

Association for Information Systems AIS Electronic Library (AISeL)

PACIS 2018 Proceedings

Pacific Asia Conference on Information Systems
(PACIS)

6-26-2018

The Generic Ecosystem and Innovation Patterns of the Digital Transformation in the Financial Industry

Tobias Riasanow

Technical University of Munich, tobias.riasanow@in.tum.de

Rob Jago Flötgen

Technical University of Munich, rob.jago.fluetgen@tum.de

David Soto Setzke

Technical University of Munich, setzke@in.tum.de

Markus Böhm

Technical University of Munich, markus.boehm@in.tum.de

Helmut Krcmar

Technical University of Munich, krcmar@in.tum.de

Follow this and additional works at: <https://aisel.aisnet.org/pacis2018>

Recommended Citation

Riasanow, Tobias; Flötgen, Rob Jago; Setzke, David Soto; Böhm, Markus; and Krcmar, Helmut, "The Generic Ecosystem and Innovation Patterns of the Digital Transformation in the Financial Industry" (2018). *PACIS 2018 Proceedings*. 77.

<https://aisel.aisnet.org/pacis2018/77>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2018 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

The Generic Ecosystem and Innovation Patterns of the Digital Transformation in the Financial Industry

Completed Research Paper

Tobias Riasanow

Technical University of Munich
Boltzmannstraße 3, 85748 Garching
tobias.riasanow@in.tum.de

Rob Jago Flötgen

Technical University of Munich
Boltzmannstraße 3, 85748 Garching
rob.jago.floetgen@tum.de

David Soto Setzke

Technical University of Munich
Boltzmannstraße 3, 85748 Garching
setzke@in.tum.de

Markus Böhm

Technical University of Munich
Boltzmannstraße 3, 85748 Garching
markus.boehm@in.tum.de

Helmut Krcmar

Technical University of Munich
Boltzmannstraße 3, 85748 Garching
krcmar@in.tum.de

Abstract

The emergence of financial technology companies (Fintechs) through the easy access of digital technologies is transforming the entire financial industry, heralding a new era of business models. With digital technologies like mobile payments, robo advisors, and distributed ledgers or blockchain, Fintechs are challenging the prevailing position of traditional financial institutions. However, literature does not provide a structured overview of the digital transformation in the financial industry, including inter-organizational innovation patterns. By analyzing 792 Fintechs, this paper visualizes the 22 generic roles and value streams within the financial ecosystem using the e^3 -value method. Moreover, we identify and discuss seven inter-organizational innovation patterns of the digital transformation in the financial industry. We contribute to literature by examining digital transformation in the financial industry from an inter-organizational perspective. Practitioners may apply the model to position themselves and to identify disruptive actors or potential business opportunities. We also analyze the influence of blockchain technology.

Keywords: Digital Transformation, Financial Industry, Fintechs, Inter-Organizational Innovation Patterns, Ecosystem, e^3 -value model

Introduction

When asked why he launched Alipay in 2004, Jack Ma, the founder and chairperson of Alibaba replied “at that time, I went to a bank, and the bank said ‘we can’t do that [online] (...)’. So I decided to do it, and threw everything into it” (Custer 2015). In 2016, Alipay had more than 450 million of the 1 billion internet users registered and already accounted for 52% of the Chinese online payments, which represents more than \$ 2,500 billion in transaction volume (Meeker 2017; Statista 2018).

The case of Alipay in the Chinese market shows that pure technology companies are continuously penetrating the business model of traditional financial institutions. One reason is that the market for digital technologies is easily accessible and constantly innovating. Digital technologies, like e.g.,

mobile payments, robo-advisors, crowdfunding or -sourcing, or blockchain (Cearley et al. 2017), are some of the main drivers in the financial industry.

Digital platforms that have the capacity to combine and deploy innovative technologies create new business models that fundamentally transform the way business is done (Lucas and Goh 2009; Tiwana 2015). We refer to this organizational transformation as digital transformation following Fitzgerald et al. (2013). Digital transformation is defined as “the use of new digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements (such as enhancing customer experience, streamlining operations or creating new business models)” (Fitzgerald et al. 2013, p. 2). The transformative influence on industrial-age products has remained unnoticed in the Information Systems literature for years (Yoo et al. 2010). However, due to the easy access and the decreasing cost of innovative digital technologies many startups are challenging the value creation of established organizations.

In the financial industry, these startups are referred to as Fintechs, which is essentially a combination of “finance” and “technology” (Zavolokina et al. 2016). Fintechs use innovative digital technology to create novel financial products or services that either improve existing processes or create new business models, such as robo-advisors or cryptocurrencies (Zavolokina et al. 2016). According to Puschmann (2017), Fintechs reflect the IT-induced transformation of the financial industry. Central advantages of Fintechs are costs efficiency, flexibility, speed, and scalability (Deutsche Bank AG 2014). However, Fintechs either change or improve established processes, products, or services, or create competition or eventually disrupt established business models (Puschmann 2017; Zavolokina et al. 2016).

