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ORIGINAL RESEARCH

Sustaining the current or pursuing the new: incumbent digital transformation strategies in the financial service industry

A configurational perspective on firm performance

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Abstract Digital transformation (DT) is a major challenge for traditional companies. Despite the term, DT is relatively new; its substance is not: a whole stream of research has examined the relationship between DT and firm performance with contradictory findings. Most of these studies have chosen a linear correlational approach, however, did not analyze the holistic interplay of DT dimensions, leading to firm performance. This applies especially to the mature financial services industry and the future perspectives of traditional financial service providers (FSP). Hence, it remains an open question for both research and practice what DT configurations have a positive impact on firm performance. Against this background, the aim of this exploratory study is to examine how DT dimensions are systemically connected to firm performance of incumbent FSP. Drawing on a qualitative-empirical research approach with case data from 83 FSP, we identify digital configurations along different levels of firm performance. Our findings suggest an evolution of digital configurations of FSP, leading to five empirical standard types from which only one managed to establish a profound basis of DT.

Keywords Digital transformation · Banking · Insurance · Financial services · Configurational analysis · fsQCA

JEL Classification M15

Maik Dehnert is a research associate and project leader of "Banking" at the Chair of Business Informatics and Digitalization. His research focuses on digital transformation strategies, digital business models of incumbent firms and changing consumer behavior. His research has been published in Electronic Markets.

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1 Introduction

Management scholars have examined the difficulties of industry incumbents to innovate their business (Eklund and Kapoor 2019). Especially the financial services (FS) industry is undergoing a radical transformation. The previously stable market shows unprecedented competitive dynamics, regulatory changes and non-/near-banks as asymmetric competitors in the day and age of digital technologies. Practitioners speak of a disruptive change that could decrease the importance of traditional financial service providers (FSP), exemplified by a recent practitioner study (McKinsey 2019) that tackles future industry perspectives regarding profitability measures.

Our article focuses on DT of incumbent FSP with the characteristics of high market power, revenue streams from traditional services, and the presence of physical branches (Chiorazzo et al. 2018). Incumbent banks and insurance companies play an important role in society and for sustainable development, as they exert several important economic functions, such as the promotion of saving and wealth formation in the population and the credit supply to the economy. Given their long tradition, FSP have a particular focus on their B2C retail businesses with four major product types: payment, financing, investment and insurance (cf. Alt and Puschmann 2016), roughly resulting into two major subsectors: banking and insurance. While banking implies the transfer, accumulation and increase of savings and the provision of capital, insurance involves mainly the transfer and management of risks.

Traditionally, FS are barely interesting products, making differentiation difficult. Digitalization, however, makes customer orientation a central aspect for competition (Alt and Puschmann 2012; Bons et al. 2012; Nüesch et al. 2015). New digitally empowered competitors position themselves with a range of standardized digital and easy-to-handle products. While switching costs decline, customers can choose among the offers of both traditional and novel FSP for their accounts, payments, loans, mortgages, investments or insurance products, questioning their former strong, trust-based relationship to their FSP (Pousttchi and Dehnert 2018). In addition to new digital offerings, interaction via digital channels becomes a decisive competitive factor. Pousttchi et al. (2015) found that the traditional, direct communication scenarios could lose significant proportions against impersonal and indirect communication scenarios. The tendency towards digital services puts traditional FSP in an uncomfortable position: While the competitive effect of their dense branch networks weakens, cost pressure skyrockets. This development is also reflected in firm performance (PERF), which is reflected in key figures, such as profitability. Digital transformation may be a key driver to increase profitability by reducing costs and increasing revenues.

A whole stream of research has examined the relationship between digitalization and PERF (Aral and Weill 2007; Bharadwaj 2000; Chae et al. 2014; Chen et al. 2009; Koellinger 2008; Mithas et al. 2011; Rai et al. 2006). The findings are somewhat contradictory. Bharadwaj (2000), for instance, indicates that firms with a high IT capability outperform the control sample of firms on a variety of profit and

cost-based performance measures, whereas Chae et al. (2014) found no significant link between IT capability and PERF. Aral and Weill (2007), for instance, found that firms' total IT investment is not associated per se with PERF, however, investments in specific IT assets consistent with their strategic purpose can explain performance differences. More recent research, however, supports the notion of digital transformation being a mediator between IT investments and PERF (Nwankpa and Roumani 2016). In particular, DT was found to have a large and positive long-term effect on FSP PERF (Scott et al. 2017), productivity (Bertoni and Croce 2011) and organizational agility (Ravichandran 2018). DeYoung et al. (2007) also found a positive relationship between DT and community bank profitability.

One recurring finding is that specific configurations seem to be essential for PERF (Ray et al. 2005; Ketchen et al. 1997). In particular, prior studies on FSP showed that contiguous resource management is vital for superior PERF (Sirmon and Hitt 2009), however, none of this studies have yet analyzed the interplay of DT dimensions and its relationships to firm performance. Against this background, we tackle the following research question: 'Which digital configurations in financial services are systemically connected to superior firm performance, and which are not?' To tackle this research question, we adopt a qualitative-empirical research approach to examine if and how structural elements of digital transformation in FS are systemically connected to PERF and, accordingly, which FSP standard types have developed along different levels of PERF.

Our coherent research design consists of three steps. First, we develop a research model of the relevant DT dimensions to specify the research scope and lay the foundation for our further research. Second, we conduct a literature review with a deductive, concept-oriented approach to obtain a comprehensive overview of the current state of research on digital transformation in the FS industry. Third, we collect case studies from the international FS market to examine how a FSP's configuration of digital transformation is connected to PERF. In particular, we use fuzzy-set qualitative comparative analysis (fsQCA) as an innovative approach in management and IS research (e.g. Fiss 2011; Park and Mithas 2020; Werani et al. 2016) to identify standard types of consistent digital configurations in the FS industry.

The rest of the paper is organized as follows: In the next section, we provide the background, i.e. the research model and our setting along with a comprehensive literature review on DT in FS. In the Sect. 2.2.3, we conduct the configurational analysis. In the Sect. 4, we present the results of the configurational analysis and five standard types. In the Sect. 5, we discuss our findings regarding the identified FSP evolution as well as their future perspectives. We close with a conclusion and outlook.

2 Theoretical background

In a first step, we develop a research model that underpins our research design in two ways: On the one hand, it precisely circumscribes the area and scope of DT in FS. On the other hand, it structures both the review of the literature and the

configurational analysis. After this, we analyze the state of the art in research of DT in FS, collecting relevant literature, following the guidelines from Webster and Watson (2002). This helps us to gain a deeper understanding of DT for FSP and the potential impact of each dimension on PERF. A keyword search was conducted in relevant scientific databases (i.e. AISel, IEEE Xplore, ACM DL, EBSCOhost, ScienceDirect, SpringerLink, Proquest, Informs, Wiley) in mid-2019 to identify relevant literature for the following expressions: ("digital*" OR "digitiz*") AND ("financial service" OR "bank*" OR "insur*") within relevant research strands (i.e. IS, Business Informatics, Economics, FS, Banking, Insurance), and, subsequently, classified against our research model in a concept-oriented approach. The focus was on industry-specific DT articles in IS, management and industry-specific journals, listed in VHB-JOURQUAL3 as "B" or higher. Due to the novelty of the research field of DT, the search period started from 2010 onwards but was extended in the case of promising citations during the backward and forward search. This resulted in over 350 relevant sources for both industry sectors, from which only a subset of the 92 most representative research articles has finally been included in the paper. Hence, these papers were selected as they give an indicative picture of the different research strands in DT of FS for the building blocks of our research model.

2.1 The financial services industry

Banks and the insurance companies play a central role in modern economies as typical providers of financial services (e.g. Hellenkamp 2015; Nguyen and Romeike 2013). There are several functional similarities which both industry sectors share. First, this entails the *risk transformation function*. While banks reconcile the different risk propensities of debtors and investors in the credit and investment function, the insurance business model consists of risk identification, calculation, and balancing in underwriting processes. Second, the *maturity transformation function* allows banks to reconcile the different maturity interests of debtors and creditors, whereas specific insurance companies conduct savings and deposit businesses as well, such as life insurers. Third, the *customer service function* distributes complex financial products by means of customer advisory services. Hence, both sectors are characterized by the management of customer accounts: On the one hand, the banking current account, on the other hand, the insurance file. An important basis for these three main pillars is the *information transformation function*, i.e. the timely processing of financial market data in banking or the data-driven underwriting and premium pricing processes in insurance. Moreover, banks also perform *lot size transformation* activities, which are more comparable to reinsurer businesses, and provide *payment transaction functions*. These activities lead to comparable deposit and disbursement models of banks and insurance companies, which finally impact the annual net income and firm profitability (i.e. PERF). The competitive threat posed by declining revenues and high fixed costs, which challenge incumbent firms to secure their future economic existence, are particularly evident here. Regarding this, we systematize the concrete impact of DT on FSP across three dimensions in the following.

2.2 Digital transformation in financial services

Digital transformation affects the FS industry as digital technologies change business in three characteristic dimensions: value creation, value proposition and customer interaction (Pousttchi 2020; Pousttchi et al. 2019). The *value creation model (VCM)* captures the impact of DT on how FS products and services are created (Pousttchi 2020). This entails the underlying processes to perform the different business functions, such as risk, maturity, or information transformation. According to Pousttchi (2020), achieving both efficiency and effectiveness advantages requires a process-oriented reengineering of the firm (Hammer and Champy 1993); the corresponding business processes require a different form of management (Picot et al. 2003). The *value proposition model (VPM)* includes the impact of DT on what FS products and services are created, i.e. the improvement of existing products and services, the offering of new or even novel products and services, and changes in revenue models (Pousttchi 2020; Skålén et al. 2015; Teece 2010). This entails the concrete outcomes of the different business functions provided to different customer segments. FSP may conduct profitability and performance analysis and use data to develop new products and services. The *customer interaction model (CIM)* includes the impact on the nature and content of customer interaction in financial services, i.e. "the cross-channel and holistic design of the customer relationship and the inclusion of automated communication and modern forms of data analysis" (Pousttchi 2020). This entails the concrete interaction with customers in the customer service function, such as for sales, service, and marketing purposes.

