



Exploring characteristics and transformational capabilities of InsurTech innovations to understand insurance value creation in a digital world

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Abstract

Recent developments in the insurance industry embrace various “Insurance Technology” (InsurTech) innovations. To date, there is a lack of structured assessments of InsurTech. Prior research on FinTech fails (1) to clarify how InsurTech can be characterized and what capabilities are employed, and hence, (2) to reveal implications for value creation on firm and industry level. We address this by inductively building a model of InsurTech innovation adopting the grounded theory method. Our empirical data includes 208 InsurTech innovations from a market analysis based on Twitter data and a multiple-case study. The resulting model comprises 52 characteristics and 14 transformational capabilities and is integrated with extant value networks and intermediation literature. The former explains how InsurTech affects firm-level value creation and suggests that disruptive potentials emerge from aligning the transformational capabilities along three interdependent activities. The latter explains the entrance of digital intermediaries and their roles in the personal insurance market.

Keywords InsurTech · FinTech · Digitalization · Insurance · Insurance IT innovations

JEL classification L22 · O32 · O33 · M15 · M13 · N20

Introduction

Today, the manifestation of the digitalization is already far progressed and goes beyond shifting from analog to digital information. Its disruptive nature leads to and requires contemporary strategies, processes, organizational structures, products, and services throughout different industries, but at different pace (Fitzgerald et al. 2014). In this regard, incumbent insurances struggle to become digital leaders with clear digital business cases, despite the intangible nature of their products and services (EY Global Insurance 2013).

However, in a world of increasing uncertainty and dynamics, the economic and social importance of being insured seems undisputed and even gains in importance. Accordingly, the potential to harness information technology (IT) to innovate the traditional insurance industry is tremendous for both incumbents and new market entrants (Puschmann 2017). Against this backdrop, rising start-up companies such as TröV, Bought By Many, and Knip are drawing on simplicity, flexibility, and customer centricity and, thereby, reach a broad audience (Alt and Ehrenberg 2016). This puts traditional insurers in danger (Alt and Ehrenberg 2016); their role, besides being pure risk carriers, is challenged.

In these premises, the field of Financial Technology (FinTech) and Insurance Technology (InsurTech) is gaining attention from scholars (e.g., Alt and Ehrenberg 2016; Puschmann 2017; Zabolokina et al. 2016) and practitioners (e.g., PricewaterhouseCoopers 2016) alike. Due to the novelty of the topic and the scarcity of scientific literature on FinTech and InsurTech, prior research on this emerging phenomenon lacks structured empirical assessments (Puschmann 2017). In fact, most prior research is “not grounded in empirical evidence” (Muthukannan et al. 2017, p. 4). Hence, two research gaps are apparent.

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First, recent research on FinTech has yielded taxonomic models that describe FinTech business models (Eickhoff et al. 2017) as well as consumer-oriented service offerings (Gimpel et al. 2017). To date, structured empirical assessments of the insurance-specific branch of FinTech, that is InsurTech, are still non-existent. It remains unclear how InsurTech innovations can be characterized and what capabilities they employ. In particular, we consider capabilities as abilities of organizations to utilize their organizational resources to perform a corresponding activity (Helfat and Peteraf 2003), which are transformational in the sense that they affect incumbent cost and value structures. Accordingly, we pose the following research question:

RQ1: What are the characteristics and transformational capabilities of InsurTech innovations?

Second, it remains unclear how contemporary InsurTech innovations affect firm-level value creation of insurances. Since decades, such analyses have been approached by decomposing firms into strategically critical activities and representing these activities in an integrated form to assess the impact of IT on their cost and value structures. Having identified the characteristics and transformational capabilities of InsurTech innovations constitutes the foundation to integrate them in a holistic form that fits the underlying nature of value creation and to analyse implications on industry structure. This is relevant, because incumbents need to respond not only to evolutionary changes in their markets through sustaining innovations, but also to revolutionary changes through disruptive innovations (Christensen and Overdorf 2000). As such, we pose the following second research question:

RQ2: What are the implications of InsurTech on firm-level value creation and industry structure?

Analyzing the InsurTech market in a structured way promises to provide insight into FinTech in general, and InsurTech in particular. To do so, this research inductively builds a model of InsurTech innovation by following a grounded theory method approach. The empirical data consists of a list of 208 InsurTech innovations from a market analysis based on Twitter data, a multiple-case study, and additional sources of evidence. The emergent model is integrated with existing value network and intermediation literature. While the former reveals implications on firm-level value creation, the latter explains the entrance of digital intermediaries on industry-level.

The remainder of this article is structured as follows. First, we conceptualize InsurTech. Second, we introduce and elaborate on the research methodology. Third, the emergent model of

InsurTech innovation is presented. Fourth, the model is integrated into and discussed in the light of literature on value networks and intermediation. Finally, the present article ends with conclusions illustrating contributions, limitations and future research.

Background on InsurTech and FinTech

At its core, insurance arrangements consist of a risk transfer (Trowbridge 1975). To put it simply, a customer transfers a risk to an insurance coverage provider, which in return evaluates the risk and charges a corresponding amount of money. Technological innovations have to be seen against the backdrop of the ongoing digitalization. At the risk level, IT alters risk parameters, e.g., objects get enriched with sensors and connectivity (McKinsey 2015). In particular, vehicles, houses, and factories are digitally equipped and embrace properties such as being programmable, addressable, sensible, communicable, memorable, traceable, and associable (Yoo 2010). In regard to the insurance customer, studies show that customers have changed their behavior in the course of digitalization. For example, 21% of consumers in the US are said to own wearable technology products (PricewaterhouseCoopers 2014). Moreover, 37% of daily communication is now digital, almost half the decision-relevant shopping information comes from digital sources, and consumers own 2.5 Internet-ready devices on average (Esche and Hennig-Thurau 2014). In the insurance industry, a significant part of customer interactions is said to be digital by 2020 (Maas and Janesch 2015). The financial industry is moving toward customer orientation with a growing consideration of all states of the customer journey (Alt and Puschmann 2012). On the risk assessment level, IT and data enable a more fine-grained risk assessment by insurance providers. For example, the above described change in the behavior of customers to use wearable technology for self-improvement and self-monitoring creates new opportunities for health and life insurance. Today, most data arising from connected products is not even used by the manufacturer itself (McKinsey 2015); hence, much of the potential remains unexploited supporting the growing relevance of InsurTech within the insurance industry. In summary, the customers, the risks, the insurance providers as well as their intersections are affected (e.g., the relationship of customers to the risk, the assessment of the risk by insurers, and the relationship between customers and insurance).

Although the body of literature on FinTech and InsurTech is scarce, prior research comprises attempts to conceptualize the term FinTech (Puschmann 2017). Therefore, we build on existing conceptualizations to derive a definition of InsurTech and to clarify how the term is understood in the present research acknowledging that “most of the approaches focus on banking [...] while only a few consider insurance” (Puschmann 2017, p. 71).

For this endeavor the structured review on FinTech conducted by Zavolokina et al. (2016) provides a comprehensive foundation (see Table 1). At first, “solutions for the insurance industry are often more specifically named ‘InsurTech’” (Chuang et al. 2016, p. 3) and InsurTech is seen as the “insurance-specific branch of FinTech” (PricewaterhouseCoopers 2016, p. 2). Thereof, we build on the definition of Arner et al. (2015) describing FinTech simply as technology use for financial solutions. While they include any use of technology to deliver financial solutions, we limit the scope to innovative and IT-based solutions as suggested by Alt and Ehrenberg (2016). Moreover, we incorporate the emphasis that InsurTech innovation can have its origin in both traditional financial service providers and non-traditional companies, such as start-up companies and companies from other industries, which is in line with Puschmann (2017). In summary, we consider InsurTech as part of FinTech and conceptualize it as follows:

A phenomenon comprising innovations of one or more traditional or non-traditional market players exploiting information technology to deliver solutions specific to the insurance industry.

Against the background of our conceptualization, we acknowledge the extant body of literature describing different kinds of innovations. On the one hand, sustaining innovations are distinguished from disruptive innovations (Christensen 1997; Christensen and Overdorf 2000). The former represents evolutionary changes leading to incremental improvements of products and services, while the latter describes revolutionary changes leading to entirely new markets with different value propositions (Christensen 1997; Christensen and Overdorf 2000). Similarly, incremental innovations are distinguished from disruptive innovations

(Hacklin et al. 2004; Puschmann 2017). In fact, the different kinds of innovations go along with changing capabilities required to succeed in corresponding markets (Henderson and Clark 1990). In the context of FinTech, innovations often comprise novel platforms and ecosystems (Dapp 2015; Tan et al. 2015; Breidbach and Ranjan 2017; Leong et al. 2017; Muthukannan et al. 2017). In particular, the development of ecosystems requires organizations to enact IT capabilities in order to evolve from an initial assessment phase, over an acceleration phase to an augmentation phase (Muthukannan et al. 2017). While some scholars associate FinTech innovations with disruptive technologies (Muthukannan et al. 2017), others argue that considering “the previous development in electronic markets, the FinTech phenomenon is a logical evolutionary step” (Gimpel et al. 2017, p. 1). In this regard, Puschmann (2017) acknowledges that FinTech comprises both incremental and disruptive innovations. However, we root our research on InsurTech innovations in our empirical data without limiting our analysis either on disruptive or incremental innovations to prevent being preconceived (Urquhart et al. 2010), which is also in line with our understanding of InsurTech.