Due to the rising number of new market entrants, traditional financial institutions such as banks are no more alone in the market. Hence, established organizations have to align their strategies to compete with these new market entrants, which provide customer-centric financial services for their customers (Matt et al. 2015; Puschmann 2017; Riasanow et al. 2018). Currently, traditional financial institutions invest heavily into Fintechs (Puschmann 2017). Yet, existing studies solely focus on the business model of Fintechs or the transformation of the business model of established financial institutions (Puschmann 2017). However, following Puschmann (2017), literature does not provide an inter-organizational and macro-economic overview of the current and ongoing transformation of the financial industry, particularly through Fintechs. Further, innovation patterns of the digital transformation through Fintechs are particularly missing (Puschmann 2017). Towards this goal, and to trigger further research, this paper aims to answer the following research question: *What is the generic ecosystem of the digital transformation in the financial industry and which inter-organizational innovation patterns can be observed?* Therefore, we first use qualitative content analysis of Mayring (2010) and Miles and Huberman (1994) to identify 22 generic roles we derived from analyzing 792 companies. We extracted the company data from the Crunchbase database, a comprehensive, socially curated database for established companies and startups. Further, we use the e³-value method to develop a generic ecosystem of the digital transformation in the financial industry including Fintechs based on these 22 roles. Following Puschmann (2017), we discuss seven inter-organizational innovation patterns to structure the digital transformation in the financial industry, such as the elimination of intermediaries.

The paper is organized as follows. First, based on digital transformation literature we analyze related background on the digital transformation in the financial industry through Fintechs. Second, we describe our methodology. As third, the 22 generic roles and the generic ecosystem are presented. Further, we suggest seven innovation patterns of the digital transformation in the financial industry. Next, we discuss the results, implications and future research. The final section is the conclusion.

Digital Transformation in the Financial Industry through Fintechs

Digital transformation is currently one of those topics practitioners and researchers hardly can avoid when talking about IS or business strategy making. Digital transformation is an industry level phenomenon (see, for example da Silva Freitas et al. 2016; Downes and Nunes 2013) which changes the way organizations within and across industries compete. Therefore, digital transformations “affect large parts of companies and even go beyond their borders, by impacting products, business processes, sales channels, and supply chains” (Matt et al. 2015, p. 339).

Following Horlacher et al. (2016), inherent to digital transformation is the development of technology enabled business models that are new to the organization that has initiated the transformation. This is particularly relevant for the financial industry, as a magnitude of emerging technology-enabled players penetrate the market (Puschmann 2017). These organizations, so called Fintechs, use innovative digital technology to create novel financial services or products that either improve existing processes or create new business models, such as robo-advisors (Zavolokina et al. 2016). According to Deutsche Bank AG (2014), central advantages of Fintechs are costs efficiency, flexibility, speed, and scalability. The changing role of IT, changing customer behavior, changing ecosystems, and changing regulation are the main drivers for the success of Fintechs (Puschmann 2017).

Moreover, digital transformation means changing the way value is delivered to customers (Piccinini et al. 2015), which is also observable in the financial industry. Hence, Fintechs revolutionize the financial industry in several ways. They may improve established processes, products, or services, create competition through innovative products or services, or eventually disrupt established business models (Puschmann 2017; Zavolokina et al. 2016). To be successful, the evolution of a company's business model needs to be complemented by a co-evolution on the customer side (Riasanow et al. 2017). In particular, Haffke et al. (2016, p. 2) emphasize the effects on "sales and communication channels, which provide novel ways to interact and engage with customers" and a "firm's offerings (products and services)", which replace or augment physical offerings. Drawing on the software industry, Apple's App Store shows DT is not just affecting the organization with its internal value creation processes. Apple heavily invested into resources (e.g., the software development kit for iOS) that helped the organization to establish an ecosystem of connected developers and customers. Today the magnitude of applications is created by external companies or independent developers (Eaton et al. 2015).

Recognizing this interdependence, researchers have analyzed digital transformation with an intra-organizational perspective (see, for example Bley et al. 2016; Haffke et al. 2016; Matt et al. 2015; Piccinini et al. 2015). However, research is missing a detailed inter-organizational, macroeconomic analysis of the current and ongoing digital transformation in the financial industry (Puschmann 2017) as existing studies solely focus on organizations' business models. Thus, we analyze the digital transformation in the financial industry from the holistic perspective of its ecosystem.

