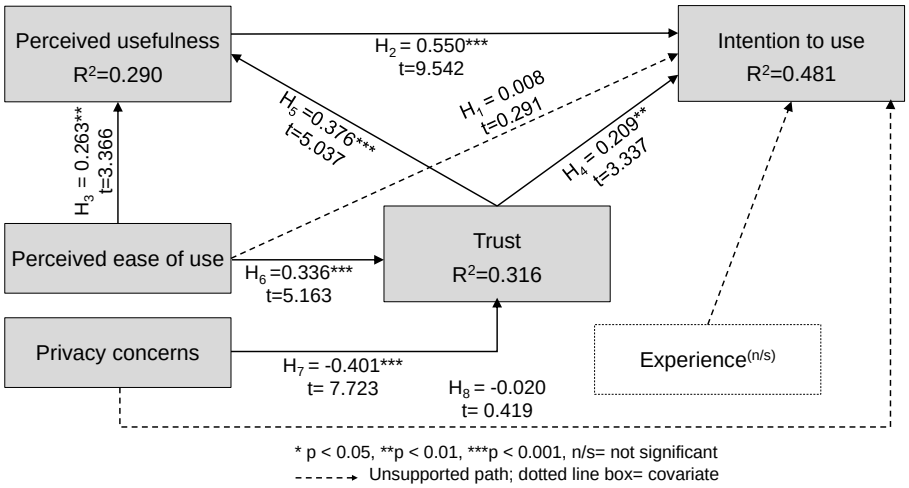


Figure 8: Conceptual model and partial least squares results from Rodríguez Cardona et al. (2021a, p. 562)

Furthermore, to assess the current level of chatbot technology diffusion in terms of the technical and functional complexity present in existing chatbots deployed for insurance settings, a sample of extant insurance chatbots was analyzed using the taxonomy of design elements for domain-specific chatbots presented at the beginning of the third part of this dissertation. Based on both analyses, a series of design implications in connection with the identified significant effects are provided. According to the partial least squares results for the structural model, perceived usefulness has a greater positive influence than perceived trust on the intention to interact with chatbots in an insurance context. In particular, this implies that chatbot design efforts should be directed at enhancing the perceived usefulness of chatbots in the eyes of the users, and must therefore prioritize the integration of chatbot design elements that add practical value to the digital experience of the user.

In view of the foregoing findings, a framework for the user-oriented design and implementation of chatbots is proposed. The research design used to develop this framework applied the design science research paradigm consistent with Vaishnavi and Kuechler (2015) in which semi-structured interviews are first conducted with experts and chatbot developers to identify the implementation conditions, relevant key issues, and the different phases comprising the implementation process of chatbots. The empirical insights obtained through the qualitative analysis of the semi-structured interviews were subsequently consolidated with further conceptual and technical knowledge from the human-computer interaction literature on user-centered design to derive the framework. To ensure the scientific rigor of the approach, the framework was evaluated through additional expert interviews, a focus group discussion, and the application of a case study. The final framework is composed of 101 user-oriented implementation questions structured in line with the previously identified implementation

phases, and the people, activity, context, and technology model of Benyon (2014; 2019), as shown in Figure 9.

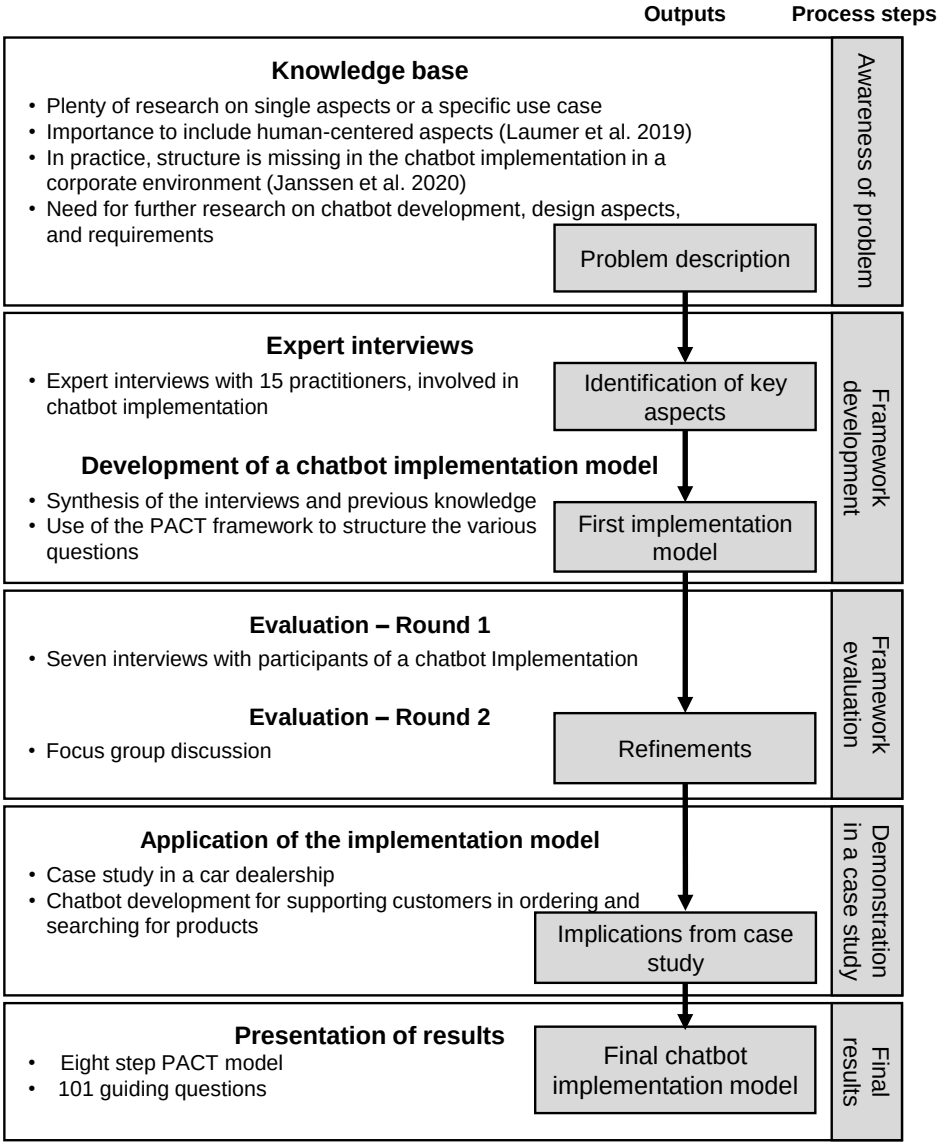


Figure 9: Representation of the research design followed by Janssen et al. (2022, p. 2)