Research methodology

Due to the lack of existing research on the insurance-specific branch of FinTech and the novelty of InsurTech, a grounded theory methodology (GTM) is chosen to develop theory inductively from rich empirical data (Corbin and Strauss 1990; Strauss and Corbin 1997; Glaser and Strauss 2009). In line with the flexibility of GTM (Birks et al. 2013), we adopt an exploratory research design anchored in the interpretivist paradigm, i.e., humans socially construct the nature of reality.

Table 1 Selected definitions of FinTech and InsurTech

Concept	Definition (Source)
FinTech	<p>“Financial technology or FinTech refers to the use of technology to deliver financial solutions.” (Arner et al. 2015, p. 3)</p> <p>Fintech or financial technology describes innovative information technology solutions, which are utilized by financial service providers or players new to the industry to design business models in the financial service sector (translated from German). (Alt and Ehrenberg 2016, p. 12)</p> <p>“As an umbrella term, fintech encompasses innovative financial solutions enabled by IT and, in addition, is often used for start-up companies who deliver those solutions, although it also includes the incumbent financial services providers like banks and insurers.” (Puschmann 2017, p. 70)</p>
InsurTech	<p>More specific conceptualizations such as “Banking Innovations”, “Insurtech” for insurance technologies or “Regtech” for regulatory technologies are domain-oriented but have not yet become as established as FinTech (translated from German). (Alt and Ehrenberg 2016, p. 10)</p> <p>“The insurance-specific branch of FinTech, InsurTech, is emerging as a game-changing opportunity for insurers to innovate, improve the relevance of their offerings, and grow.” (PricewaterhouseCoopers 2016, p. 2)</p>

Table 2 Case and interview details

Case company	Position	Interview Details
Alpha insurance (DACH, 1000–5000 employees)	Strategy	Participant 1, face-to-face
	Strategy	Participant 2, face-to-face
	Collaboration	Participant 3, face-to-face
	Strategy	Participant 7, face-to-face
	IT Management	Participant 8, face-to-face
	IT Architecture	Participant 9, face-to-face
Beta insurance (South America, ~ 50'000)	Innovation	Participant 4, Skype
Delta insurance (DACH, > 100'000 employees)	IT Strategy	Participant 5, face-to-face
Gamma insurance (DACH, > 100'000 employees)	Security	Participant 6, face-to-face
	IT Management	Participant 10, face-to-face

Data collection

According to GTM, data can come from various sources and can be coded in the same way as interviews (Corbin and Strauss 1990). Accordingly, our approach to data collection consists of a systematic InsurTech market analysis based on Twitter data, a multiple-case study to collect in-depth insights on the implications of these innovations for the insurance industry, and additional sources of evidence (i.e., observations from innovation projects, an insurance congress and practitioner feedback to the emergent model).

InsurTech market analysis on twitter

Empirical data of InsurTech innovations were collected from publicly available Twitter tweets associated with the keywords #insurTech and #insureTech. We accessed the data through the advanced search function offered by Twitter.¹ By utilizing the date range and hashtag filters, tweets were collected iteratively over different time frames (i.e., from October 2015 to August 2016 after each month). Considering the primary goal of exploring InsurTech innovations, we successively conducted the following workflow: In the first step, a tweet was reviewed to determine if it includes a potential name, description, or link to an InsurTech innovation. Aside from textual content, we considered images, e.g., illustrations of the InsurTech landscape with various InsurTech start-up company names. In the second step, we enriched this data by collecting information from the corresponding web page (i.e., a description of the InsurTech innovation, its mission, its type of insurance, and its originating country). InsurTech innovations were included if they matched the following criteria: insurance specificity (i.e., industry independent innovations were excluded), technology support, and novelty (e.g., deprecated technology utilization such as creating insurance leads via phone were excluded). InsurTech innovations were excluded if no project or company website was available. In each iteration, we followed this

workflow until theoretical saturation in the given time frame was reached, i.e., additional tweets did not lead to new empirical data on InsurTech innovations (Morse 2003). In total, a list of 208 InsurTech innovations was collected.

Multiple-case study

Guided by the objective to understand the impact of InsurTech innovations, we conducted a multiple-case study (Yin 2017) to inductively ground our research in empirical data (Eisenhardt 1989). From October to December 2015, we conducted 10 explorative semi-structured interviews that lasted between 30 and 60 min. They were conducted by the same interviewer, and with one person at a time. Participants with operational and strategic backgrounds and from different divisions of the insurance companies were selected (see Table 2).

The structure of our interview guideline followed Myers and Newman (2007) and was reviewed by two senior scholars leading to a few corrections pertaining to the wording of the questions. In line with our GTM approach (Strauss and Corbin 1997), interviews within the earlier stages of the research solely involved open-ended questions from the mentioned areas of interest. Later in the research process, we focused more narrowly on the emerging concepts. Specifically, in the end phase of the interviews we employed card sorting (Fincher and Tenenberg 2005) to categorize the emerging characteristics and transformational capabilities of InsurTech innovations into groups depending on their relevance. That is, (1) the threat interviewees see for their insurance company, and (2) the opportunities interviewees see for their insurance company.

The set of open questions probed two areas of interest. First, the interviewer asked general questions about the impact of the digitalization on the insurance industry. Example questions were “What is the role of digitalization on the value creation of insurance companies?” and “What opportunities/challenges will arise today/in five years from digitalization?” Second, we asked about the impact of InsurTech innovations

¹ <https://twitter.com/search-advanced>

Table 3 Research approach to data collection and analysis at a glance

Data source	InsurTech market analysis based on twitter data (primary data)	Multiple-case study (primary data)	Insurance congress (primary data)	Innovation projects (secondary data)	Exchange with experts (primary data)
<i>Details</i>	208 InsurTech innovations with #insur(e)Tech were collected and enriched with information from their websites.	10 semi-structured interviews with participants and observations from different divisions of four insurance companies.	17 pages of notes and observations from an insurance congress on IT innovation and digitalization in the insurance industry.	Stakeholder analyses, prototypes, documentations, and interviews from five university innovation projects with insurances.	Feedback for the emergent model was gathered by sharing it with experts and within a workshop.
Theoretical sampling – selecting data sources that advance and strengthen the emergent theory					
<i>Rationale of use</i>	Collection of a broad range of InsurTech initiatives.	Gaining rich details from people working in the target industry.	Data triangulation and verification.		Refinement and verification.
Constant comparison and iterative conceptualization – building and refining the emergent theory					
<i>Open coding (52 characteristics as 1st order concepts)</i>	Categorization and comparison of the collected InsurTech innovations.	Categorization of the interviews and comparison with the emergent characteristics.			
<i>Axial coding (14 transformative capabilities as 2nd order concepts)</i>	Interviews, notes and observations enabled us to identify commonalities and provided us with relationships between the 14 transformative capabilities.		Comparison of the data with the emergent model and the interview statements provides an additional perspective on the phenomenon at hand.		Refining and enriching the emergent model using the feedback.
<i>Selective coding (6 themes as 3rd order categories)</i>	Going through the data and codes again enabled refinement and upscaling (Urquhart et al. 2010).				
Outcome and theoretical integration					
<i>Outcome</i>	An emergent model (Wiesche et al. 2017) of InsurTech innovation grounded in the coded characteristics, transformational capabilities and themes (see Table 4).				
<i>Theoretical integration</i>	First, the transformational capabilities are related to the primary activities of value networks (Stabell and Fjeldstad 1998), so that the impact of InsurTech on firm-level value creation becomes apparent. Second, the transformational capabilities are related to the roles of intermediaries in electronic markets (Bailey and Bakos 1997), so that the impact on industry-level becomes apparent.				

on the traditional insurance industry. Example questions were “How do innovative InsurTech start-ups affect the value creation in the insurance industry?” and “How do you respond to the innovative exploitation of information technology?”

Additional sources of evidence

Empirical observations from innovation projects at University of St.Gallen were included. Over nine months, project teams of four graduate students cooperated with insurance companies (two teams from September 2014 to July 2015 and three teams from September 2015 to July 2016). We considered multiple sources of evidence (Yin 2017), namely their explorative analysis of stakeholders, prototypes, documentations, and interviews with customers and employees of insurance companies. Additionally, notes and observations from an insurance congress in Germany in autumn 2015 led to further insights about InsurTech and the digitalization in the insurance industry. To make the evolving model tangible, we created a web application that offers a visual filter of the collected InsurTech innovations and maps the emergent model. We continuously shared the tool with practitioners from the insurance industry to gather their opinion on our interpretations. Their feedback refined the emergent theory and confirmed the practical utility. In particular, minor changes in the wording of our model were made and practitioners added suggestions for missing InsurTech innovations.