Research Approach

We conducted a five-step research approach based on Riasanow et al. (2017). To develop the generic ecosystem of the financial industry, we first identified the roles of the actors in the industry and the value streams between them. Second, we presented the generic ecosystem based on the prior identified roles and value streams. Third, we validated the model with four semi-structured expert interviews. Afterwards, we identified innovation patterns of the digital transformation in the financial industry using qualitative content analysis.

For the first step, we decided to use Crunchbase data¹ in order to derive the roles in the ecosystem. Crunchbase possesses a comprehensive database for existing companies and startups (Marra et al. 2015) including a description of organizations' value propositions. Crunchbase contains startups at all funding stages, which enables researchers to capture business model innovations in emerging markets (Marra et al. 2015; Perotti and Yu 2015).

We extracted all organizations listed on October 02, 2017. To collect all organizations of the financial industry as well as related technologies, we filtered the Crunchbase category list by the search term "fintech", which led to a sample size of 1000 European funded companies. This led us to capture established and emerging organizations, which are representative for the current financial industry. We excluded eleven companies, which have been "closed" so far, for example Kiria, a Berlin-based mobile financial assistant. Furthermore, we had to exclude three organizations from our coding, as the listed website did not exist anymore. Screening the data, we found companies, which had no relationship to

¹ The Crunchbase database is accessible via www.crunchbase.com. We used a premium account for data collection.

the financial industry, e.g., DigitalMR, a company that uses artificial intelligence for customer insights. Hence, we shortened the data set by further 247 companies.

With the remaining 742 organizations we conducted in a first step a structured content analysis, including an inductive category development based on Mayring (2010) and Miles and Huberman (1994). With this method, we identified a set of 22 generic roles. We established inter-coder reliability to ensure consistent coding. Two experienced raters independently coded the 742 organizations. Further, to prevent restriction to the European market, we randomly extracted 50 further non-European organizations from Crunchbase and coded them accordingly, leading to 792 organizations in total. However, we could not derive new roles from this additional data set. This implies our data sample is a comprehensive representation of the international financial industry.

Before the raters started coding the organizations from Crunchbase, both raters coded several organizations to become familiar with the coding scheme and then compared their coding for calibration purposes. All authors confirmed the final coding of each organization and discussed the coding discrepancies until we reached a consensus; this helped to eliminate individual disparities (Bullock and Tubbs 1990). For example, we coded Klarna as “alternative payment solution” based on its description “*Klarna provides e-commerce payment solutions for merchants and shoppers*”. We used the same approach for the identification of the value streams, but combined the Crunchbase information with secondary publicly available information from company websites, reports, press articles or annual reports. For example, we coded the value streams between “loans” and “customers” as exchange of money (payment and fees) and loans or leasing based on the quote “*RateSetter is a P2P lending website allowing users to lend and borrow money directly with each other according to their own interest rates*” (RateSetter 2018). After both raters completed the coding, we used Krippendorff’s (2004) Alpha to determine inter-coder reliability. The results indicated an Alpha of 0.85, reflecting an acceptable inter-coder reliability (Krippendorff 2004).

In the second step, we use the e³-value method to visualize the ecosystem of the financial industry based on the identified generic roles and the value streams between the generic roles. The e³-value method is a business modeling methodology to elicit, analyze, and evaluate business ideas from an ecosystem perspective. It is used to evaluate economic sustainability of ecosystem by modelling the exchange of things of economic value between actors (Gordijn and Akkermans 2003). Further, we compared the prior generic ecosystem to the generic ecosystem including Fintechs.

In the third step, drawing on qualitative content analysis following Mayring (2010) and Miles and Huberman (1994), we derive inter-organizational innovation patterns of the digital transformation in the financial industry. Therefore, we analyzed emerging roles that either corporate or compete with existing roles in the ecosystem.

Fourth, we conducted four interviews with experts from the financial industry or founders of Fintechs to validate the generic ecosystem. We used a semi-structured technique (Myers and Newman 2007) to interview a venture fund representative, a senior analyst at a major German investment bank, and two founders of European Fintechs. Each of the experts has substantial experience in the financial industry and in new digital technologies. The interviewees are either working in a leading strategic position or information technology related function (Goldberg et al. 2016), who have privileged access to information and knowledge on the subject (Bogner et al. 2009). We conducted the interviews between January and February 2018. The interviews were recorded and transcribed afterwards. Each interview took 41 minutes on average. To validate the generic roles, value streams and innovation patterns, we discussed the roles and value streams of the proposed generic ecosystem with the experts.

Fifth, we draw on Puschmann (2017) to identify the inter-organizational innovation patterns. We derive the innovation patterns by comparing the traditional ecosystem with the digitally transformed ecosystem due to Fintechs.

The Generic Ecosystem of the Financial Industry including Fintechs

Due to the emergence of innovative digital technologies, the financial industry is transforming. This is particularly due to new market entrants like Fintechs. To model the ecosystem of the financial industry, we follow the approach of Riasanow et al. (2017).