Other factors from the fields of *technological* and *strategic choices* are systematically connected to these three dimensions. From a resource perspective, FSP require sufficient IT resources to conduct the business functions appropriately (e.g. standardized or customized hardware, applications, databases, and data warehouses). This entails the operation of the *IT core systems (CORE)* and cross-functional support of all activities. Regarding the information transformation function, *data analytics (DATA)* is a major technological driver and hence another suitable building block for FSP technological prowess (Sun et al. 2019). This includes data-driven decision-making from customer-contracting, to providing warning signals to financial market traders about position risk, to detecting customer and inside fraud and improving compliance and reducing model risks (e.g. Yang et al. 2017). *Digital strategies (STRA)* are another important driver for organizational change in incumbent FSP, with increasingly converging business and IT strategies (Bharadwaj et al. 2013; Constantiou and Kallinikos 2015; Grover and Kohli 2013; Matt et al. 2015; Seddon et al. 2017). In the area of strategy making, strategic technological partnerships entail a number of possibilities to enhance the business model (Al-Debei and Avison 2010; Osterwalder and Pigneur 2013). FSP sourcing decisions may affect the organizational distribution and competitive positioning toward new Fintech service providers. In this regard, *cooperation (COOP)* indicates to which extent incumbents have expanded their value network to third-party providers in times of open banking regulations.

There are further conceptualizations of DT available in the literature (see Vial 2019 for a review) which mostly coincide with our DT building blocks for concrete

tangible DT outcomes but also include additional qualitative aspects, such as agility or organizational culture, which would have been difficult to assess in our study and, hence, were not in the scope of our analysis.

The themes identified from the literature are introduced for each DT building block in the following.

2.2.1 Value creation model

The *value creation model* entails operations with a transaction processing downstream of product and sales activities such as risk transformation, transaction management as well as asset and liability management. There are different research strands on DT in FS in this area. Some scholars examined methods to measure the efficiency of FS processes (Frei and Harker 1999), others highlight specific barriers to digitalizing bank processes (Graupner et al. 2015; Graupner and Maedche 2015). Another stream of research dealt with structural characteristics of incumbent FSP (Zhu et al. 2004). Insurance-focused literature analyses mainly to what extent digital technologies can improve the internal core processes. Claims processes, for instance, can benefit highly from business platforms or spill-over effects from collaborating networks (Menon 2018). Further contributions concentrate on process automation (e.g. Braunwarth et al. 2010; Cooper et al. 2017) and flexibility gains (e.g. Afflerbach et al. 2014; Braunwarth and Ullrich 2010). In sum, prior research shows that digital business processes can foster firm productivity along the entire value chain in FS (Bertoni and Croce 2011; Eling and Lehmann 2018).

Since *IT core systems* are essential to perform tasks and processes of a FSP, serving as the IT backbone of the transactional business, another important question is how transformed the incumbent core systems are already. In this area, FSP typically operate 'legacy' systems, which are often older than 30 years. Accordingly, core system renewal is a major research area (Alt and Puschmann 2016; Mocker et al. 2015; Puschmann et al. 2012). Scholars, for instance, studied migration strategies for renewing core applications in banks and risk management systems of insurers (e.g. Wolle 2014). Another research stream is discussing application areas of blockchain technology, which is still in its early stages in practice (Avital et al. 2016; Nofer et al. 2017; Notheisen et al. 2017). Prior research has verified the impact of IT-driven innovation on PERF in particular for FS: Beccalli (2007) found a heterogeneous impact of different types of IT investments on bank performance, with especially IT outsourcing being positively related to PERF, whereas Harris and Katz (1991) discovered a positive link between IT investments and insurers' performance.

Prior research in the area of *data analytics* covered the management and applications of data-driven innovation (Sun et al. 2019). Possible implementation issues are important to consider (Audzeyeva and Hudson 2017), especially regarding data analytics for marketing purposes (Martens et al. 2016). Insurance-related literature explores and discusses the potential of advanced data analytics methods greatly to foster the actuarial competencies of insurers. Many contributions focus on the implementation of usage-based insurances or pay-as-you-drive models through sensors, actors and real-time analytics (e.g. Marabelli et al. 2017; Vaia et al.

2012; Weidner and Transchel 2015). However, new data sources and analysis methods can bring new opportunities for risk calculation and underwriting or forecasting (e.g. Biffis and Blake 2013; Boyer et al. 2012), for instance, using maintenance records to predict accidents (Bair et al. 2012). Further prospects derive from new possibilities for individual pricing and fraud detection (Crainich 2017). Performance-enhancing effects have been found for customer analysis and knowledge processing (Coltman et al. 2011; Setia et al. 2013; Tomczyk et al. 2016). In particular, prior research found that data analytics can, in fact, increase customer knowledge and, based on new service offerings, also the profitability of FSP (Alt and Reinhold 2012; Fang et al. 2016; Tomczyk et al. 2016).

In the area of *digital strategies*, scholars examined the presence of digital agendas (Bohnert et al. 2019), diversified intermediaries (Peng et al. 2017) and the impact of digital strategies on service productivity and service innovation (Aspara et al. 2017), all of which are positive factors on PERF. Potential paths towards digital strategies in FS are analyzed in the literature as well (Chanias 2017; Chanias et al. 2019).

2.2.2 *Value proposition model*

The *value proposition model* includes the business areas of product development, business direction and innovation management for originating and testing new products, services, and business models. Scholars identified novel types of digital products and services in FS in the area of *value proposition*, such as digital finance, investment, money, payment, financial advisory, and digital insurance (Gomber et al. 2017). Social customer relationship management (Du et al. 2019) and crowdlending (Blohm et al. 2016), for instance, are promising digital banking services. Insurance-related contributions cover mainly the benefits of usage-based insurances (Vaia et al. 2012) or cyber-risk insurances (Eling and Schnell 2016). Gordon et al. (2003) present a framework for cyber-risk insurances, while Zhao et al. (2013) explore useful alternatives. Other product innovations include insurances for SLA violations (Morshedlou and Meybodi 2018), reputational damages through social media, flaws from cloud computing services, semi-autonomous cars, or new product types, such as micro and add-on insurances (Fleisch et al. 2015) or integrated services (Mocker and Ross 2013). Concrete product implementations, such as robo advisors, have been examined in the literature as well (Jung et al. 2018a, b). Prior research found a positive relationship between digital service portfolio and service performance (Setia et al. 2013). Hernando and Nieto (2007) showed that in Spanish banks, the introduction of online banking was positively related to profitability. Regarding new digital revenue sources, only a few scientific contributions can be identified in the banking literature. Insurance-oriented literature reveals a similar picture: basically, usage-based insurance products (Vaia et al. 2012) and digital distribution channels (Klotzki et al. 2017) are analyzed as drivers to generate digital revenues. In sum, this indicates the potential crucial role of digital product portfolios, however, research on the impact of revenue models on PERF is still rare.

2.2.3 Customer interaction model

The *customer interaction model* in FS includes sales and customer services as well as marketing initiatives. In this area, multi-sided platforms set up novel recommendation and marketing systems to become the monopolized first touchpoint of the customer (Pousttchi and Dehnert 2018; Pousttchi and Gleiss 2019). With these new Fintech entrants, new challenges for customer interaction of FSP emerged. In this regard, digital channels are an important research stream (Cortiñas et al. 2010; Geng et al. 2015; Klumpes and Schuermann 2011), especially on new opportunities to interact with customers (e.g. Klotzki et al. 2017; Pousttchi and Dehnert 2018), and choosing the right channel for a specific service is a complex endeavor (e.g. Perissinotto 2003). The implementation of omnichannel management, taking changing user behavior into account, is even more complex (e.g. Honka and Chintagunta 2016). More generally, Dauda and Lee (2015) explored customer preferences in banking, whereas Dai and Salam (2014) identified service convenience as a significant factor for long-term relationships between customers and FSP. Several studies have analyzed the customer acceptance of new digital channels (Ackermann and Wangenheim 2014; Choudhury and Karahanna 2008; Polo and Sese 2016). The adoption of mobile services in banking (Bons et al. 2012; Ha et al. 2012; Laukkanen 2016; Sharma 2017; Zaffar et al. 2019) or insurance (Heinze and Matt 2018; Lee and Cheng 2007; Prasopoulou 2017) has especially been highly investigated in research. Other customer characteristics have also been examined, such as financial knowledge and risk preferences (Königsheim et al. 2017). Further light is shed on the importance of customer satisfaction, loyalty and retention (e.g. Hammerschmidt et al. 2016; Keiningham et al. 2015). Other contributions focus on the role of co-creation and self-service technologies (e.g. Moeller et al. 2013; Yu et al. 2012), which might lead to a reduction of service costs for FSP (Kumar and Telang 2012). Regarding the impact on PERF, Campbell and Frei (2010) examine the effects of digital customer interaction on short-term customer profitability and long-term customer retention. Their findings indicate that new digital services may lead to lower short-term customer profitability; however, the usage is also associated with higher customer retention rates over multi-year horizons, and leading to higher market shares.

The major research emphasis in the area of *cooperation* is on networking models of FSP. One particular research stream deals with digital platforms: Ondrus et al. (2015) analyze the effects of platform openness, Drummer et al. (2017) explore possibilities of credit marketplaces and Kazan et al. (2018) find categorization criteria based on value architectures. Further contributions identified challenges and opportunities of open platform models (Gozman et al. 2018). Other analyses examine ecosystem moves from competition towards coopetition between banks and Fintech (Drasch et al. 2018; Schmidt et al. 2018) or insurances and Insurtech, respectively (Stoeckli et al. 2018). More generally, some contributions shed light on how insurance companies cooperate with IT service providers to streamline their processed or reduce costs (Ejodame and Oshri 2018; Mani and Barua 2015; Willcocks and Lacity 1999; Zimmermann et al. 2018). The importance of intermediaries, particularly in insurance-related literature, has been explored widely

(Karaca-Mandic et al. 2018; Peng et al. 2017; Pousttchi and Gleiss 2019). Most of these contributions, however, did not account for the particular impact on PERF.