Data analysis

Upon completing the qualitative interviews, we anonymized, transcribed, and analyzed the recordings using the computer-assisted qualitative data analysis software NVivo. Along each step, the codes were independently double-checked by a second researcher. In alignment with GTM (Urquhart et al. 2010) and interpretive research (Klein and Myers 1999), we systematically collected and analyzed our empirical data until theoretical saturation was reached. Specifically, we iterated until “no new data appear[ed]” (Morse 2003, p. 1) and a coherent picture of InsurTech innovation emerged. To ensure quality, we followed the suggestions of Corbin and Strauss (1990) and the guidelines of Urquhart et al. (2010). Specifically, their guidelines comprise (1) constant comparison of new data with the emergent model, (2) iterative conceptualization by abstracting and elaborating relations between categories, (3) theoretical sampling, (4) upscaling to increase the generalizability, and (5) theoretical integration of the emergent theory (see Table 3).

The emergent model of InsurTech innovation

Grounded in empirical data, we now present the emergent model of InsurTech innovation comprising 14 transformational capabilities across 6 overarching themes elaborated with 52 characteristics (see Table 4). Each capability is transformational as that it affects the cost and value structure. As such, they represent building blocks, which can be exploited individually or in combination resulting in either sustaining or disruptive innovations.

Theoretical integration

To further advance the understanding of InsurTech in a wider theoretical context, we relate the emergent model to extant literature as suggested by Urquhart et al. (2010). In doing so, the model, first, proves to be a powerful lens to understand insurance value creation in a digital world in the light of InsurTech. Considering the transformational capabilities individually, reveals sources of competitive advantage that lead to incremental innovations. In turn, disruptive potentials emerge from the combination and the alignment of these transformational capabilities. Second, we take up an industry perspective and link our identified transformational capabilities to literature on intermediation. Hence, elaborating how they enable to take in intermediary roles and, thus, industry level changes.

Impact on firm-level value creation – sources of competitive advantage

The impact of IT on value creation becomes apparent through assessing its impact on cost and value structures of strategically critical activities (Porter and Millar 1985). For this purpose, the value chain model represents value creation in a sequence of activities (Porter 1985; Porter and Millar 1985). However, both (1) our empirical data and (2) prior research suggests that a sequential representation is less helpful to gain an understanding of InsurTech. Accordingly, we draw on the primary activities proposed in value network literature (Stabell and Fjeldstad 1998). Specifically, we link the identified transformational capabilities to the activities ‘infrastructure operations’, ‘service provisioning’ and ‘network promotion’ (Stabell and Fjeldstad 1998).

First, our InsurTech-specific empirical data shows that the identified transformational capabilities and their underlying activities are interdependent. For example, developing services that fulfil customer needs (i.e., TC7) and exploiting data for risk assessment and underwriting (i.e., TC2) goes along with customers contributing data instead of creating value sequentially. In addition, increasing customer engagement by integrating insurance with related and complementary

Table 4 The emergent model of InsurTech innovation

Theme	Transformational capability (TC)	Characteristic of InsurTech innovation	Example	
Digital infrastructure operations	TC1. Establishing digital service provisioning and distribution infrastructure, i.e., the capability to establish digital infrastructure that lower cost through self-service, while increasing differentiation through value adding services and new points of contact.	Web portal	SwissLife myWorld	
		Mobile app portal	Clark	
		Interfaces (e.g., plugins, add-ons, widgets, API)	Simplesurance	
		White-label infrastructure	IptiQ	
		Digital signing and identification	Certrack	
Data-driven infrastructure operations	TC2. Exploiting data for risk assessment and underwriting, i.e., the capability to access and exploit data related to the insured risk to calculate accurate risk models and inform underwriting decisions.	Digital transactions and processing	Dynamis	
		Driving data	Kroodle	
		Vitality and nutrition data	WeSavvy	
		Sensor data of properties and products	Roost	
		External data, Social Media data	FitSense	
Digital service provisioning	TC3. Exploiting data for claims handling, i.e., the capability to access and exploit data to lower the transaction costs of handling claims.	Real-Time data	AnalyzeRe	
		Advanced data science	QuanTemplate	
	TC4. Offering services digitally, i.e., the capability to offer insurance services digitally to lower cost through self-service and increase customer value through lower transaction costs.	Automated claims processing and verification	Fizzy (AXA)	
		Advanced fraud detection	Everledger	
	TC5. Complementing insurance with prevention and recovery services, i.e., the capability to offer services aside from reimbursement to lower cost and increase customer value through loss prevention or recovery.	Digital claim submission and notification	Haftpflichthelden	
		Digital policy administration and adjustments	WeFox	
	Insurance service development	TC6. Integrating insurance with related services, i.e., the capability to integrate insurance services with related services to increase customer value.	Digital conversations	Asuro
			Digital advisory, robo-advisory	Insurify
			Predictive prevention, proactive warnings	Sanitas Active
		TC7. Developing services that fulfil customer needs, i.e., the capability of understanding customer needs and developing insurance products and services accordingly to achieve competitive advantage through differentiation.	Loss mitigation, recovery service	Allianz & Panasonic
Service provisioning at the point-of-demand			Lemonade	
Aggregation across insurers and/or insurance products/services			Clark	
Integration with financial services	Moneymeets			
Integration with employee benefit services	Bayzat Benefits			
Integration with health services	MyDoc			
Situational product, on demand	Cuvva			
Customer network promotion	TC8. Adopting to changes of insured risks, i.e., the capability to adjust insurance products/services to the changing nature of the insured risks.	Flexible period of insurance coverage	Trov	
		Simple convenient product	Snapsure	
		Individualized product	FounderShield	
	TC9. Covering new risks, i.e., the capability to develop insurance products and services that offer coverage of new risks.	Niche product	Bought By Many	
		Peer-to-peer (P2P) insurance	Friendsurance	
	TC10. Offering risk-adjusted pricing, i.e., the capability to assess risks dynamically to offer products and services at competitive prices.	All-in-one allround-care	Knip	
		Digitized object (e.g., car and home)	Kiwi.ki	
		Adjusted behavior/ needs (e.g., virtual business)	DigitalRisk	
	Customer network promotion	TC11. Distributing insurance digitally, i.e., the capability to design and decide on digital distribution channels.	Coverage of risk based on new data sources	MeteoProtect
			Coverage of risk arising from new phenomenon	Zurich Cyber Insurance
TC11. Distributing insurance digitally, i.e., the capability to design and decide on digital distribution channels.		Usage-based pricing (e.g. pay-per-mile)	Metromile	
		Behavior-based pricing (e.g. pay-how-you-drive)	Ingenie	
		Rewards-based pricing	Drive like a girl	
Customer network promotion	TC11. Distributing insurance digitally, i.e., the capability to design and decide on digital distribution channels.	Online distribution	GetSafe	
		Distribution at the point-of-sale	Simplesurance	
		Multiple distribution channels	eBaoTech Multichannel Integration	
		Offline distribution with digital support	Softfair FinanzLotse	

Table 4 (continued)

Theme	Transformational capability (TC)	Characteristic of InsurTech innovation	Example
	TC12. Harnessing digital marketing opportunities, i.e., the capability to acquire and select the right customers through digital marketing channels.	Customer acquisition, affiliate/predictive marketing Online presence	Contactability Allianz Social Media for Agents
	TC13. Acting as digital broker, i.e., the capability to exploit digital channels to sell insurance coverage to customers with some degree of independence from the insurer.	Multiple marketing channels Comparison platforms All-in-one insurance manager Insurance-as-a-Service Online broker	Multichannel Check24 Esurance Kasko.io OnlineVersicherung.de
Partner network promotion	TC14. Forming strategic partnerships, i.e., the capability to build competitive advantage from inter-organizational relationships.	Co-created product or service Cooperation ecosystem	Allianz & Panasonic Rakuten Ecosystem

services (i.e., TC5) is often only possible in a whole network of service providers.

Second, prior research emphasizes that digitalization promotes network-oriented value creation in general (Tilson et al. 2010; Rai and Tang 2013; Autio et al. 2017; Koch and Windsperger 2017) and in the context of FinTech in particular (Dapp 2015; Tan et al. 2015; Breidbach and Ranjan 2017; Muthukannan et al. 2017; Schrieck and Wiesche 2017).

As such, we not only adopt a lens that fits our empirical data, but also a lens that is in line with the foundational tenets of the digital world. Figure 1 summarizes our empirical results and illustrates the alignment of the primary activities as proposed by Stabell and Fjeldstad (1998). After presenting the transformational capabilities, we discuss how the disruptive potential of InsurTech emerges from a network-oriented alignment of the transformational capabilities based on these three primary activities.