Hence, we first derive the roles of the actors in the ecosystem by drawing on data from 792 companies derived from the Crunchbase database. Actors, which offer similar services and products to the customer are abstracted to one role based on a structured content analysis following Mayring (2010). As our roles are on a more abstract level than business models, one role can refer to different business model types. Further, one company can act in different roles by offering different services to other players. In table 1, we first present the generic roles of the traditional actors in the financial industry.

Table 1. Generic Roles of the Traditional Actors in the Financial Industry

Role	Description	Example(s)
<i>Consumer</i>	The consumer requests, among other applications, financial services for business or private use. In some cases, the consumer is a <i>prosumer</i> through simultaneously using and creating a service. This is particularly the case for crowdsourced services, where users may simultaneously provide and use the service. Consumers pay for services with money, data, or cryptocurrency.	
<i>Savings Accounts</i>	A savings account is a deposit account that pays interest but cannot be used directly as payment solution in the narrow sense of a medium of exchange. Sometimes customers can compare different plans among several European partner banks. The service is often completely digital and may be activated through a digital identity provider (Ho 2017).	Wells Fargo Saving Accounts
<i>Loans</i>	A loan is a debt provided to another entity at an interest rate, and evidenced by a promissory note, which specifies, among other things, the principal amount of money borrowed, the interest rate the lender is charging, and date of repayment. A loan entails the reallocation of the subject asset(s) for a period of time, between the lender and the borrower. Fintechs in this segment, in cooperation with a partner bank, extend credit to customers without recourse to the crowd. They offer innovative factoring solutions, such as selling claims online or offering factoring solutions without a minimum requirement. Companies with this role automate many of their processes, thereby enabling cost-effective, fast and efficient services (Dorfleitner et al. 2017).	Fannie Mae, Schwäbisch Hall, Monetise, Finanzarel, Capitalise,
<i>Fraud Detection</i>	Fraud detection targets to protect customer and enterprise information, assets, accounts and transactions through analysis of activities by users and other defined entities. It uses background server-based processes that examine users' and other defined entities' access and behavior patterns, and typically compares this information to a profile of what's expected. Fraud detection is not intrusive to a user unless the user's activity is suspect (Griffin 2012; Phua et al. 2010).	Featurespace, Fraugster
<i>Risk Management</i>	Risk Management providers use big data analyses to offer more personalized products and services, e.g. to reduce currency risk in institutional portfolios (Puschmann 2017).	Risklab, Riskopy
<i>Stock Market</i>	A stock market portal offers customers central access platform to all cash market services concerning listing, trading and clearing (Hull 2009).	NASDAQ, XETRA
<i>Portfolio Management / Robo-advice</i>	Portfolio management systems and robo-advisors provide algorithm-based and largely automated investment advice (European Supervisory Authorities 2015). These providers are generally based on passive investing and diversification strategies	Blackrock iShares ETFs, Easyfolio,

	(Sironi 2016). They consider investor's risk tolerance, the preferred duration of the investment, as well as other goals (Fein 2015). We distinguish between “automated investment advice” in which a one-off investment recommendation is given, and “automated financial portfolio management,” which is characterized by ongoing recommendations (BaFin 2018). Since these two services often overlap, they are conflated in this paper.	Scalable Capital
<i>Personal Financial Management</i>	Personal financial management (PFM) includes Fintechs that offer private financial planning, administration, and presentation of financial data, using digital services. PFMs are typically connected to other financial institutions, using Application Programming Interfaces (APIs). In many PFM systems, a manual entry of the account data is still required (Glushko et al. 1999; Nienaber 2016).	Bean
<i>Money Transfer</i>	Companies that offer e-wallets are money transfer services. An e-wallet is a system in which both digital currencies (not cryptocurrencies) and payment information for various payment systems are stored. The payment information can be used during an online payment process without re-entering it. This enables very fast and user-friendly transactions (Mallat 2007). Other solutions offer peer-to-peer transactions. The money is transferred online and thus faster than via traditional financial institutions (Merritt 2010).	TransferWise, Western Union
<i>Regulatory Authority</i>	Regulatory authorities supervise the solvency of banks, insurers and financial service providers. Their market supervision facilitates fair and transparent market conditions and protects consumers. The tasks of regulatory authorities include to prevent money laundering, terrorist financing (Dewispelaere 2017).	Securities and Exchange Commission (SEC)

Second, we propose the generic ecosystem of the traditional financial industry, see Figure 1.