2.3 Configurational theory

Prior research has examined all of the aforementioned DT building blocks in a rather isolated manner. The findings indicate a particular influence of several dimensions, however, have not analyzed their particular interplay with regard to PERF. In this regard, the study of *organizational configurations* is a rather innovative research approach (Lee et al. 2004; Liu et al. 2017; Park et al. 2017; Park and Mithas 2020). Organizational configurations are "any multidimensional constellation of conceptually distinct characteristics that commonly occur together" (Meyer et al. 1993, p. 1175). The underlying theory suggests that organizations are best understood in their interconnected structures. In contrast to traditional regression analysis, configurational analysis focuses on the causes of effects not on the net effects of causes. While statistical approaches are symmetric, holding other dependent variables constant, configurational analysis allows to identify asymmetric configurations to achieve an outcome (Fiss 2011). The concept of *equifinality* considers at least two or more organizational configurations as separate paths to achieve PERF (Fiss 2007).

Firm performance serves us as an indicator of *competitive advantage* (Peteraf and Barney 2003; Porter and Millar 1985; Schilke 2014), measuring how well a firm can meet its goals and objectives compared with its primary competitors (Miller and Cardinal 1994). Our analysis focuses on the financial perspective of PERF with profitability measures as a well-accepted indicator in management (e.g. Hughes et al. 2019) and information systems (e.g. Chae et al. 2014). In case of low PERF over longer periods, for instance, the raison d'être of a FSP may be at stake, while superior PERF is generally characterized by higher profitability, growth and market value (Cho and Pucik 2005).

The *resource-based view* suggests that firm-specific resources are the primary determinants of PERF (e.g. Nwankpa and Roumani 2016). Thus, we argue that DT configurations are systemically connected to PERF, since more digital FSP may, after an initial adoption phase, generate more profits through increasing revenues and decreasing costs. Drawing on the concept of equifinality, we account for multiple causal relationships linking DT and PERF (Fiss 2011). Some FSP might focus on digitalizing their value-creating processes and infrastructures, some might concentrate on developing new value propositions, and others may prioritize strengthening their value network and introduce digital channels for customer interaction first (Sebastian et al. 2017). Each approach presents a different way of assembling DT logic, potentially connected to different PERF. In this regard, the results of the literature analysis highlight multiple potential influences from the DT building blocks on PERF which are connected in a systemic, but non-linear way. Our research follows an inductive approach to analyze these connections.

Control variables in fsQCA are usually not incorporated into the analysis as we do not estimate independent effects of causal variables but focus on combinations of causally relevant conditions (Fiss 2011). As such, we identified three potential

contingency factors for PERF in the literature: Firm size, regulation and interest rate situation (e.g. Forman 2005). First, there are studies on firm size in FS that underline its impact on the choice of bank strategies (e.g. Tallon 2010). One of these studies showed that smaller banks may benefit more than larger ones from the adoption of digital technologies (Scott et al. 2017). Second, regulation sets the political frame for FSP in DT (Knackstedt et al. 2013) and different regulations might affect PERF. Finally, the interest rate situation affects existing revenue models (Altavilla et al. 2018; Hayo et al. 2019) and, thus, may drive and limit DT. In the context of FS, however, we found only a few research articles supporting these factors in DT. There are, for instance, no scientific contributions regarding the relationship between interest rates, DT building blocks, and PERF. Hence, following the two-step QCA approach (Schneider 2019), we conducted prior necessary condition analyses by obtaining current data based on market estimates on the global FS regulation and interest rate situation from industry experts (Citibank 2018, 16; OECD 2019) and assigning these to the companies in the best possible way. This was difficult for two reasons: first, the majority of the companies in our sample are large international corporations; therefore, we based our assessments mostly on the domestic markets. Second, our study focuses largely on highly regulated and homogeneous low-interest markets, such as Europe or the US, leading to only a little variance between local interest rates. Our preliminary test of the contingency variables as necessary conditions for PERF showed that, despite an existing correlation between regulation as well as interest rate and PERF, no substantial causal effect is to be expected on PERF. We decided not to include external factors other than firm size into our main analysis due to the restrictions in the number of variables to incorporate, as an in-depth contingency analysis was not the aim of this paper. The fsQCA typically follows an iterative process (Greckhamer et al. 2018) unless the focus is on theory-testing (Park et al. 2020). Hence, we included these variables in additional robustness checks (c.f. Sect. 4.4).

Figure 1 shows the research model for configurational analysis with its seven DT building blocks.

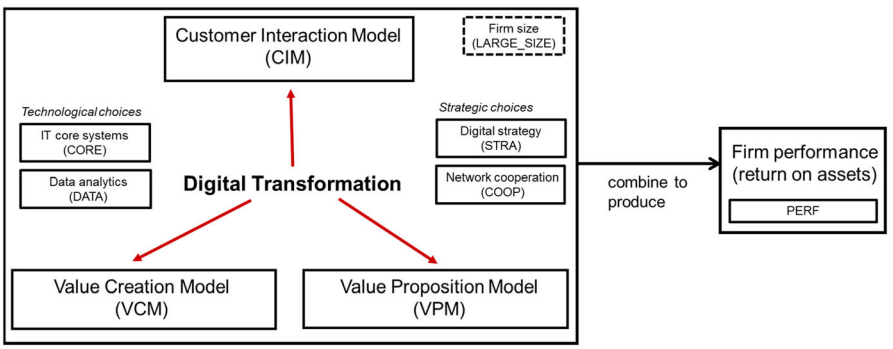

Fig. 1 Research model

3 Research approach and analysis

While our literature review confirmed a potentially positive impact of all building blocks of our research model on PERF, the focus of this study is on the interplay of the DT building blocks, as these are interconnected in different ways. Regarding this, *configurational analysis* allows us to incorporate larger numbers of cases and identify the combinatorial nature of organizational configurations associated with an outcome in a holistic way (Fiss 2011; Park et al. 2017). Prior research into configurational methodologies revealed a mismatch between configurational theory and particular methods, such as cluster analysis (Fiss 2007). We use fuzzy-set qualitative comparative analysis (fsQCA) as a representative of set-theoretic methods to avoid this pitfall (Fiss 2011; Schneider and Wagemann 2013). Set-theoretic methods build on configurational theory in their conceptualization of cases as combinations of Boolean variables in the analysis (Ragin 2008). The fsQCA method is particularly suitable for qualitative data analysis to identify configurations that can be used for theoretical abstraction in the context of typology formation. In this sense, the fsQCA reflects the causal structures with both core (necessary) and peripheral (sufficient) conditions to achieve an outcome (e.g. firm profitability). The fsQCA allows one to include ordinal and continuous measures from 0 to 1 to describe the outcome variable more precisely and to stay with the Boolean algebraic logic (e.g. Fiss 2007; Ragin 2008; Schneider and Wagemann 2013). In the following, we use the fsQCA 3.0 software package to analyze digital configurations of FSP that lead to the outcome of PERF.

3.1 Data collection

To run its analysis, fsQCA requires researchers to operationalize items and calibrate the membership of cases in dimensions and outcome variables. In contrast to most qualitative research, fuzzy sets formalize concepts by representing membership numerically. An item shows how strongly a FSP adopts a particular digital building block, e.g., by coding qualitative data or aggregating responses on items from a survey. This requires to make informed, justifiable choices based on data and theoretical knowledge regarding the presence or absence of relevant conditions and outcomes in the empirical FSP cases. At this, our approach follows guidelines on qualitative data use in fsQCA (e.g. Greckhamer et al. 2018; Nishant and Ravishankar 2020). It consists of three steps: (1) operationalization of the research model, (2) coding of cases, and (3) calibration of the data. In the following, the research sample is described and each step is shortly introduced.

3.1.1 Research sample

Our dataset comes from a diverse set of incumbent FSP. The outcome of interest PERF was used to identify a purposeful sample of suitable cases (Greckhamer et al. 2018). The qualitative data collection took place in mid-year 2019. Our theoretical sampling was done inductively with a focus on different FSP types, firm size, and

regions. To avoid limited diversity, we especially looked for companies from different PERF categories. Our goal was to reflect the international state of the art in DT, but also to include regional banks in the sample. To identify a representative set of major international FSP, we went through reviews, lists, and international banking awards (e.g. Euromoney, Asian Banker Award). We further identified important minor (i.e. regionally operating) FSP in Europe and the US in press and practitioner releases. An important criterion was the availability and practicability of firm-specific information for the purpose of our analysis. Since there is only sparingly available public data on smaller FSP, especially regarding IT core system status, data analytics, and digital strategy, we conducted additional telephone interviews and a management survey with DT executives from 22 German community banks. These banks operate on a regional level and draw on similar corporate structures, whereas they differ in their size and location (city, periphery, and rural area) as well as in their digital maturity. Our final sample includes 59 banks and 24 insurance companies from mostly Europe (55), the US (12) as well as the rest of the world (16) such as Asia, Africa, and Australia.

3.1.2 Operationalization

In the first step, we developed measurement items based on the findings of our literature review for every building block of our research model. We examined what observations and other types of qualitative data translate into what range of values on a single DT building block. Helpful sources were theoretical knowledge, scales from relevant survey items (e.g. Aral and Weill 2007; Chae et al. 2014) as well as empirical findings from other studies. If we detected ambiguities in connection to a specific dimension, we revisited our operationalization, which provides the necessary means for a systematic and transparent assignment of items scores across all DT building blocks (Legewie 2017). We subsequently discussed the operationalization, based on 5-point scales as anchor points, with a handful of FS practitioners who gave us helpful remarks.

For the VCM, we look at the digital implementation of contracting processes in major product areas from the perspective of customers, for instance, accounts, loans and savings in banking, leading from many non-digital interfaces to end-to-end digitalization. We further examine the products and business models of each FSP for the VPM regarding the degree of digital revenues, ranging from traditional-only to data-driven credit and telematics tariffs. Regarding the CIM, we consider the channels of each FSP, ranging from the provision of traditional branch to a complete set of digital channels including video consultations or AI-based chatbots. Regarding IT core system status, we examine the digital maturity of the core transaction system of each FSP, ranging from untransformed legacy systems to transformed cores. We further look for the presence of tactical or strategic data analytics applications. We analyze whether FSP are in concrete agreement with Fintech, either as a platform sponsor or partner, regarding network cooperation. We finally examined the extent and time frame of digital strategy for each FSP. For PERF, we rely on recent numbers on return on assets (RoA), which is a commonly used indicator in both management (e.g. Fiss 2011) and IS research (e.g. Bharadwaj

2000). The RoA lays out how profitable a company is in terms of its net income relative to its total assets, thus, how well a company utilizes its assets (Deloitte 2013). RoA is a particularly appropriate measure for incumbent FSP, as these firms operate as monoliths with extensive assets (e.g. branch networks) and, thus, high operating costs. We also include the actual numbers of employees for each FSP as a typical figure for firm size.