Digital and data-driven infrastructure operations

The purpose of insurances is “the organization and management of a risk pool to provide insurance coverage to multiple clients” (Fjeldstad and Ketels 2006, p. 116). Therefore, infrastructure is required to exchange corresponding services within the network (Stabell and Fjeldstad 1998). Our empirical data shows that the impact of InsurTech on infrastructure operations manifests itself in their digital (see TC1) and data-driven (see TC2–3) nature. While the latter is InsurTech-specific, the former shares similarities with FinTech as well as with digital innovation in general. Through a sophisticated balancing of flexibility (openness) and stability (control), digital infrastructures are known for their generativity that facilitates distributed innovation (Tilson et al. 2010; Yoo et al. 2012), e.g., through FinTech platforms and ecosystems (Dapp 2015; Tan et al. 2015; Breidbach and Ranjan 2017; Muthukannan et al. 2017; Schrieck and Wiesche 2017).

TC1. Establishing digital service provisioning and distribution infrastructure

Web portals and mobile apps serve as first point of contact for customer-facing insurance processes (e.g., sales, policy administration, and claims handling). Thus, the capability to establish digital infrastructures becomes critical. Aside from isolated customer portals, InsurTech innovations often rely on inter-organizational collaboration through interfaces or distributed infrastructures. Specifically, the identified InsurTech innovations harness application programming interfaces, plugins, widgets and add-ons that allow integrations into third-party systems (e.g., Simpleurance offers plugins that can be easily integrated into e-commerce shops to sell product insurances). Based on that, various white-labeling solutions have been identified (e.g., iptiQ, snapsure, and Simpleurance). Moreover, IT is leveraged to facilitate policy administration efficiency and enable digital signing and identification (e.g., Certrack offers cloud-based management of insurance certificates). Infrastructure technologies such as Blockchain enable distributed and immutable digital transactions and processing. InsurTech innovations particularly use smart contracts, e.g., Dynamis develops smart contracts for P2P insurance.

TC2. Exploiting data for risk assessment and underwriting

InsurTech has a tremendous impact on risk assessment activities. Given, the increasing availability of data (e.g., risk data and customer’s behavior data), data can be exploited to assess risks more precisely and accurately. For example, driving behavior data may be gathered using driving recorders attached to cars (e.g., AXA Drive Recorder) and with location-based apps on the customer’s smartphone (e.g., Kroodle). Having the right data and expertise to make sense of this data is key (e.g., QuanTemplate provides a platform for insurance data integration and analytics to improve underwriting performance). In this respect, managing external data and ensuring its quality becomes relevant.

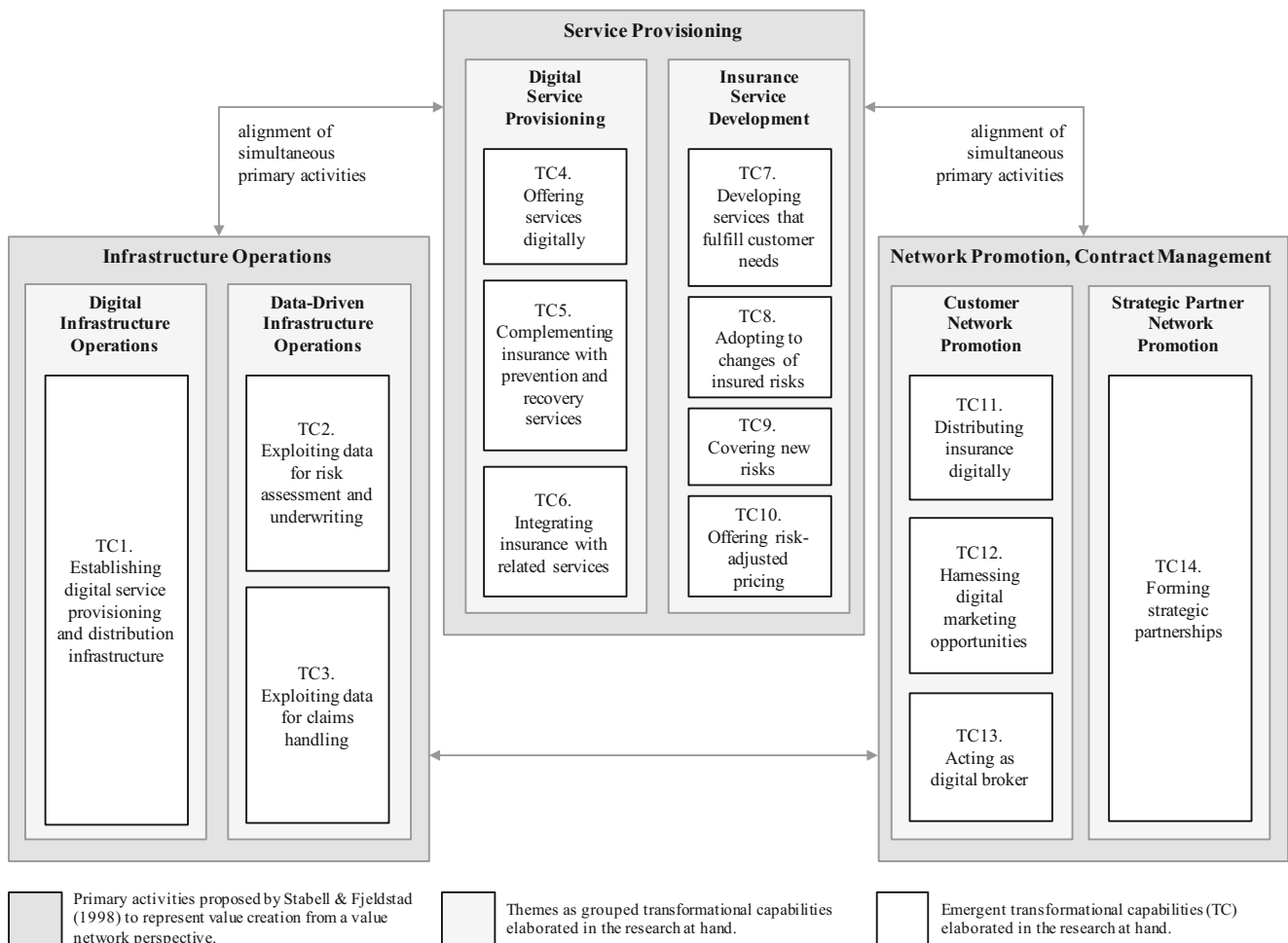


Fig. 1 Transformational capabilities of InsurTech innovations linked to the primary activities of value networks

TC3. Exploiting data for claims handling The more risk data is available, the more possibilities emerge to monitor risks in real-time. As such, data science technologies can be harnessed for fraud detection. An interviewee pointed out that the first notice of loss shifts from the customer to the insurer, which might become aware of latent risks before the customers. Combined with distributed infrastructure (i.e., TC1), IT is leveraged to automate claims processing and verification. For example, Fizzy (AXA) offers a Blockchain-based insurance solution against delayed flights, which automatically triggers the compensation upon flight delay (i.e., no need to submit a claim).

Digital service provisioning and insurance service development

The second primary activity of service provisioning comprises “establishing, maintaining, and terminating links between customers and billing for value received” (Stabell and Fjeldstad 1998, p. 429), e.g., payments and claims (Fjeldstad and Ketels 2006). The impact of InsurTech manifests itself in

digital service provisioning (see TC4–6) and in the development of contemporary insurance services (see TC7–10). Digital service provisioning relates to research on IT-enabled digital service provisioning. For example, prior research reveals that self-service may lead to positive effects such as higher efficiency, cost reduction, and increased convenience (Bitner et al. 2000; Barrett et al. 2015), but also negative effects such as lower customer satisfaction (Ba et al. 2010). However, the identified transformational capabilities have to be seen in the context of the relatively low frequency of interactions in the insurance domain, which differentiates InsurTech from FinTech. The development of contemporary insurance services is insurance-specific and relates to increasingly flexible, personalized and diversified products and services in the context of FinTech (Eickhoff et al. 2017; Gimpel et al. 2017) and digital innovation (Fichman et al. 2014).