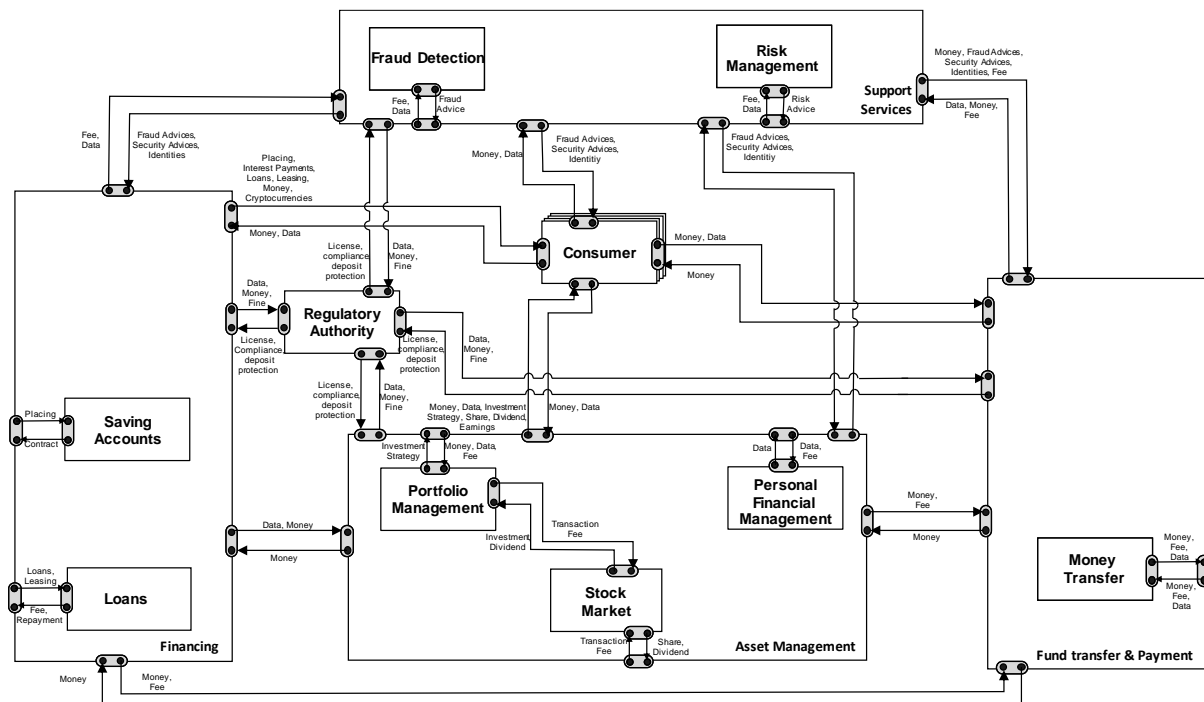


Figure 1. Generic ecosystem of the traditional financial industry

Drawing on the e³-value method, it depicts the identified roles and the value streams between them. As our roles are on a more abstract level than business models, on role can refer to different business model types. Further, one company can act in different roles by offering different services to other players. Following Dorfleitner et al. (2017), products and services in the financial industry can be divided into three categories: financing, asset management, and payment.

Third, we show the generic roles of the actors emerging actors that are exclusively based on Fintechs in table 2. Further, following the generic ecosystem for cloud computing, we included the four roles of Böhm et al (2010): cloud infrastructure provider, cloud platform provider, cloud application provider, and cloud market platform.

Table 2. Generic Roles of the Emerging Actors due to Fintechs in the Financial Industry

Role	Description	Example(s)
<i>Crowdfunding</i>	Crowdfunding involves an open call for the provision of financial resources either in the form of donations or in exchange for the future product or some form of reward to support initiatives for specific purposes and achieve a common goal (Klöhn and Hornuf 2012). Crowdfunding platforms enable the matchmaking between potential complementors (Belleflamme et al. 2014).	Kickstarter, indiegogo
<i>Crowdlending</i>	Crowdlending describes platforms that enable customers to secure loans from the crowd. In return for the provision of the loan, lenders receive a predetermined interest (Bradford 2012).	LendingClub, Auxmoney
<i>Cryptocurrency wallet</i>	Cryptocurrency wallets are platforms, which are accessible from web or mobile devices and store containers for private keys, usually implemented as structured files or simple databases. Cryptocurrency wallets contain only the keys, not cryptocurrency coins. The coins are stored on the blockchain in the form of transaction-outputs. Wallets are key-chains containing pairs of private/public keys. Users sign transactions with the keys, thereby proving they own the coins (EvryLabs 2015; Mougayar 2016).	Coyno, MyEther-Wallet
<i>Digital Identity Provider</i>	Digital identity providers offer identity on demand services to verify individuals for financial services digitally. Besides verification, identity and access management is managed, with all identity information collected in one access point, in addition to electronic signatures and certificates. Its aim is to prove who you are, online and in person (Puschmann 2017).	Yoti, AimBrain, OneVisage
<i>Cryptocurrency exchange</i>	Cryptocurrency exchange provider are digital platforms, which are accessible from web or mobile devices. The purpose of an exchange platform is to transact cryptocurrency securely, through a clean, intuitive user-interface. Banks are not required to serve as intermediaries for the transaction. Core features are a built-in security center that helps the user to secure his account, backup funds and prevent unauthorized access, as well as the provision of partnerships with trusted exchanges. This facilitates buying and selling cryptocurrencies from the platform. The user pays a transaction fee each time cryptocurrency moves in or out of the wallet. The amount of the fee is based on the size of the transaction and the level of network activity at the time (EvryLabs 2015; Schlatt et al. 2016).	Coinbase, Kraken, Bitfinex