3.1.3 Coding

The second step turns each dimension and seeks to determine scores while coding. For each dimension, we developed a list of codes to identify the respective building block(s) of DT and subsequently its maturity for each firm. Regarding the annual reports, we also coded information on business processes, workflows or innovations, such as in the area of operations. The building block VCM, for instance, includes processes, systems (including industry-specific characteristics and supplier brands), work environment, employee competencies, workplace, and operations. Based on the coded case's relevant data and the developed scale, each coder assigned a score. Concrete references on the re-engineering of processes or the standardization of IT systems were indications of a high maturity of the VCM, which, however, also had to be reflected in the concrete functionality to the customer, such as on the website or via an app, at which each coder had an in-depth look. The observation to be able to "make purchases and sales of securities, sign-ups and repurchases by funds, and conduct arbitrage online", for instance, translates to the high degree of digital processing in the VCM. Similarly, the scale has been grounded on behalf of the literature and through the analysis of the cases for each building block. The information in annual reports and press releases was further used to assess each FSP's digital strategy, IT core system status and data analytics. For instance, time and content of statements, such as: "business uplift from 'Think Forward' digital strategy" translate to the extent of digital strategy-making involved, and likewise for the other DT building blocks. The coding procedure was done by the research team with two scientific assistants, independently.

Interrater reliability is measured using Krippendorff's alpha with values between 0 ("random") and 1 ("perfect match"). In our case, alpha was 0.835 for the coding in our dataset, which is well above the recommended threshold of 0.8 (Krippendorff 2004). Thus, the interrater reliability is good, which may be mostly attributed to the clear definition of the measurement items during the operationalization. The research team subsequently had in-depth discussions on all areas with more pronounced differences in coding, which further enhances the reliability of the coding procedure. We complemented the coded case data on DT with independent actual financial data for the outcome variable of PERF, which also avoids common method bias (Podsakoff et al. 2003). We used single values of RoA which we accessed via recent annual reports and from market data platforms. Accordingly, we rely on numbers of firm size.

3.1.4 Calibration

In the third step, we calibrate the income and outcome variables into set-membership scores. The use of fuzzy scores with fsQCA forces us to employ theoretical and substantive knowledge in the creation of the measure (Fiss 2007). In this sense, calibration defines the extent to which a given case has membership in the set of, for example, a certain level of PERF. There are three qualitative anchors implemented in fsQCA: full membership, a crossover point of maximum ambiguity and full nonmembership (Ragin 2008). These three anchors have to be determined by our contextual knowledge (Fiss 2007; Park et al. 2017; Ragin 2008). The original interval-scale data are converted into fuzzy membership scores by calibration of fuzzy sets that range from "0" to "1" (Ragin 2009). Thus, the final fuzzy set can be seen as a continuous variable that has been purposefully calibrated to indicate the degree of membership (Ragin 2008). In that sense, fsQCA assigns all cases with values below the lower boundary to "0" (full nonmembership) and all cases above the upper boundary to "1" (full membership).

We especially have to consider how to calibrate the outcome variable PERF measuring firm profitability (RoA). In fsQCA, it is possible to analyze the configurations for the presence and the absence of an outcome separately (Greckhamer et al. 2018). To determine the sustainability of the competitive advantage based on the differences between companies that have a difficult or a more solid market position, we have chosen a conservative approach to RoA calibration. We use a RoA value of "0.8" as the upper boundary for the analysis, "0.2" as the crossover point and "0" as the lower boundary. The crossover value of 0.2 allows for both a rational distinction between the low-end (inferior) and better performing (superior) FSP (PERF, 0.8, 0.2, 0). Using this low outcome threshold, we can examine low-performing digital configurations indicating a long-term financial risk that may endanger the raison d'être of the FSP. We do this by negating the calibrated outcome ($\sim$ PERF), which outputs digital configurations of inferior FSP that cannot achieve an RoA of "0.2" at the lower end of the market.

The list of calibrated sets with their anchor points is described in "Appendix". The set labels for each DT building block represent a *high level of maturity* in case a condition is present for the sake of simplicity.

3.2 Configurational analysis with fsQCA

After calibration, in the next step, we apply truth table analysis in fsQCA that identifies consistent combinations of the DT building blocks producing the outcome variables (Ragin 2008). A truth table includes all logically possible combinations of the elements, and each row corresponds to one combination. We included the seven *DT building blocks* and *LARGE_SIZE* as input variables leading to PERF, with profitability as the outcome variable. The truth tables are depicted in "Appendix".

The truth table algorithm calculates a consistency score that explains how reliably a combination results in the outcome. This consistency value is defined as the subset membership score between two sets (Ragin 2009) and can be seen as an indicator of the quality of the results, comparable to significance levels in regression

analysis. We set the recommended value "0.8" as a cutoff for raw consistency. Thus, only combinations with a raw consistency of at least "0.8" go into further reduction algorithms. We set minimum PRI consistency value "0.5" to avoid fatal inconsistencies but also allow for broader coverage (Greckhamer et al. 2018), in additional robustness checks we set this threshold to "0.75" (c.f. Sect. 4.4).

In the next step, we define a frequency cutoff as the minimum number of cases in each combination to be considered further. When the total number of cases is manageable, i.e. less than 100 cases, frequency cutoffs of 1 are appropriate (Ragin 2009). As we could gain familiarity with each case during the interrater coding process, this mitigates the coding errors that would motivate the use of a higher threshold. Based on the threshold "0.8" for raw consistency, the performance column shows a value of "1" for all combinations with a raw consistency above 0.8, otherwise "0". The reduction procedure then finds smaller sets of configurations.

After the reduction, we identify necessary and/or sufficient conditions for the outcome of interest. This is also referred to as *core* and *peripheral conditions*, which are two core aspects of causality (Fiss 2011; Ragin 2008, 2009). Three solutions are derived by fsQCA for each analysis: A "complex" solution (no logical remainders used), a "parsimonious" solution (all logical remainders used) and an "intermediate" solution (selected logical remainders used). For the latter, we use our theoretical knowledge based on the literature to define whether a DT building block is present or absent, to achieve the respective level of PERF. If this remains unclear, the logical remainders are not defined and not incorporated into the analysis. For low PERF, this entails the theoretical assumption that the three DT dimensions and the building blocks of IT core systems, data analytics and digital strategy are *absent*, the rest were defined as present or absent. For superior PERF, this includes the theoretical assumption that the three dimensions and a dedicated digital strategy are *present*, the rest were defined as present or absent.

4 FSP configurations in digital transformation

In this section, we present the results in the form of multiple configurations that produce PERF from which we derive standard types of FSP.

4.1 Sufficient solutions

We next describe the causal recipes sufficient for different performance levels based on the fsQCA notation (Ragin and Fiss 2008). Table 1 presents the fsQCA results in the Boolean expression for parsimonious and intermediate solutions: * means logical operator AND, + means logical OR, and ~ means negation, → denotes the logical implication operator. The set-subset relationships between core and peripheral conditions are of special interest in set-theoretic analysis. Core conditions in fsQCA are examined by the parsimonious solution, whereas peripheral conditions refer to the respective intermediate solutions for achieving a certain level of PERF.

Exemplarily, regarding superior performance, our findings indicate a parsimonious solution with three causal recipes (configurations), meaning three different

Table 1 Configurations of elements sufficient for different levels of performance

Outcome	Parsimonious solution	Intermediate solution
Low performance	**CIM * ~ COOP** + ~ **VPM*STRA** → ~ PERF	~ CORE * ~ DATA * ~ VPM * **CIM * ~ COOP** * ~ LARGE_SIZE + ~ VCM * ~ CORE * ~ VPM * **CIM * ~ COOP** * ~ STRA * ~ LARGE_SIZE + ~ VCM * ~ CORE * ~ DATA * ~ VPM * **CIM * ~ COOP** * ~ STRA + ~ VCM * ~ CORE * ~ DATA * ~ **VPM** * CIM * **STRA** * ~ LARGE_SIZE → ~ PERF
Superior performance	**COOP * ~ STRA** + ~ **VCM * ~ STRA * ~ LARGE_SIZE** + **VPM** → PERF	CIM * **COOP** * ~ **STRA** + **COOP * ~ STRA** *LARGE_SIZE + ~ **VCM** ~ COOP * ~ **STRA** ~ **LARGE_SIZE** + VCM * DATA * **VPM** *CIM * COOP + **VPM** * CIM * COOP * ~ LARGE_SIZE + CORE * DATA * **VPM** * CIM * COOP → PERF

*: AND, +: OR, ~: NOT, →: implicates

combinations of the DT building blocks produce superior performance (see Table 1): **COOP* ~ STRA + ~ VCM * ~ STRA * ~ LARGE_SIZE + VPM** → PERF. This can be interpreted as the combination of present value network cooperation and absent digital strategy or the combination of absent digital processes, absent digital strategy and absent large firm size or a present digital value proposition. Following the notion of Park et al. (2017) and Park and Mithas (2020), the elements in the parsimonious solution are embedded in the intermediate solution as a bold font. The elements of the parsimonious solution described are *core conditions* that have a strong causal relationship with the outcome. The other elements in the intermediate solution are *peripheral conditions* that have a weaker relationship with the outcome. They complement core conditions for achieving PERF.

We explain the fsQCA notation in more detail in "Appendix".

4.2 Configurations

In this section, we describe the configurations identified along two different levels of PERF.