TC4. Offering services digitally Manifold efforts to handle claims digitally can be observed (e.g., RightIndem offers specific tools and techniques along the customer claims journey from first notification of loss until the settlement). In

particular, we identify innovative designs for claims submission procedures (e.g., *Haftpflichthelden* and *RightIndem* enable the visual selection of the damaged car parts). Aside from increased efficiency in claims submissions, digital service provisioning provides transparent and timely status updates of claims and policies. Policies are either digitized or the corresponding details are made available digitally, thus, providing customers with possibilities to have an overview of their policies, to query the covered benefits and to make policy adjustments. In this regard, incumbents have started to offer service provisioning on insurance-specific portals (e.g., *my.Allianz* and *myCSS*), while digital brokers often aggregate service provisioning (i.e., TC6). Furthermore, IT is harnessed for having digital conversations and providing advice digitally, but with a varying degree of human involvement. On the one hand, advisory services are provided in form of conversations (e.g., chat). On the other hand, advisory services are offered on digital platforms (e.g., *Brolly* shows a status of coverage visually and offers a policy checkup that reveals the percentage to which a customer is insured). In both cases, artificial intelligence minimizes human involvement to offer so-called robo-advisory (e.g., *Insurify* and *Sure*), which can be observed in the broader context of FinTech as well (Jung et al. 2017).

TC5. Complementing insurance with prevention and recovery services Increasing efforts are identified to complement traditional insurance service provisioning (e.g., financial reimbursement) with prevention and recovery services. On the one hand, predictive prevention and proactive warnings can be seen as important cornerstones to lower claims costs. On the other hand, we see a move towards educating the customer (e.g., to drive safer or live healthier), which improves the value proposition. With an increasing amount of data, the first notice of loss is shifting towards the insurance. For example, Panasonic's smart home solution coupled with the home protection service of Allianz detects water leaks, notifies the user and initiates the first steps. In case of loss, IT enables loss mitigation and recovery, which not only reduces costs for the insurer, but also improves the customer value (i.e., impact on differentiation). For example, *CarKroodle* provides customers with novel information such as driving insights into speed, brake performance, time, and calculates a score after each ride).

TC6. Integrating insurance with related services Given the relatively low frequency of interaction between insurance service providers and their customers, InsurTech increasingly integrates the digital service provisioning with related services to increase the customer engagement and value. On the one hand, all-in-one insurance managers aggregate service provisioning across insurances and across insurance products/services in a single portal. On the other hand, our empirical data reveals integrations of insurance with financial services,

health services, and employee benefit services, which broadens the value proposition towards the customer.

TC7. Developing services that fulfil customer needs InsurTech enables to provide insurance customers with situational insurance products (i.e., on demand) and flexible selectable periods of coverage (e.g., buying flight insurance and flight accident insurance from *Airsurety* before entering a plane or insuring a car driver for one hour at *Cuvva*). Many of our identified InsurTech innovations amplify product simplicity and convenience (e.g., understanding and ordering a smartphone insurance within minutes). At the same time, differentiation occurs through highly customized insurance products and coverage of insurance niches (e.g., pet insurance for rescue dogs and health insurance for cyclists). In contrast to traditional business models where insurance companies pool risks and withhold premiums if no claim occurs, we identify various peer-to-peer (P2P) insurance approaches (e.g., *Friendsurance*, *insPeer*, and *Lemonade*). Specifically, they allow peers to share risks partly with each other and everything that exceeds a certain limit is usually covered by a traditional insurer. As such, understanding customer needs and developing products and services accordingly offers opportunities to achieve competitive advantages through differentiation (Shah et al. 2006).

TC8. Adopting to changes of insured risks On the one hand, traditional insurance products and services are affected by digitized objects (e.g., household insurance is affected by homes equipped with sensors). On the other hand, behavior and needs of insurance customers change (e.g., needs of virtual businesses differ from traditional companies). Against this backdrop, differentiation can be achieved by adjusting the insurance products and services to the changing nature of the underlying insured risks.

TC9. Covering new risks Based on new data sources and new needs that arise from new phenomena, new risks can be covered. For example, a Chinese insurance company (PICC) offers virtual product insurance to insure losses that gamers experience as they buy virtual properties and equipment online. Also, cyber risks become a critical business risk (e.g., Zurich Insurance insures corporate companies against data loss and cyber-attacks).

TC10. Offering risk-adjusted pricing Grounded in more accurate risk assessments, differentiation through new risk-adjusted pricing models becomes possible (e.g., pay-how-you-drive offerings with usage-based rewards and pay-per-mile pricing). Besides traditional incumbents like AXA, new competitors have entered the market (e.g., *Drive like a girl* from the UK). Similar potentials provide vitality, nutrition, sensor, and other internet of things data. For example, smart home solutions that exploit access and data from connected

doors, surveillance, thermostats, and smoke detectors. Regarding health insurance, Generali and Discovery for example have collaboratively developed a product that is advertised with the promise “Know your health - Improve your health - Enjoy the rewards”.

Customer and strategic partner network promotion

The third primary activity of network promotion aims at “inviting potential customers to join the network, selection of customers that are allowed to join and the initialization, management, and termination of contracts governing service provisioning and charging” (Stabell and Fjeldstad 1998, p. 429). In fact, it further includes monitoring of contracts as well as attracting and selecting customers (Stabell and Fjeldstad 1998). The activities of monitoring, attraction and selection of customers are where the impact of InsurTech manifests itself the most within this primary activity. Namely, it puts the emphasis on a shift from linear sales and distribution activities towards the management of customer as well as strategic partner networks.

TC11. Distributing insurance digitally The prevalence of IT in today’s world facilitates to sell insurance digitally. In particular, the identified start-up companies exploit their digital nature and draw on digital distribution. However, traditional insurers follow this path and start leveraging digital channels as well. An interviewee pointed out that some incumbents have already been selling insurance electronically for a long time (e.g., CosmosDirekt). As such, we see large differences within this transformational capability. More precisely, distributing insurance digitally is not limited to getting quotes online but includes designing innovative systems that offer smooth and customer-oriented processes (e.g., Trov streamlined their mobile app in a way that enables customers to turn insurance protection on or off by using a simple switch button). In regard to innovative approaches to digital distribution, we identify Insurance-as-a-service providers, which bring insurance services to the point-of-demand. For example, Simpleurance offers integrations into e-commerce systems at the point of sale allowing for cross-selling insurance policies for various types of products. Aside from pure digital ways to distribute insurance, differentiation can be achieved by supporting manual processes with digital devices (e.g., mobile and tablet advisory based on USU-POS and Softfair FinanzLotse 3.0), which the interviewees perceived as particularly relevant for complex insurance products and services (e.g., corporate insurance).

TC12. Harnessing digital marketing opportunities Further potential lies in digital approaches to customer acquisition, lead generation and multi-channel management. For example, Amodo exploits, among other data, driving behavior data that enables targeted marketing and sales campaigns. Accordingly,

it is wisely combined with gaining access to data (i.e., TC2) and integrating insurance with related and complementary services (see TC5 and TC6). As such, potential future customers of insurance services may already be users of related services.

TC13. Acting as digital broker A plethora of identified InsurTech innovations ground in digital brokerage models, i.e., sell insurance policies with some degree of independence from insurers. Aside from general online brokers (i.e., traditional brokerage model through online channels), we particularly identified comparison platforms (e.g., Comparis, finanzchef24, Check24), all-in-one insurance managers (e.g., Knip, GetSafe, Clark, WeFox), and Insurance-as-a-Service providers (e.g., Simpleurance, kasko.io, Virado, Pablow). The latter is not only interesting from a digital distribution point of view (i.e., TC11) but also from the perspective of whom they enable to offer insurance services. Namely, they enable third-parties to offer insurance services within a few minutes (e.g., Simpleurance enables e-commerce shop providers to integrate a plugin to offer product insurance services). While they give away part of their commission, they still control the process end-to-end.

TC14. Forming strategic partnerships Many InsurTech innovations are cooperative actions from adjacent market players. In line with Dyer and Singh (1998), our results emphasize the relevance of forming strategic partnerships to achieve competitive advantages from inter-organizational relationships, i.e., partnering with the right organizations in the right way. For example, the partnership between Panasonic and Allianz to offer Panasonic smart home device users access to the home protection services of Allianz. However, partnerships are not limited to bilateral cooperation but include ecosystems (i.e., networks of interdependent actors). For example, the Japanese Rakuten Group pursues a one-of-a-kind business model and includes one player of each industry (including an insurance company). This builds the foundation for offering a convenient shopping and service experience (e.g., through a shared membership database and a reward system).

Discussion on the linkages and the emergence of disruptive potentials

At first glance, many of the identified transformational capabilities seem to result in incremental innovations. In this regard, the term InsurTech may evolve similar to how Weill and Vitale (2002) delineated e-business a decade ago: “The term ‘e-business’ will disappear, but many of the fundamental tenets of e-business (that is, 24/7 online transaction processing and information provision, and single point of customer contact) will become part of the management toolkit. ‘Business’ will include ‘e-business’” (p. 18). However, we see evidence

that the disruptive potential of InsurTech emerges from the combination and alignment of the three interdependent activities ‘infrastructure operations’, ‘service provisioning’ and ‘network promotion’. More precisely, disruptive potentials emerge through (1) the continuous alignment of infrastructure operations (i.e., digital and data-driven infrastructure operations) with service provisioning (i.e., insurance service development and digital service provisioning), (2) the continuous alignment of infrastructure operations and network promotion (i.e., towards customers and strategic partners), and (3) the continuous alignment of network promotion and service provisioning.