<i>Multi Banking-Aggregator</i>	Aggregators imply the administration and presentation of financial data using digital services. Aggregators enable customers to visualize multiple assets they have deposited with different financial institutions in one user interface. It often requires a one-off or annual fee from users. Examples for multi banking-aggregators are remote deposit capturing apps for mobile phones which allow users to optimize their payment processes by simply photographing a bill instead of typing the data into their online banking system (Glushko et al. 1999; Nienaber 2016).	Feelix, finq, Just Spent
<i>Social Trading</i>	Social trading is a form of investment in which consumer (or follower) observe, discuss, and copy the investment strategies or portfolios of other members of a social network (Liu et al. 2014). Individuals benefit from the collective wisdom of a large number of traders. Consumers can be charged for spreads, order costs, or percentages of the amount invested (Pentland 2013).	Wikifolio, etoro
<i>Alternative Payment solution</i>	“Alternative payment solutions” is an umbrella role that applies to Fintechs whose applications and services concern payment and mobile payment transactions. The term “mobile payment” generally encompasses various functionalities that are handled via mobile phones (Mallat 2007). The payments often include the use of the mobile devices, such as smart phones.	PayPal, ApplePay, AliPay
<i>Cloud Market Platform</i>	This role represents a marketplace where cloud services of different providers are offered. The main objective of the market platform is to bring customers and service providers together. The former can search for suitable cloud computing services while the latter can advertise its services (Böhm et al. 2010).	Univention AppCenter
<i>Cloud Infrastructure Provider</i>	A cloud infrastructure provider, consists of a shared pool of Internet-based configurable computing resources (e.g. servers, storage, applications and services), which can be rapidly provisioned and released with minimal management effort (Youseff et al. 2008).	Amazon Elastic Compute Cloud (EC2)
<i>Cloud Platform Provider</i>	The cloud platform provider offer an environment to develop, run, and test applications. From a technical perspective an operating environment, application programming interfaces (APIs), programming languages are provided. Developers are shielded from technical, infrastructure related details. Programs are executed over datacenters, not concerning developers with matters of resource allocation (Böhm et al. 2010).	SAP Cloud Platform, Microsoft Azure Cloud Platform
<i>Cloud Application Provider</i>	The cloud application provider hosts and operates applications, in contrast to the traditional software model, in an own or outsourced datacenter. Cloud applications are accessible for customers via the internet. The application provider has to ensure a smooth operation of the applications, including monitoring, asset/resource management and failure/problem management (Böhm et al. 2010).	Salesforce CRM, Dropbox

Third, we used the e³-value method to develop a generic ecosystem of the digital transformation in financial industry including Fintechs. It extends the ecosystem in figure 1 by the Fintechs, we found by drawing on the identified generic roles for Fintechs.