First, we analyze configurations of low performing FSP at the low end of the market. We do this simply by analyzing those configurations that are consistent for the absence of the outcome of performance. This is done using a negation of the outcome variable (~ PERF, with RoA < 0.2). That means, all FSP which cannot achieve superior performance get "full membership" and are, thus, low performers. As Fig. 2 shows, we found four configurations with two main solutions that FSP adopt which achieve low performance. The raw coverage of 0.55 indicates that the DT conditions included explain a considerable share of the outcome variable PERF.

The first main solution, comprising A1, A2 depicts FSP with digital customer interaction but without Fintech cooperation. These FSP, at least partly, managed to innovate their customer interaction but failed to digitalize their value proposition as well as huge parts of their value creation, especially regarding IT core systems. The second main solution comprising B is constituted by FSP with a digital strategy but lacks a digital value proposition with digital products and revenues. These companies managed to digitalize their customer interaction regarding digital channels, however, the VCM and especially the VPM are still rather untransformed—with non-digital processes, non-digital IT core systems and not yet existing advanced data analytics. Configuration A1 has the largest unique coverage, in the equifinal solution set for low performance, which indicates that A1 is the empirically most relevant configuration of low (inferior) performers. Configuration A1 includes 11 FSP with a membership score above 0.5, and A2 and A3 each have 1 FSP. Configuration B includes 3 FSP.

Second, we examine the configurations for superior performing FSP with higher profitability levels. As Fig. 3 shows, we found six configurations for FSP which achieve *superior performance* (PERF, with RoA > 0.2) with three main solutions. The overall solution consistency is 0.89, which is far above the recommended cutoff value (0.80). The raw coverage of 0.68 indicates a broad explanation of PERF by the DT conditions included.

Configurations for Achieving	Low Performance			
	Solution			
	A1	A2	A3	B
Firm Size		⊗		
Digital Strategy		⊗	⊗	●
Value Network Cooperation	⊗	⊗	⊗	
IT Core System Status	⊗	⊗	⊗	⊗
Data Analytics Use	⊗		⊗	⊗
Value Creation Model		⊗	⊗	⊗
Value Proposition Model	⊗	⊗	⊗	⊗
Customer Interaction Model	●	●	●	•
Consistency	0.89	0.92	0.94	0.80
Raw Coverage	0.42	0.21	0.24	0.37
Unique Coverage	0.14	0.00	0.03	0.10
Overall Solution Consistency	0.81			
Overall Solution Coverage	0.55			

● present core condition • present peripheral condition blank: don't care

⊗ absent core condition ⊗ absent peripheral condition

Fig. 2 Digital configurations of FSP for achieving low firm performance (PERF)

The first main solution, comprising C1 and C2, depicts both larger and smaller FSP with a strong focus on Fintech cooperation but without an actual digital strategy. The second main solution, comprising D, describes smaller FSP that are based on non-digital processes and, thus, do not yet define a digital strategy or any value network cooperation. The third main solution, comprising E1, E2 and E3, depicts FSP with digital value propositions and digital customer interaction. They build upon value network cooperation and, at least partly, managed to innovate their IT core systems and data analytics applications. The consistency value of all the six solutions is well above the recommended cutoff (0.8). Configuration E1 has the largest unique coverage in the equifinal solution set for superior performance, which indicates that E1 is the empirically most relevant configuration of the superior performers. Configuration C1 includes 4 FSP with a membership score above 0.5 and C2 includes 2 FSP, respectively. Configuration D only includes 2 FSP. Configuration E1 comprises 11 FSP, E2 19 FSP, and E3 8 FSP, respectively.

Configurations for Achieving Superior Performance	Solution					
	C1	C2	D	E1	E2	E3
Firm Size		●	⊗		⊗	
Digital Strategy	⊗	⊗	⊗			
Value Network Cooperation	●	●	⊗	●	●	●
IT Core System Status						●
Data Analytics Use				●		●
Value Creation Model			⊗	●		
Value Proposition Model				●	●	●
Customer Interaction Model	●			●	●	●
Consistency	0.91	0.97	0.82	0.93	0.89	0.98
Raw Coverage	0.31	0.24	0.09	0.46	0.35	0.43
Unique Coverage	0.01	0.03	0.03	0.04	0.03	0.03
Overall Solution Consistency	0.89					
Overall Solution Coverage	0.68					

● present core condition ● present peripheral condition blank: don't care

⊗ absent core condition ⊗ absent peripheral condition

Fig. 3 Digital configurations of FSP for achieving superior PERF

4.3 Standard types

The results of configurational analysis can be interpreted in such a way that the fsQCA software identifies several solution sets that represent ideal types. These ideal types display standard types as outcomes of the case-based typology derivation (Fiss 2007, 2011). Each of the real type FSP refers more to one of these standard types than to another. We return to the data through case-level analyses to interpret the fsQCA findings and facilitate theory building (Greckhamer et al. 2018). In the following, we analyze the DT configuration of each standard type in detail with special regard to a typical example from the cases. Due to their important role and the differences identified with regard to the DT strategies adopted, the three subtypes of standard type E are described in greater detail.

Table 2 depicts each of the standard type in detail. We have used the pseudonyms Alpha and Beta to maintain the anonymity of the representative FSP for standard type A and B, respectively.

4.3.1 Standard type A—facader (Alpha)

The community bank Alpha is a typical representative of standard type A. Alpha started DT a few years ago with an external project, leading to a first catalogue of DT measures, but still does not have a comprehensive digital strategy. Up to now,

Table 2 FSP standard types

Dim	Type				
	A Facader	B Transitioner	C Cooperator	D Preserver	E Innovator
SIZE	Small and medium community banks, insurance companies	Small and medium community banks, large banks	Esp. medium and large insurance companies	Small insurance companies, small private banks	Esp. large banks and insurance companies
STRA	No dedicated digital strategy	Dedicated digital strategy	No dedicated digital strategy	No dedicated digital strategy	Digital as an inherent long-term part of corporate strategy
COOP	No strategic cooperation with Fintech	No strategic cooperation with Fintech	Strong Fintech ecosystem	No strategic cooperation with Fintech	Strong Fintech ecosystem
CORE	Untransformed legacy core	Incremental update of legacy core	Incremental update of legacy core	Incremental update of legacy core	Incremental update of legacy core or transformed new cloud core
DATA	Not recognizable	Tactical application (e.g. rule-based customer sales)	Tactical applications (e.g. small data risk underwriting)	Not recognizable	Strategic applications (e.g. product development or fraud detection)
VCM	Low maturity (non-digital processes, many interfaces)	Medium maturity (individual categories, such as digital mailbox services)	Medium maturity (individual categories, such as digital claim processing)	Low maturity (non-digital processes, many interfaces)	Medium or high maturity (e.g. digital loans, AI-based process automation)
VPM	Low maturity (existing products, online tariffs)	Low maturity (existing products, online tariffs)	Medium maturity (e.g. digital apps, new tariffs)	Low maturity (existing products and tariffs)	High maturity (e.g. data-driven tariffs, software licensing, personal finance, robo advisory)
CIM	High maturity (digital channels, e.g. video banking)	High maturity (additional digital channels, e.g. WhatsApp)	High maturity (digital channels and appointments)	Medium maturity (mobile app)	High maturity (e.g. biometrics, AI chatbots, third party integration of channels)

the institute mainly relied on DT of the CIM, for instance, the development of an online customer portal, the underlying campaign management or the provision of additional digital channels. Many digital customer channels are already offered (e.g. chat, video, screen sharing) but have not yet been fully integrated. The institute does

not cooperate with Fintech, except for the payment area; it relies more on the IT standards set by its umbrella organization. Regarding its VPM, only few digital products, such as P2P payments, were already introduced. Regarding its VCM, the company considers itself to be rather backward-oriented and relies on the group's IT service provider. The umbrella organization has, for instance, introduced a center for the evaluation of digital process maturity in which Alpha takes part. The introduction of new processes aims primarily at increasing operational efficiency internally, such as in the area of digital signatures. The introduction of an incremental update of the IT core system is planned, which will introduce new customer-configurable advisory solutions such as construction financing and further improve interaction with customers via digital channels, especially sales and back office processes. Externally, Alpha provides solely consulting services with tablets using mobile communication technologies, such as Wi-Fi. Advanced data applications are currently not apparent at Alpha.

The standard type A constitutes a frequently occurring type of FSP with a strong focus on customer interaction. In addition to Alpha, other community banks especially run the risk of remaining in this group. However, for standard type A, not only banks but also insurance companies correspond to this type. Like Alpha, NICL India lays a strong focus on customer interaction, for example, via dedicated online customer portals, social media channels or 24/7 accessibility on live chat. The low performing FSP of this group might be even in more trouble in future as they are not well prepared regarding digital business models.

As these FSP have not yet implemented digital processes and improved their IT core systems and barely incorporate digital innovations in their VPM, those companies rely on digitalizing their interface towards the customer. These FSP digitalize their front end but not their back end, giving the outward impression that they are highly digitized but, in fact, are not. Customers experience this especially, for instance, through many non-digital processes and long processing times. Thus, we call this type a "facader."

4.3.2 Standard type B—transitioner (Beta)

The community bank Beta is a typical representative of the standard type B. Beta has newly developed a dedicated digital strategy with external partners and participates in strategic projects of the umbrella organization, such as identity services. An incremental update of the old core banking system has already been introduced, cloud core migrations are planned. Regarding the CIM, Beta relies on new consulting settings, such as customer-configurable services and new advisory settings with tablets as well as the connection to further customer channels, such as WhatsApp. Beta was also focusing on the development of a mobile application for the young customer group and, together with its partners, is developing additional interfaces to connect business partners. Regarding the VPM, Beta started to invest in new developments in the product area, for example, in new app functions, such as P2P payments. The core processes at Beta are more digitalized than at Alpha, but there are still many process interfaces and the channels are not integrated from the customer's point of view. As with Alpha, process digitalization at Beta is primarily

internally focused, such as a paperless branch, digital file, or digital mailbox. Currently, Beta does not rely on strategic Fintech cooperation, except for payment, but shows a greater willingness than Alpha to do so in the future. Data silos could be reduced through a new release of the IT core. In the area of data analytics, Beta has implemented a rule-based customer sales engine ("next best product") but is not using any advanced techniques yet.