First, for instance, Trov harnesses a mobile app infrastructure to only to offer insurance services that fulfill customer needs (i.e., a simple and situational product insurance with flexible period of insurance coverage), but aligns them well with digital service provisioning possibilities along the entire customer journey: (1) a simple way to insure properties by adding a photo or receipt, (2) a designated switch button to flexibly turn protection on and off, (3) a way to check the protection status of all the insured properties at a glance, and (4) a way to submit claims by sending text messages. In contrast, traditional incumbents are slowed down by their existing infrastructure operations (e.g., operating claims hotlines or operating branches that physically processing and storing policies). Given their legacy IT systems, they have, for a long time, hesitated to digitalize service provisioning. However, incumbent insurers make first steps to establish data-driven infrastructures, which in turn enables innovation in terms of insurance services (e.g., Sanitas Active, AXA Drive Recorder, Allianz and Panasonic).

Second, digital infrastructures enable or prevent network promotion in terms how and from whom these activities can be performed. The digital risk-carrier Lemonade allows to integrate their insurance services into websites and apps by providing third-parties with an API and widgets. Thus, providers of platforms such as e-commerce, real estate, and smart home are able to offer insurance at the point of demand. Interestingly, a similar approach comes from a reinsurance company. Namely, Swiss Re has launched IptiQ to develop a digital platform that includes an (automated) underwriting system, policy administration and front-end systems such as an online portal. Thus, they enable organizations to sell life and health insurance products online using a white-labelling approach. Based on their insurance licenses, they enable not only insurances but also other corporations to sell insurance digitally (i.e., engage in network promotion), while still taking over service provisioning. In contrast to the latter examples of Lemonade and iptiQ, Simpleurance has a similar approach but acts as a digital broker. They offer plugins for well-established e-commerce software and work together with incumbents to cover the risk.

Third, Simpleurance is also able to gain expertise in selling insurance online by evaluating on a large basis (e.g., through A/B split-tests with different visualization templates) across insurance products, across e-commerce shops and across insurance carriers. Consequently, the knowledge gained through network promotion can be continuously exploited to improve the infrastructure as well as service provisioning. In turn, building on digital service provisioning promotes the network towards digital affine customers (e.g., Knip, Esurance and Clark attract customers interested in having a single app for managing all policies, submitting claims and receiving digital advisory). The same applies for integrating insurance services with related services (i.e., TC6), which enables to promote the network of insured customers in a certain domain (e.g., employee benefits services).

Considering the alignment of these three primary activities together allows to infer two different kinds of innovation cycles (see Fig. 2). First, the product development of insurances is commonly tightly coupled to actuarial modelling and underwriting. In contrast, InsurTech enables innovations, which are decoupled from the underwritten insurance product (i.e., left cycle in Fig. 2). For instance, a given insurance product (based on a particular actuarial model) may be integrated in various contexts and in combination with complementary services (e.g., by means of employee benefits services as illustrated above). Second, InsurTech enables innovations that are coupled to the underwritten insurance product. For instance, data-driven infrastructures enable the development of insurances based on a fine-granular assessment of the insured risk (i.e., right cycle in Fig. 2). Imagine an insurer that exploits car usage data (i.e., infrastructure operations) to offer pay-how-you-drive insurance services (i.e., service provisioning) to car enthusiasts (i.e., network promotion). In turn, however, car enthusiasts (i.e., network promotion) may be interested in driving insights (i.e., service provisioning) based on a mobile application (i.e., infrastructure operations). Hence, both cycles are linked together.

Summarizing the above aspects, our integrated model (see Fig. 1) offers an alternate and holistic lens to understand the impact of InsurTech on insurance value creation. In particular, it provides a foundation for decisions on where to strive for competitive advantages and where to give up sovereignty. The identified transformational capabilities reveal sources of competitive advantage through their impact on cost and value. By aligning them, disruptive potentials emerge, which is in line with research showing how the “convergence of several well-known, incrementally developing technologies can result in innovations with highly disruptive character” (Hacklin et al. 2004, p. 1). Nevertheless, two main factors may hinder the exploitation of the transformational capabilities.

First, organizations have different regulatory conditions. On the one hand, regulations can inhibit the exploitation of the identified transformational capabilities (e.g., utilization of

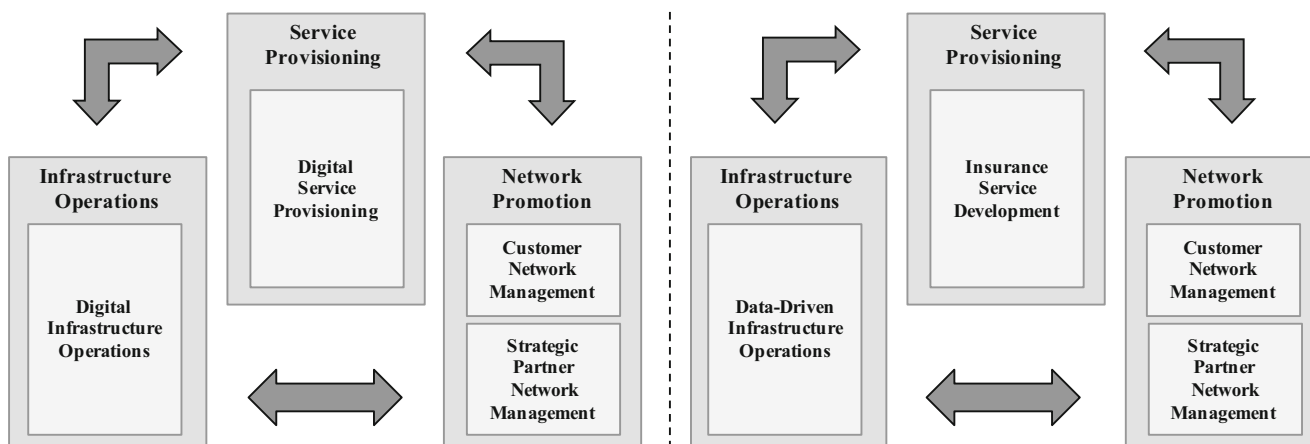


Fig. 2 InsurTech enables both innovation cycles decoupled (left) and innovation cycles coupled (right) to the underwritten insurance product

risk-related data by insurers depends on privacy and data protection regulations). On the other hand, governmental actions can have a positive impact. In China, Kenya, and United Kingdom government support and less regulation has led to major growth of FinTech and InsurTech (Allayannis and Cartwright 2017). Furthermore, different insurance systems facilitate the exploitation of certain transformational capabilities. For example, the employment-based private health insurance system in the United States enables the integration of health and life insurance service provisioning together with a wide range of employee benefits services (e.g., Bayzat and Zenefits). However, integrating insurance with services, which are less affected by regulation might be an efficient way to increase customer engagement.

Second, organizations originate from different insurance markets, which differ in the frequency of customer interactions (e.g., health insurance is usually associated with more frequent claims and policy adjustments than life insurance) and the duration of contracts (e.g., short term general insurance contracts, long term life insurance contracts). This influences the potential to exploit the identified transformational capabilities. For example, the potential to lower costs through digital service provisioning portals is smaller in markets with a low frequency of customer interactions, while the potential for differentiation is lower in low engagement markets. However, integrating insurance with related services (i.e., TC6) and forming strategic partnerships (i.e., TC14) may offset initial competitive disadvantages such as infrequent use or low customer retention. Furthermore, the prevalent insurance penetration as well as the ratio between distribution through insurance-dependent captive agents and independent brokers differs between countries influencing the exploitation (e.g., around two third of the non-life personal insurance lines in Switzerland rely on agents). For example, although many incumbents offer insurance-specific customer portals

for service provisioning, they differ in the way they involve their insurance-dependent agents (e.g., while the Swiss insurer CSS integrates a messaging system into their customer portal, Mobiliar has put emphasis on their agents by referring to their email and phone number).

Impact on industry structure - the rise of novel digital intermediaries

Based on the changing nature of value creation on firm level, we further find empirical evidence of changes on industry structure. In particular, we see a wave of intermediation in the personal insurance market. Specifically, a plethora of new market entrants position themselves in between the insurance buyer and seller, with varying degree of independence from insurers (Cummins and Doherty 2006). One way to interpret this wave of intermediation is to consider it as insurance-specific manifestation of the potential of FinTech to reorganize the value chain by enabling new business models and new market entrants (Puschmann 2017). To further elaborate on the roles they take, we build on prior literature that proposes four roles of intermediaries in electronic markets, i.e., aggregation, facilitation, matching, and trust (Bailey and Bakos 1997; Sarkar et al. 1998). Accordingly, we relate the transformational capabilities to these roles and illustrate how these roles are observed empirically (see Fig. 3).