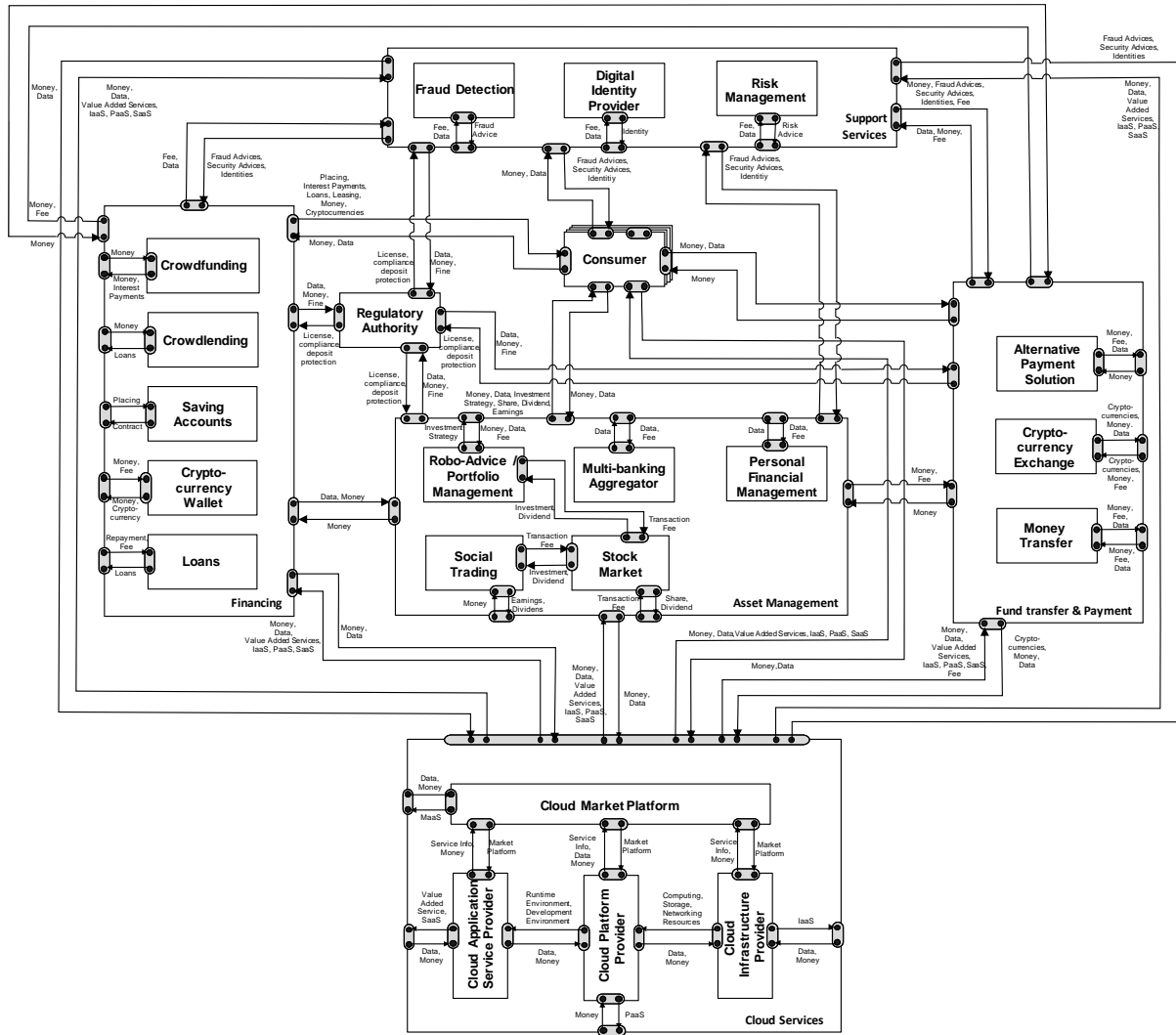


Figure 2. Generic ecosystem of the financial industry including Fintechs

Innovation Patterns of the Digital Transformation in the Financial Industry

Based on the analysis of the digital transformation in the generic ecosystem, e.g., compare figure 1 with figure 2, we identified seven innovation patterns of the digital transformation in the financial industry. These innovation patterns are inter-organizational, as they affect the relationship of at least two roles in the proposed generic ecosystem of the financial industry.

The first innovation pattern is the **elimination of intermediaries**. In this pattern, Fintechs are ruling out products or services of traditional financial institutions. One example is PayPal, where customers send or receive money without the necessity of traditional saving accounts. Another example can be found in the case of crowdlending. In the traditional financial industry, customers only had the chance to get loans from banks if they fulfilled the requirements of the bank. Crowdlending eliminates the necessity of a bank for the distribution of loans. Crowdfunding is the practice of funding a project or venture by raising many small amounts of money from a large number of people, typically online (Belleflamme et al. 2014). Crowdfunding is a form of crowdsourcing and of alternative finance. Crowdfunding has been used to fund a wide range of for-profit entrepreneurial ventures such as artistic and creative projects, medical expenses, travel, or community-oriented social entrepreneurship projects (Barnett 2015).

The second innovation pattern, **enhance transparency**, refers primarily to the generic roles in the security segment. There, the generic roles fraud detection, digital identity provider, and risk

management are intended to generate transparency in payments, asset management, and financing. The pure online bank Starling Bank built a mobile platform to increase transparency. Their service “gives their customers the ability to instantly check their spending habits, apply overdraft controls directly from their app, and eliminate all fees when traveling abroad” (Biermann 2017).

Most of the emerging roles in the financial ecosystem follow the third innovation pattern **cloud-based services**. These services are built on a modular cloud infrastructure that enables quick scalability and, therefore, eliminates the boundaries of traditional financial products or services that are bound to the capacities of the financial institution. Here, the scalability is bound to the computing power of the cloud infrastructure provider (Youseff et al. 2008). However, Fintechs like TransferWise are increasingly building on established cloud infrastructure providers, such as Amazon Web Services (Biermann 2017).