The standard type B constitutes a transition type regarding DT. In addition to Beta, there are other banks which follow this DT logic and, thus, constitute this group. Like type A FSP, these low performing FSP might struggle in the future if they do not manage their ongoing transition towards a more digitalized business model. Like type A, these FSP have implemented digital channels for customer interaction to a greater extent but are still lagging concerning digitalizing their VCM and VPM. These FSP started adopting dedicated digital strategies but have not yet managed to transform their VPM. Hence, the implementation is evolutionary and based on an old technology back end. Thus, we call this type "transitioner."

4.3.3 Standard type C—cooperator (Allianz)

Allianz is a typical representative of standard type C. The transformation of Allianz was first set out in the recently adopted corporate strategy, which is one of the important company initiatives leading to a newly established technology committee. In contrast to FSP type A and B, the entry into new digital business fields is achieved mostly by drawing on strategic technology cooperation. Allianz has formed many technological alliances through partnerships, for example, with the Chinese company Baidu or the mobility provider Drivy, to increase digital competitiveness. The company also relies on Fintech and Insurtech partnerships in the area of data analytics. Allianz X is a fund and incubator for start-ups to access innovative business models. Similar to Alpha and Beta, the transformation so far has been focused on digital channels and web-based interactive tools for improved interaction with customers. Customers currently have access to online contracts, apps for motor vehicles (claims payment) and a digital customer portal (online, app). A digital factory deals with the redesign of the customer journey, and meanwhile, appointments with brokers can be arranged digitally. However, Allianz has not yet fully digitalized its VPM, only provides an app-based digital claim processing, but aims to radically simplify its insurance products, such as homeowners' and liability insurances, in future. Some products can already be configured online, but most products require intensive personal advice and cannot be concluded online. In addition to its technological partnerships, Allianz builds on its existing infrastructure, with individual IT systems slowly being replaced, especially the IT core systems, to become faster and more agile. To improve this, the harmonization of IT systems and VCM processes is being pushed ahead across the company, such as underwriting systems and data centers.

This standard type applies to several international insurance companies such as Generali, Roland, and Prudential. The standard type C constitutes a frequently occurring type of FSP that puts an emphasize on cooperation with Fintech, especially to incorporate new forms of value proposition and customer interaction.

Those companies have a focus on customer interaction but only dispose of initially digitalized value creation and products or services; they try to compensate for this through strategic cooperation. Thus, we call this type "cooperator."

4.3.4 Standard type D—preserver (Emmental)

A typical representative of standard type D is the insurance company Emmental, which is a small customer cooperative for property and liability insurance. It has made a name for itself in B2B sectors, such as agriculture, in addition to its private customer business. The company regards the insurance business as a relationship business, following the claim: "We are there for our customers personally." Consequently, the company focuses on personal advisory services. As the focus remains on personal contact scenarios, in its CIM and VPM, Emmental provides only essential digital channels and digital products. The paper-bound process of claims recording, for instance, can already be done via a mobile app. In this case, the electronic claims report and the fee invoice are imported electronically, compensation agreements can be entered directly via mobile app and corresponding payments can be initiated digitally. Emmental also does not explicitly have a dedicated digital strategy. To this end, the corresponding IT core systems have been revised, however, advanced data applications are not used.

The standard type D constitutes a less frequently occurring type of FSP. These FSP rely mainly on non-digital customer relationships (e.g. in branches or agencies). Due to intense customer relationships, these FSP preserve their non-digital heritage, and do only provide essential digital services such as mobile apps. This type of FSP applies to smaller insurance companies that have not established a digital strategy but operate in a non-digital way. This standard type might also be applicable to smaller private banks although the sample did not incorporate this type of FSP. Thus, we call this type "preserver."

4.3.5 Standard type E—innovator (Ping An)

Ping An is a typical representative of a type E1 FSP. This type pursues a strategically farsighted DT approach on platform ecosystems and data. As a bancassurance offering car policies, life insurance, mortgage loans, credit cards and bank accounts, Ping An features a strong digital focus on finance based on three core technologies: AI, blockchain and cloud computing, to support several ecosystems: FS, health care, auto services, real estate services and smart city services (Kyriasoglou and Palan 2019). Similar to Amazon, Ping An sells its software and analysis tools to other financial providers and generates its own revenues through its digital value proposition (VPM). Ping An develops new business models outside the boundaries of the traditional banking and insurance business (e.g. China's largest used car platform Autohome or the health portal Good Doctor, Kyriasoglou and Palan 2019). These digital services form the basis for future digital revenues. Compared to type C insurance companies, Ping An is very digitalized along all three DT dimensions: Policy sellers, for example, are selected using data analyses, voice robots replace call center employees and claims

processing is already fully digital (VCM). However, direct non-digital customer touchpoints still exist (CIM). Ping An also relies heavily on networking partnerships (COOP): With a strong emphasis on platform ecosystems, Ping An connects several European B2B customers via APIs, providing its technology to other banks and insurances (Kyriasoglou and Palan 2019). Through its software licensing business, Ping An also gains access to the data of other international insurance companies and banks. The company builds individual platforms, develops new digital products, and integrates digital channels using artificial intelligence (DATA). Accidents, for example, can be analyzed by means of recorded images from a mobile app connected to an extensive spare parts database (Kyriasoglou and Palan 2019). Data required for credit assessment is provided by facial recognition, for example, and prospective credit applicants conduct interviews for the credit granting directly via mobile app (Kyriasoglou and Palan 2019). Ping An is able to analyze and segment customers and dynamically adjust product recommendations and prices based on its big data platform.

Incumbents of type E2, small and medium banks, such as EmiratesNBD, international community banks, such as Umpqua, as well as insurance companies, such as HukCoburg, emphasize digital value propositions with first comprehensive data-driven tariffs (VPM), a strong ecosystem integration, and special industry applications. Emirates NBD, for instance, extends its product portfolio to include social aspects (i.e. social banking) and offers interfaces in non-banking areas (e.g. fitness accounts). Other FSP such as Wells Fargo provide their products fully digitally via mobile apps. What these FSP still lack is a fully digitalized IT core system.

Incumbents of type E3, medium and large banks, such as DBS, China Merchants Bank or Sberbank, as well as insurance companies, such as Achmea, already operate full digital divisions. DBS, for instance, sets a strong focus on its operational IT backend for greater automation and scalability, which distinguishes it from FSP of other standard types. Sberbank, on the other hand, relies on a re-engineered centralized service platform. In the VCM, standardized business processes and integration strategies enable flexible service provision, such as digital services which allow customers access to banking services without necessary branch visits. DBS renewed its IT core systems, a new cloud-based core banking system for more scalable operations, and provides, on this basis, strategic data applications, such as AI-based product recommendations and fraud detection (Skinner 2020). China Merchants Bank, for instance, relies on a data platform for big-data analyses to recommend its products to customer segments.

In summary, the standard type E constitutes a frequently occurring type of FSP with a strong focus on digital VPM. It is a common type of FSP that *proactively* faces DT. Insurance companies, such as Ping An, or IAG Australia, as well as banks, such as DBS, Emirates NBD or China Merchants Bank, belong to FSP type E. These FSP belong to the better financial performers. These FSP mostly pertain over higher digital process maturity and data capabilities than all prior standard types, in some cases, having already completed the transformation of their IT backbone. What firms of this type have in common, is their long-term orientation on DT, indicated by its crucial inherent role in corporate strategy-making and

organizational culture. This gives these companies a decisive time advantage over companies from the previous types, which also leads to a reduction in costs and greater possibilities in the area of digital products and services. Thus, we call this type "innovator."

4.3.6 Future standard type—full-digital FSP

What all prior cases have in common is that the DT of the VCM and related technological back end has not yet been completed—either from an underlying processual, IT system or a data technological perspective. Fintech such as N26, Revolut, or Oscar, however, operate on modern "full-digital" core systems. On the incumbent side, the standard type F has not yet been fully established in the market (we did not find a consistent solution), however, our prior findings clearly show it on the horizon. This type constitutes FSP that innovate their digital IT backbone, eliminating legacy systems to build full digital services on this (like Fintech or Insurtech companies who operate straight-forward digital cores). In the VCM, standardized business processes and integration strategies enable flexible service provision, such as DBS Digibank, a full-digital service which allows customers access to banking services without having to visit a branch. Santander has launched its fully digital Openbank, with full-digital services available through a single website and mobile app, and automated investment through robo-advisory.

In future, this type will resemble FSP operating on a fully digital backbone. Most of these full-digital FS services provide banking services separately from the parent organization (e.g. Goldman Sachs Marcus), and some of these initiatives also failed on the market (e.g. RBS Bó). The FSP of future type F may represent either a digital spin-off from an incumbent organization (such as described) or an evolution of one of the previous FSP types (esp. the innovators). Thus, we call this type "full-digital FSP." This type masters all building blocks holistically but may still provide traditional advisory services upon request to specific customer segments (e.g. via pop-up stores).

4.4 Robustness checks

One important aspect of fsQCA studies is to ensure that the essential findings, i.e. the configurations identified, do not change greatly through a variation of the input factors, such as the sets of variables, calibrations or settings included (Greckhamer et al. 2018; Schneider and Wagemann 2013). One way to check this is to perform robustness checks in which individual parameters are systematically varied (cf. Greckhamer et al. 2018). Our additional analyses encompass five models with (a) a higher PRI consistency value of 0.75, (b) a bank/insurance distinction variable, (c) additional contingency factors, but only the three central DT dimensions, IT and data systems (due to restrictions in the number of variables), (d) different crossover values for PERF and e) different calibration values of the outcome PERF. The details of these specific analyses are described in "Appendix".

While these analyses provide additional interesting insights into the structures of the relationships, in sum, the interpretation of the results remained substantively

unchanged. Type B and D FSP (the transitioners and the preservers) were already at the boundary of consistency thresholds in our main analysis, so, they should be considered with caution. However, we stick to these standard types since our additional case analyses revealed strong differences in the DT approach between these FSP and the other types, especially for small and medium-sized companies. Our analyses provide evidence particularly on the dichotomy between type A facaders and type E innovators that is backed by many cases, revealing an impressive contrast in terms of the sustainable competitive advantage between companies that will struggle to survive in the short to medium term (i.e. the facaders) and those that are better prepared to meet the competitive challenges and generate new revenues (i.e. the innovators). This underlines the fact that in our sample, with the conditions for FS mentioned above, DT could primarily be understood as a lever to maintain the sustainable competitive advantage of a firm (i.e. the long-term survivability of the companies), however, since companies are in the midst of their DT process, today's digital maturity is not necessarily a factor for differentiating the high or even very high performers according to our analyses.