Aggregation

Intermediaries aggregate the products of sellers or the demand of buyers to achieve economies of scale or scope, and to reduce bargaining asymmetry (Bailey and Bakos 1997). Three manifestations of this role are reflected in our empirical data.

First, the role of an aggregator of sellers' products is reflected by the rise of price comparison platforms (e.g., Comparis, finanzchef24, and Check24) and all-in-one

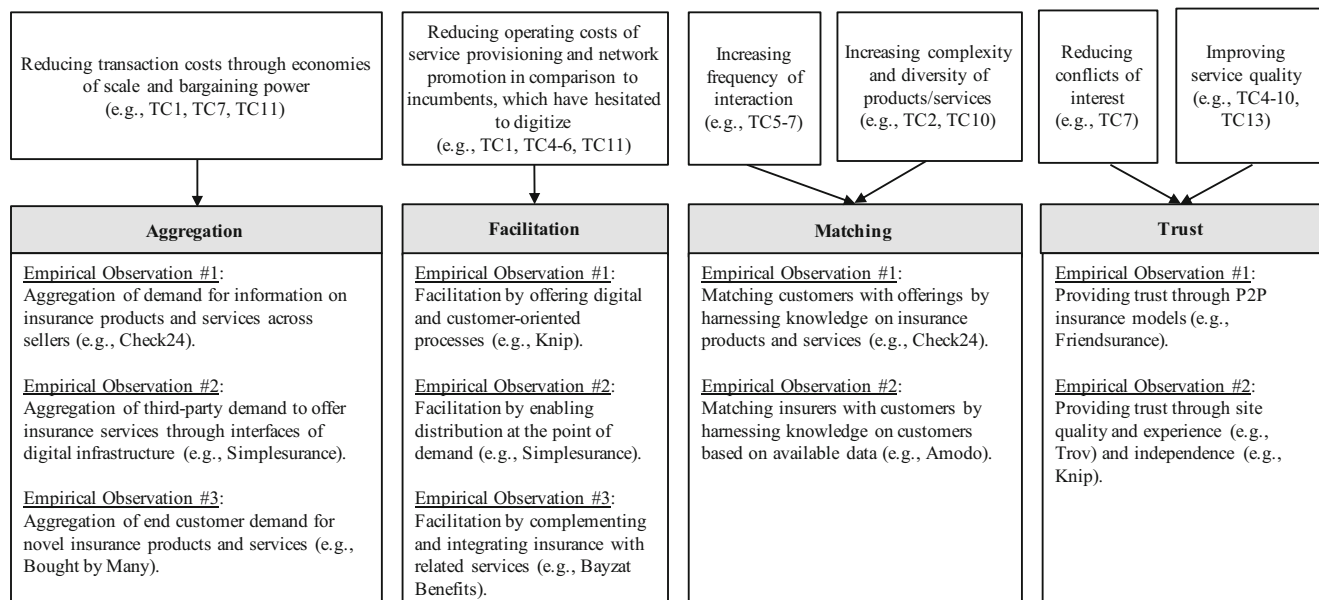


Fig. 3 Transformational capabilities linked to intermediation roles and empirical observations

insurance managers (e.g., Knip, Esurance, Clark, and WeFox). As content aggregators, they aggregate insurance products and services of many insurance companies. At the same time, the larger the customer base of aggregators the more they gain in bargaining power to demand product and price information from insurance companies.

Second, aside from aggregating insurance products and services, we identify intermediaries, which aggregate the demand of third-parties to offer insurance services to their customers. Insurance-as-a-service intermediaries such Kasko.io, Simpleurance, Virado, and Pablow build and optimize their digital infrastructure to enable third-parties to offer insurance (e.g., through API's, plugins, and add-ons). For example, instead of having the situation in which each e-commerce shop provider has to negotiate individually with an appropriate insurance, they can integrate the corresponding plugin within minutes. This way, shop providers are not only able to offer insurance for their products but also benefit from earning a commission. Another intermediary is Pablow, which does the same with travel insurance.

Third, we find empirical evidence of intermediaries that aggregate the demand of private customers. Traditionally, insurances develop standard products to achieve demand based on the law of large numbers. With the advent of InsurTech, we identify a variety of intermediaries that exploit digital channels to aggregate insurance needs of potential customers and, then, develop and negotiate policies with specific insurers. For example, on the one hand, Bought by Many aggregates long-tail insurance needs to develop niche insurance products such as pet insurance for rescue dogs and health insurance for cyclists. On the other

hand, we identify intermediaries such as Drive like a girl, which aggregate the demand for innovative novel insurance products and collaborate with specific incumbents as risk carriers.

Facilitation

Intermediaries act as information exchange facilitators that reduce operating costs, e.g., the overall processing and coordination costs (Bailey and Bakos 1997). For a long time, incumbent insurers hesitated to digitize their processes along the customer journey. Therefore, novel digital intermediaries are able to reduce the operating costs of private customers by exploiting transformational capabilities that digitize customer facing processes.

First, all-in-one insurance managers such as Knip, Esurance, WeFox and Clark have entered the market and offer digital and customer-oriented processes by exploiting several of the proposed transformational capabilities (e.g., digital claim submission, digital access to policies). In particular, all-in-one insurance managers take on both roles (aggregator and facilitator) and offer their customers one single point of interaction across insurance companies (e.g., access to policies and claim submissions of all insurances in one portal). Thus, reducing the overall processing and coordination costs for their customers, although our case study suggests that back office processes like policy administration are not yet fully automated. One interviewee stated: “they promote and push the digitalization per se. They offer electronic processes [...] but how do they operate? They manually scan the policy they receive from us in the background and provide them digitally to the customer.”

Second, considering the insurance-as-a-service providers (e.g., Simpleurance) from an end customer point of view, suggests that they act as facilitators. Namely, by enabling third-parties such as e-commerce providers to sell insurance at the point of sale, they lower the operating costs of the end customers.

Third, facilitation comprises the provisioning of additional services (Bailey and Bakos 1997). This is reflected by actors that exploit the transformational capability of integrating insurance with related services (i.e., TC6) as well as complementing reimbursement with prevention and recovery services (i.e., TC5). In an increasingly digital economy, such associated services can span across industry borders. Against this background, our research shows that new market entrants integrate employee benefit services, health services and financial services and, thus, take on a facilitating intermediary role. Moreover, in case of employee benefit services, intermediaries such as Bayzat Benefits and Zenefits do not only offer health insurance related services to employees, but also retirement saving and human resource services (in countries that couple health insurance with employers). In fact, such facilitators occur along entire customer journeys, e.g., Abracar (part of Allianz) provides services such as security and trust along the customer journey of private individuals that sell their car.

Matching

Traditionally, insurance intermediaries act as market makers by matching insurance needs of customers with those of insurers (Cummins and Doherty 2006). By accumulating market supply and market demand knowledge, they filter information for the respective party. As such, we identify two corresponding forms of intermediaries.

First, from a customer perspective, intermediaries take the role of matching customers with offerings by harnessing their knowledge on insurance product and price information. This is reflected in our empirical data by all-in-one insurance managers (e.g., Knip and WeFox) as well as price comparison platforms (e.g., Check24 and Comparis 360). Specifically, they go beyond aggregating product and price information and offer insurance coverage optimization by proposing concrete offerings to customers.

As such, these intermediaries take advantage of the high transaction costs required to compare insurance offerings. However, the influence of the identified transformational capabilities on the need for matching is twofold. On the one hand, as insurers increasingly exploit digital service provisioning (see TC4–6) and digital distribution (see TC11–13) transaction costs decrease and, consequently, the need for matching decreases as well following a general trend in electronic

markets (Malone et al. 1987; Chircu and Kauffman 1999). On the other hand, though, the identified transformational capabilities represent potentials to increase product and service differentiation, thus, resulting in increased diversity and complexity of insurance offerings (e.g., by exploiting data for risk assessment and underwriting, offering risk-adjusted pricing, pursuing predictive prevention or providing proactive warnings). This, in turn, leads to increased need for matching (Chircu and Kauffman 1999), because the value of fulfilling a matching function depends on the frequency and complexity of the transaction (Bailey and Bakos 1997). Accordingly, intermediaries could theoretically match customers with individualized offerings based on their data (e.g., driving behavior and mobility preferences) by harnessing their knowledge on market supply (e.g., differences in rewards for certain driving behavior or differences in on-demand and annual pricing). Empirically, such intermediaries could not be identified in our data, even though we find many intermediaries that develop insurance products and service with risk-adjusted pricing (e.g., Drive like a girl). They do collaborate with a specific incumbent, which acts as a risk-carrier. Therefore, we consider them to aggregate the demand for risk-adjusted insurance products rather than taking a matching role (see Aggregation).

Second, from an insurer perspective, intermediaries take the role of matching appropriate customers for insurers by harnessing knowledge on market demand based on available data. For example, Amodo exploits, among other data, driving behavior data to enable insurers to create targeted marketing and sales campaigns. In addition, customer-related knowledge is used to build insurance products and services (e.g., FitSense combines various mobile data to derive lifestyle customer profiles that enable health and life insurers to build products and services that fulfill real customer needs). While from a functional point of view, Amodo and FitSense fulfill a matching role, they operate on a white-labeling rather than brokerage model. This means, they provide insurers with white-labeled apps to gain access to their customers and, in turn, provide insurers with the knowledge they gain on the market demand.

Trust

Finally, intermediaries act as trust providers to buyers and sellers (Bailey and Bakos 1997). Prior research reveals trust that is sourced in familiarity (i.e., through repeated interaction), calculativeness (i.e., through a subjective assessment of the other party's cost and benefit of cheating), and values (i.e., through institutional structures that increase confidence in trustworthy behavior and goodwill) (Ba and Pavlou 2002). In particular in the personal lines (i.e., where we identify most new intermediaries), incumbents rely to a large extent on insurance-dependent local agents (Mayer 2008). Thus, familiarity-based trust can be interpreted as initial competitive

disadvantage of new intermediaries, because the local agents have built relationships for years. However, literature puts the emphasis on calculativeness-based trust for initial online relationships (McKnight et al. 2002). Accordingly, we identify two ways how the transformational capabilities affect the available information of customers to assess the other party's cost and benefit of cheating.

First, our empirical data reveals various P2P insurance models (e.g., Friendsurance, insPeer, and Lemonade). Accordingly, they charge a fixed percentage of the premium for insurance, while the majority is allocated for claims. The remaining money is used for a predefined purpose (e.g., Lemonade donates the money to a charity selected by the customer and Friendsurance pays the money back). Thus, they reduce conflicts of interest, because they do not benefit from refused claims.

Second, literature suggests that site quality correlates with trusting beliefs, and web experience is positively related to institutional trust (McKnight et al. 2002). This is reflected by intermediaries such as Trov, Brolly, Cuvva and Slice, which gain in attention through the way they exploit the transformational capabilities to optimize digital service provisioning and service development. At last, it has been argued that independence from insurers affects the provided quality of the services positively (Garven 2002; Maas 2010). This suggests that, among others, all-in-one insurance managers such as Knip have good prerequisites to take the role of a trust provider.

Discussion on future developments in the insurance industry

By taking over the first point of contact, novel digital intermediaries have started to gain control over the processes along the customer journey (e.g., product comparison, policy administration, claims handling, advisory). At first glance, intermediaries are not a new phenomenon, because insurers distribute via both intermediaries (e.g., brokers and agents) and directly since years. Nevertheless, in contrast to commercial insurance, brokers are relatively rare for personal insurance lines, which often rely on insurance-dependent captive agents (Mayer 2008). Based on these findings, we see four areas of future developments.

First, a possible consequence is that the opportunities for incumbents to differentiate by means of products, services, and customer-facing processes, are decreasing. Literature suggests that incumbents should focus on product differentiation and favor electronic markets that emphasize product information, rather than price information (Bakos 1998). However, intermediaries such as price comparison platforms have the power to design their platforms and affect the differentiating parameters that customers see. In many cases this is the price. An interviewee argued that in the worst case, differentiation would be limited to the price and risk appetite of insurers, which

would reduce them to pure risk-carriers. As such, we see a threat for incumbents to lose their direct access to the end customers in the personal insurance market. This in turn can impede differentiation through the development of customer-oriented products and services, because it requires understanding the customers' needs. As the founder of Simpleurance stated: "we manage all the processes, all the customer relationships end-to-end, including the claim. We collect a lot of data about customer behavior, consumer behavior, and claim behavior. And so, we can generate a lot of insights about loss ratios, about claim ratios into the verticals, the countries. [...] That puts us in a position to really come up now with our own products and own pricing for insurance products" (von Bonin 2016). Three options to respond to emerging FinTech start-ups (aside from doing nothing) have been suggested for incumbents, i.e., to acquire them, to adopt legacy IT and strategy to become a FinTech company or to partner with FinTech companies to serve customers (Allayannis and Cartwright 2017).

Second, innovative service providers have entered the market and enable incumbents to exploit the transformational capabilities (e.g., development of innovative front-end applications for claims submissions). Given the weaknesses of insurers in IT operations and development (Maas and Janesch 2015), this can further lead to increased specialization following the on-going reduction of in-house production (Puschmann 2017).

Third, value networks along the different risk domains will emerge (e.g., car, health, household and life). On the one hand, many of the identified transformational capabilities rely on access to risk-related data, which many incumbents until now do not have. On the other hand, many stakeholders with direct access to risk-related data have not yet exploited this data for insurance purposes. Hence, various arrangements become possible. From the perspective of exploiting data for risk assessment (i.e., TC2), multiple scenarios become possible. Stakeholders with access to risk-data may provide insurances with raw data, may process and complement this data, may act as digital broker to offer insurance by themselves (i.e., TC13) or may even act as risk carriers. In between, specialized service providers may enter the market. However, in many cases, risk-related data needs to be aggregated to be useful for insurances as well as customers, which again relates to the transformational capability of integrating related services with insurance (i.e., TC6).

Fourth, we observe moves of novel intermediaries to expand their power. On the one hand, intermediaries start increasing their competitive scope. For example, the FinTech start-up N26 (i.e., a purely mobile bank provider) has recently announced to partner with the InsurTech start-up Clark to expand their services and products by introducing a purely digital insurance service N26 Insurance. On the other hand,

our data suggests that intermediaries start shifting from offering pure price comparison towards individualized services. For example, the price comparison provider Check24 has recently launched a portal that offers contract management, expert check, insurance optimization, reminder services, and personal advice. Similar efforts can be observed in other countries (e.g., Optimatis and Comparis 360). This can be interpreted as a move towards combining all the four intermediary roles, i.e., aggregation, facilitation, matching and trust (Bailey and Bakos 1997). This shift towards individualized advisory services (in the personal insurance market) also bears similarities to findings in the commercial insurance market. That is, a shift from transaction-oriented services to tailor-made solutions, and a tendency towards close customer relationships, customer-orientation, and empathic and competent behavior (Maas 2010).

To sum up, the short-term impact of InsurTech is represented by a rise of novel digital intermediaries in the personal insurance industry. As such, it will be interesting to explore the long-term impact of InsurTech on the industry structure and see how these intermediaries evolve. Put simply in the exemplary words of the founder of an observed intermediary: “the vision itself for Knip is to reinvent insurance experience. We are not focused on being a broker. I think that’s the entry point for us now. It’s the easiest entry point that enables us to own the customer, to get the data that we need in terms of customer interaction and experience, but it’s not something that we say we need to stick to the next two to three years” (Just 2016).

Conclusions

Given the lack of empirical research on InsurTech and the novelty of topic, we strived to advance the understanding of InsurTech and its impact on firm-level value creation and insurance industry structure. To do so, we applied grounded theory methodology to develop theory inductively from rich empirical data. Our contribution to theory is twofold: First, our results advance literature on FinTech by contributing a systematic understanding of InsurTech through the presented model comprising 52 characteristics and 14 transformational capabilities. Drawing on value network literature, we demonstrate how the identified transformational capabilities (i.e., sources of competitive advantage) relate to the three interdependent primary activities infrastructure operations, service provisioning, and network promotion. This particularly emphasizes the relevance of aligning these primary activities and their respective transformational capabilities to understand firm-level value creation in the light of InsurTech. Second, by relating our results to the roles of intermediaries (i.e., aggregation, facilitation, matching and trust), we elaborate on the impact of InsurTech on the industry structure. Namely,

the rise of novel digital intermediaries in the personal insurance market. For practitioners, the identified characteristics and transformational capabilities serve as building blocks, which can be combined to plan, discuss and compare InsurTech initiatives. Informing strategic positioning and competitive analyses, the model provides a foundation for deciding where to strive for possessing a competitive advantage and where to give up sovereignty.

There are several limitations in the light of which our results have to be interpreted: Contingent on the qualitative and interpretive nature of our research, exhaustiveness cannot be ensured. In spite of the iterative data collection, InsurTech is continuously evolving and might demand future changes of our model. In addition, the results might suffer from sample bias, because not every InsurTech innovation is posted on Twitter. Finally, we have to emphasize that literature on value networks, FinTech and intermediation might not be the only research fields worth to relate our emergent model to in the course of theoretical integration.

In particular, we would like to emphasize two main areas of future research. First, future work should investigate InsurTech from a customer’s perspective in terms of trust, perceived value, and motives. For example, Milanova and Maas (2017) studied the motives to participate in peer-to-peer insurance. Second, as the nature of value creation shifts towards integrating and applying resources in networks of actors, it seems fruitful to investigate the emergent network structures in more detail (i.e., analyzing the exchanged operand and operant resources between actors such as reinsurance, primary insurance, service providers, and intermediaries). As such, literature on actor-network theory, value co-creation and service-dominant logic could inform future analyses.

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