5 Discussion

Prior research has exemplified competitive dynamics induced by IT for several industries other than FS (e.g. Segars and Grover 1995). We observed the evolution of DT in FS across two different PERF levels. We argued that five standard types exist in the market, each of them consisting of FSP following the same DT logic. With regard to our research question, our findings indicate that DT configurations

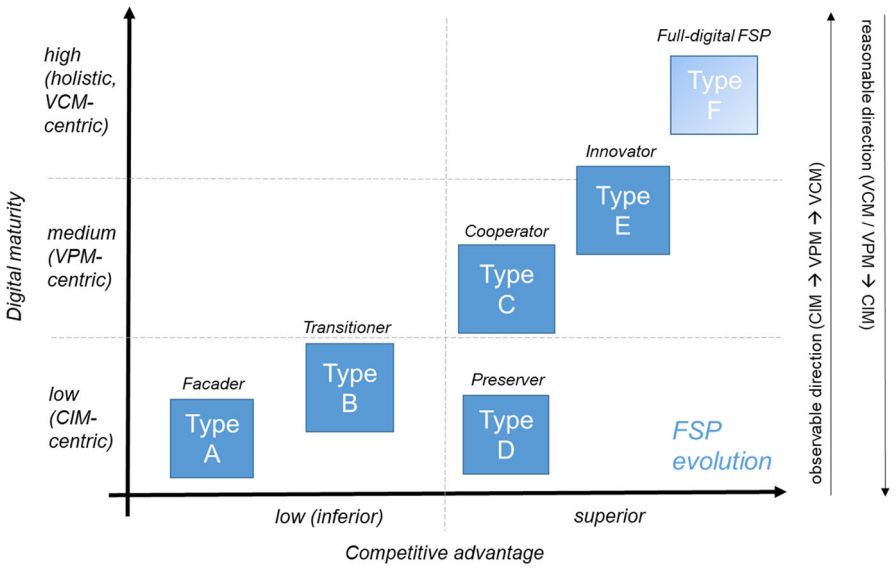

Fig. 4 FSP evolution

are related to certain levels of PERF, with two types of less developed DT configurations being related to low PERF and, one type of more advanced DT configurations being related to superior PERF. With the help of our qualitative-empirical research approach, we were able to show that the relationship between DT and PERF is non-linear, since there are also consistent types of FSP which, with low levels of DT, still produce useful market results. Our analysis also showed that no consistent DT configurations have been identified that lead to (very) high PERF.

Although the evolution across different types does not necessarily reflect the evolution of each single FSP over time, it shows the industry evolution of achieving increasing levels of digital maturity. Figure 4 illustrates the relationship between the identified standard types, their digital maturity, and competitive advantage.

Our findings point out that most incumbents approach DT incrementally or even defensively, only some incumbents take DT as their core business in all three dimensions holistically. Our results show that low-performing FSP (type A, B) follow CIM-centered transformation strategies but, to a large extent, neglected their VCM and VPM. Type A *facaders* rely on "quick wins" by offering digital interaction channels (CIM) on the basis of existing dysfunctional organizational structures (VCM). Type B *transitioners*, at least, established a digital strategy, although they have not yet managed to change their portfolio of services. Some FSP focus solely on strategic partnerships to deliver customers' digital services (type C). Type C *cooperators* use cooperation as a lifeline to offer their customers an innovative range of digital products and channels, despite their dysfunctional VCM. Lastly, some of the higher performing FSP focus on transformation of their VPM and have started to digitalize their VCM (type E). Type E *innovators* see innovation of the business model as their core task, although an end-to-end digitalization of their VCM is still partly neglected. A type F *full-digital FSP* will build its operating model around a digital core. Some FSP, the *preservers*, are remarkable exceptions to this scheme due to their special firm structures and personal relationships with customers (type D). Whether type D *preservers* can sustain superior PERF in the long run will depend strongly on their customers' behavior such as face-to-face consultations for high net worth individual, complemented by digital services.

Figure 4 also indicates that the observable direction of FSP evolution goes from CIM over VPM towards VCM; but, from a theoretical standpoint, a move in the other direction would be more reasonable. Our findings showed that a pure front end approach (CIM first) goes hand in hand with path dependencies in the infrastructure that make comprehensive DT impracticable in the long term. A back-end approach (VCM first) or even better a holistic DT approach might deliver a more comprehensive and structured approach to business model innovation in the case of FS. In this regard, our results for the FS industry are in line with findings from other industries (Kuk and Janssen 2013).

There are two propositions that can be drawn from our findings.

First, we propose that facade digitalization, which describes a type of digital strategy with a high maturity in customer interaction (CIM) but a low maturity of the value creation and value proposition building blocks (VCM and VPM, respectively), will lead to low PERF and mitigate a firm's future perspectives substantially, especially for small FSP. The absence of digital business models is

particularly evident here, due to outdated processes and technological backwardness as well as the absence of strategic technological partnerships (e.g. platform ecosystems). (P1).

Second, we propose that holistic digital configurations, which entail established digital strategy-making along with a high maturity of the three DT building blocks at the core (VCM, VPM and CIM), advanced digital technology use and the presence of strategic technological partnerships (e.g. platform ecosystems), will lead to superior PERF and sustainable competitive advantage. The presence of digitally transformed value propositions is particularly crucial in this regard. (P2).

Accordingly, we provide evidence that DT is a nonlinear process that favors holistic approaches (Park and Mithas 2020) but in the current transitional phase, also gives backward firms the chance to keep track. This as an opportunity, especially for type C FSP, to climb the ladder of digital maturity. Smaller FSP, such as community banks in low-interest areas, are particularly at risk, as a sufficient financial cushion turned out to be a necessary condition for achieving a high IT core system status. This underlines the path dependencies to overcome, primarily by switching to more cost-effective and flexible cloud services. In this regard, firm size serves as a cushion in difficult FS environments, such as a low interest rate situation or regulation, however, DT is not a condemnation of firm size. A number of regional banks were represented in the three standard types A, B and E, just as there are some large FSP among the facaders. Traditional banking and insurance strategies will remain important drivers for PERF but no guarantee for high PERF in the future, especially since FSP are in the midst of their transformation to fully leverage the effects of the digital value propositions on their revenue models. Another interesting finding was that digitalization has become an inherent long-term part of corporate strategy for the innovators, so that a dedicated digital strategy as a declaration of intent has become obsolete. Our study also reveals some remarkable differences between the two FS industries, as insurance companies may currently still achieve an acceptable PERF despite rather low levels of DT, whereas the banks in our sample typically do not do so. In particular, those FSP who do not manage to evolve at least to standard type C might struggle to maintain their competitive advantages, especially in the light of persistent low interest rates and high customer expectations.

It is questionable how the FSP evolution can be explained and what future perspectives of FSP will look like. Our findings highlight the role of *long-term* digital orientation, which was not always the case. One plausible reason is the market valuation orientation of firms. Another reason could be the *asset specificity* of firms. Prior research found that the greater an incumbent's asset specificity to an old operating model (such as branch-based FS) and the greater the level of competition they face, the lower their firms' valuations are when investing in the new model relative to when investing in the existing model (Eklund and Kapoor 2019). The literature further suggests that firms adjust their future digital investments to their market situation (Mithas et al. 2013). As such, digital strategy exerts an increasingly convergent effect under higher industry concentration and

higher industry growth. Most of the incumbent FSP, especially in Europe and the US, operate in saturated markets. Thus, the aim of these FSP in B2C business is not market growth at first but rather securing their market shares in face of new competitors and industry concentration which limited their willingness to invest in DT for a long time. We also found that direct competitors tend to move in tandem, such as type A, type C or type E, forming a strategic group (Fiegenbaum and Thomas 1995). In future, the pressure for low-performing FSP to digitalize will further increase as the branch network continues to become less differentiating (Pousttchi 2020). Fintech competition will also increase, such that Google, Apple, Facebook, or Amazon might extend their engagement in the FS industry. At this, our analysis also shows the warning implication that FSP which do not manage to evolve at least to standard type C will struggle to gain competitive advantages in the long run.

Hence, it is reasonable that survival of FSP will depend on the FSP evolution path depicted in Fig. 4. Those FSP who succeed and pass these stages toward truly digital operations will stay in the market, others will disappear (at least in their present form). The most threatened FSP, standard type A and B, such as community banks, are struggling the most with the necessary efforts to renew themselves. FSP who aim to achieve at least the performance of standard type C will either innovate their business with Fintech cooperation or (better) build their own digital business regarding value proposition and value creation. Type C shows that pursuing a new model firstly via *alliances* (e.g. Fintech cooperation) might indicate a strategy that helps to mitigate the necessary adjustment costs of transformation. It is reasonable that low-performing banks and insurance companies will make further use of platform ecosystems in the form of *open banking* and *insurance*, as well as *infrastructure sharing* in the area of IT core systems becomes a major issue. The most evolved FSP (standard type F) will have a sophisticated digital VCM, VPM and CIM in its holistic DT approach, successfully innovated their IT core system and pursue advanced data analytics.

6 Conclusion

In this study, our aim was to analyze the evolution and perspectives of FS in DT. Based on our research model, we first conducted a comprehensive literature review to identify the state of the art in research. Subsequently, we applied the fsQCA to examine the relationships between DT configurations and firm performance, and finally derived five empirical FSP standard types.

Our findings indicate an evolution of DT in the financial sector. Traditional FSP may adopt one of three general approaches.

- Focusing on digital customer interaction via apps and other digital services while leaving the underlying ground fundamentally untouched;
- developing their CIM while focusing on the digital proposition model using agile methods and aiming for low-hanging fruit but addressing the CORE only to a limited degree; or

- going the hard way, re-engineering their processes and developing a digital core as a basis for a sophisticated digital value proposition and customer interaction—while still being able to offer non-digital services if necessary (e.g. for face-to-face advisory and/or high-value customers).

Our findings have shown that the last approach is the most sustainable one. For research, our study provides three key contributions. First, we synthesize the existing literature on DT of FS with a comprehensive approach. Second, we explain the complex dynamics of DT in FS with an innovative configurational approach. At this, we identified the phenomena of *facade digitalization*, which describes a prevarication or misrepresentation of the actual digital competitiveness of FSP which may also apply to firms in other industries. Third, we make a methodological contribution by applying fsQCA to investigate the complex relationship between DT and PERF by means of configurations.

There are several limitations to be considered when using the results. We did not measure actual customer behavior but digital configurations (e.g. not digital channel use but digital channel availability). Further on, our data are based on qualitative coding and restricted to the information on the FSP available within the sample. The coded characteristics, measured on one-dimensional scales, are, in reality, multidimensional constructs. Our results have shown the relationship between DT configurations and PERF. The causality is ambiguous, since financial scope, which is based on the financial success of the companies, can also be cited as a necessary condition for achieving certain DT goals. There are a few FSP that are not financially successful but have already started to digitalize (e.g. Deutsche Bank). However, these firms do not form their own consistent standard type—our results are, therefore, not to be understood as typical correlational analysis but have their strength in the nonlinear set-theoretic approach for the analysis of causal mechanisms. In addition, our analysis of small and medium-sized FSP was limited to the western markets. However, at the time of the analysis, we did not identify any inconspicuous digital business models from smaller FSP in other regions (e.g. Asian banker awards). A future research option is utilizing metrics for PERF that measure the market valuation of companies, such as Tobin's Q. Future research should further examine the industry evolution based on longitudinal data sets over time. Regarding our main findings, it is to be expected that the gap between low and superior performers will tend to widen if the revenue models of the digital value propositions take full effect.

For practice, our findings clearly suggest that a proactive DT is a decisive factor for FSP PERF. The FSP standard types with their digital configurations allow one to categorize market participants and assess their future perspectives.

7 Appendix

7.1 Calibration—sets and anchor points (Table 3)

If we refer to the variable names of the sets for the DT building blocks, their presence always implies a high level of maturity.

Table 3 Calibration of sets

Variable	In ("1")	Crossover ("0.5")	Out ("0")
LARGE_SIZE	> 50,000 employees	10,000 employees	< 1001 employees
STRA	Dedicated digital strategy (at least three years in place)	To some extent part of corporate strategy	Not available
COOP	Strategic cooperation with Fintech or Insurtech	(Crisp set)	No strategic cooperation with Fintech or Insurtech
CORE	Transformed new integrated core	In transformation (modernized core)	Not transformed old core
DATA	Transformed new strategic big data applications	In transformation (tactical small data applications)	Not transformed data collection and use
VCM	Transformed digital processes, mostly without non-digital interfaces	In transformation (standard cases digitally possible, advanced cases require human intervention)	Not transformed non-digital processes, with many non-digital interfaces
VPM	Transformed products and revenues, i.e. data-driven credit and telematics tariffs	In transformation (e-commerce business products and tariffs)	Not transformed products and revenues, i.e. existing products and tariffs
CIM	Transformed interaction, i.e. chatbots, voice assistants or video consultation	In transformation (digital channels available: website, online portal, mobile app)	Not transformed interaction, i.e. branch, hotline
PERF	RoA $\geq$ 0.8	RoA = 0.2	RoA $\leq$ 0
$\sim$ PERF	RoA $\leq$ 0	RoA = 0.2	RoA $\geq$ 0.8
HIGH_PERF	RoA $\geq$ 1.5	RoA = 0.8	RoA $\leq$ 0
VERY_HIGH_PERF	RoA $\geq$ 5.0	RoA = 1.5	RoA $\leq$ 0
FAV_Regulation	High	Medium	Low
FAV_Interest	> 4%	2%	< 0%

7.2 Truth tables (Tables 4, 5)

Table 4 Low performing FSP

SIZE	STRA	COOP	CORE	DATA	VCM	VPM	CIM	Number	~ PERF	Raw consist	PRI consist
0	1	0	0	0	1	0	1	2	1	0.93	0.80
1	0	0	0	0	0	0	1	1	1	0.92	0.80
0	1	0	0	0	0	0	1	2	1	0.92	0.77
0	0	0	0	1	0	0	1	1	0	0.89	0.38
0	0	0	0	0	1	0	1	2	1	0.86	0.66
0	1	1	0	0	0	0	1	1	1	0.81	0.52
0	0	0	0	0	0	0	0	1	0	0.79	0.34
0	1	1	0	0	0	1	1	1	0	0.78	0.36
0	0	1	0	0	0	0	1	1	0	0.77	0.40
1	0	1	0	0	0	0	0	1	0	0.60	0.04
0	1	1	0	1	1	1	1	1	0	0.53	0.10
0	0	1	1	0	1	1	1	1	0	0.53	0.01
1	1	1	1	1	0	1	1	1	0	0.50	0.00
1	1	1	0	1	1	1	1	1	0	0.47	0.10
1	1	1	1	1	1	1	1	1	0	0.39	0.03

Table 5 Superior performing FSP

SIZE	STRA	COOP	CORE	DATA	VCM	VPM	CIM	Number	PERF	Raw consist	PRI consist
1	1	1	1	1	0	1	1	1	1	1.00	1.00
0	0	1	1	0	1	1	1	1	1	1.00	0.99
1	1	1	1	1	1	1	1	1	1	0.98	0.97
1	0	1	0	0	0	0	0	1	1	0.97	0.94
0	1	1	0	1	1	1	1	1	1	0.95	0.90
1	1	1	0	1	1	1	1	1	1	0.94	0.90
0	0	0	0	1	0	0	1	1	1	0.92	0.57
0	0	0	0	0	0	0	0	1	1	0.89	0.66
0	1	1	0	0	0	1	1	1	1	0.87	0.62
0	0	1	0	0	0	0	1	1	1	0.85	0.60
0	1	1	0	0	0	0	1	1	0	0.80	0.48
0	0	0	0	0	1	0	1	2	0	0.73	0.34
0	1	0	0	0	0	0	1	2	0	0.71	0.19
0	1	0	0	0	1	0	1	2	0	0.71	0.20
1	0	0	0	0	0	0	1	1	0	0.70	0.20

7.3 fsQCA notation

Figures 2 and 3 depict the results of Table 1 graphically using the notation system by Ragin and Fiss (2008), with the available templates by Fiss (2011). We number the configurations in our figures based on core conditions to indicate first- and second-order equifinality (Fiss 2011; Park et al. 2017). We label the configurations A1 and A2 in Fig. 2, for instance, because they share the same set of core conditions. Each solution block in these figures represents one configuration of conditions and corresponds to one recipe of the intermediate solution. Large circles indicate core elements, and small circles indicate peripheral elements. Full circles indicate the presence of a condition, and crossed-out circles indicate its absence. This means that dark circle elements are an enabler for the outcome and crossed-out elements may inhibit an FSP from achieving the outcome. The absence (X circle) in digital strategy in Fig. 2, for example, means that full membership in digital strategy does not exist in the configuration (i.e. inhibiting role of digital strategy), and the presence of value cooperation (dark circle) means that full membership for technology cooperation exists (i.e. enabling role of cooperation), which leads to superior performance. The presence of customer interaction model underlines the digital customer interaction model as an enabling peripheral element of this configuration. Blank spaces, such as in A1 for LARGE_SIZE, indicate a "don't-care situation," for example, whether LARGE_SIZE is present or absent. In addition, each figure shows two types of measures for validating the solutions: Consistency and coverage. Overall solution consistency measures the degree to which all configurations together consistently result in an outcome. The overall consistency for superior performance in Fig. 3 was 0.89, which is well above the recommended minimum level of 0.80 (Ragin 2008). The FSP can achieve performance with different digital configurations, but individual configurations differ in their empirical importance and effectiveness. Thus, coverage shows the empirical relevance and effectiveness of the solution for the outcome (Ragin 2008). Raw coverage indicates which share of the outcome is explained by a certain alternative path (comparable to R^2 in regression analysis); unique coverage indicates which share of the outcome is exclusively explained by a certain alternative path (Rihoux and Ragin 2009). Unique coverage is depicted for each solution in Figs. 2 and 3.

Robustness checks

Regarding (a), higher PRI consistency values typically reduce empirical coverage. Hence, standard type A, the CIM-focused facader, turned out to be the most empirically relevant type of low performing FSP. We found solutions for the superior performers that confirm type C (i.e. large companies with strong ecosystems) and type E (i.e. companies with strong digital value propositions). The analysis also highlights subtypes of E as potential independent standard types (i.e. the process digitalizers, the business model digitalizers and the technological leaders in IT core systems and data analytics) and reveals the rather low empirical representation of standard type D FSP (the preserver).

Regarding (b), we made an explicit bank to insurance comparison. As our results confirmed, large insurance companies tend to be less strategically digitalized than large banks (cf. primarily type C, in exceptional cases also type A) but are more likely to achieve higher levels of PERF. However, there are also more digitally advanced insurance companies that fall into type E (e.g. AXA).

Regarding (c), the consistency analyses incorporating the additional sets FAV_Regulation (Citibank 2018, 16 [4]) and FAV_Interest (OECD 2019) also confirmed the phenomenon of facade digitalization (absent VCM, present CIM) for the low performers in a difficult market environment; as well as the crucial role of digital value propositions for the highly digitalized innovators (type E, especially under difficult interest and regulatory conditions) among the superior performers and shone additional light on the role of sheer company size for type C.

Regarding (d), the main results could be largely confirmed for the slightly higher PERF crossover value of 0.4. We found two types of CIM-centric FSP that rely on digital customer interaction but lack digital processes or value propositions, with some companies among them that want to "go for digital." The superior PERF types remained largely unchanged.

Regarding (e), we found no configuration for high PERF (1.5, 0.8, 0) or very high PERF (5.0, 1.5, 0) that entails a parsimonious solution, hence, there was no stable configuration. Remarkably, companies in a favorable regulatory and interest rate environment were the only ones with a very high PERF (e.g. Sberbank).

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