Service aggregation is the fourth innovation pattern in the financial industry. There, the service provider aggregates a plethora of services and makes it accessible in one solution. The Moscow-based Advisa App with its “mobile portfolio management which covers all your banks in one app, it also converts all banking SMS and text notifications into single push inbox” (Advisa.ru 2018) is a typical example for this innovation pattern.

Fifth innovation pattern is **service integration**. This innovation pattern emerges particularly due to the roles of robo advisors or crypto currency exchanges. Robo advisors, such as Munich-based Scalable Capital, Germany’s leading online asset manager that administers more than € 600 million of customer funds, integrate a multitude of external services. There, customers may invest in various securities, ranging from government or corporate bonds, passively managed exchange traded funds (ETFs), or commodities to real estate trusts. The different securities are integrated from a multitude of service providers, such as Blackrock’s iShares ETFs or services from ING-DiBa (Scalable Capital 2018). Hence, portfolio managers, stock market, or saving accounts provide the external services.

As sixth innovation pattern of the digital transformation in the financial industry, we identified **prosumption**. In some cases a consumer simultaneously uses and creates a service, we refer to as prosumption. We borrowed this term from the software industry, e.g., when a user is sharing personal data via smartphone with Google Maps while using the aggregated real-time traffic information of other users for navigation (Riasanow et al. 2017). In the financial industry, one may participate in crowdfunding rounds, such as Lending Club. Due to the participation the network increases, which makes it easier to lend funds in the future. We observe the same innovation pattern in the case of blockchain. In case of minable cryptocurrencies, an increase in the number of nodes in the network simultaneously increases the value of the cryptocurrency, which allows the miner to participate indirectly from the value increase of the mined tokens (Tapscott and Tapscott 2016).

The seventh innovation pattern of the digital transformation in the financial industry is the creation of a **parallel universe**. This is particular the case for blockchain technology. Based on blockchain, more than 1,500 cryptocurrencies like Bitcoin, Ethereum, Ripple, IOTA, Monero, or Litecoin emerged (Coinmarketcap.com 2018). It is therefore hardly surprising that the technology, known above all as the basis of the cryptocurrency Bitcoin (Nakamoto 2008), has the potential to change entire sectors of the economy like the financial industry. Most of the products are services can be substituted or replaced through automated programmable contracts (smart contracts) that are executed without human intervention or any intermediary (Tapscott and Tapscott 2016). Historically, cryptocurrencies as a means of payment were the first application of blockchain technology. It was attributed with the potential to fundamentally transform the financial industry. For example, through the elimination of intermediaries (e.g., clearing houses in securities trading), as well as the speed of transaction, transactions can be carried out more efficiently (EvryLabs 2015). Some startups try to use the potential of the technology to improve the efficiency of existing processes; others propagate a “new economy” without intermediaries in the financial system, such as central banks, e.g., based on the cryptocurrency bitcoin. But, a large number of financial institutions already experiment with blockchain applications for securities trading, lending or contracts (Schlatt et al. 2016). For example, in the case of securities trading, a limit order could be executed automatically upon reaching the limit and immediately the securities exchanged for money through the blockchain. Currently, the transfer of securities takes between two and five days (Havard Business Review 2017).

Discussion

Based on this work five theoretical contributions arise. First, based on our analysis of 792 companies, we contribute to literature on Fintechs, as existing studies solely focus on the business model of Fintechs or the transformation of the business model of established financial institutions (Puschmann 2017). Second, by developing the generic, inter-organizational, e³-value model of the financial industry including Fintechs, we provide a macro-economic overview of the current and ongoing transformation of the financial industry. We identified 22 generic roles for traditional and emerging players in the financial industry. Third, this study shows that digital transformation is more than an intra-organizational phenomenon as it affects the whole ecosystem. Thus, we extend Fitzgerald et al. (2013), who understand digital transformation primarily as intra-organizational phenomenon. Fourth, based on the comparison of the traditional actors and the emerging Fintechs, we identified seven inter-organizational innovation patterns. These patterns that drive the digital transformation in the financial industry through Fintechs were particularly missing (Puschmann 2017). Fifth, we confirm the generic cloud computing ecosystem of Böhm et al. (2010) by showing that most of the innovation in the financial industry is driven by cloud-based services.

Six practical contributions arise. First, decision makers, e.g., from traditional financial institutions can apply the model to identify potential threats to their current market position, potential opportunities to adapt to trends, or shifts in customer needs. Second, we show that additional layers of services emerge, such as the recombination of financial services in the service integrator role, or the intelligent combination of existing services to generate a new service in the service aggregator role. The roles show, typical for digital transformation, that the way value is delivered to the customer is changing (Piccinini et al. 2015). Third, the inter-organizational innovation patterns differ in magnitude and effect. The innovation pattern *prosumption* shows that this is also true for the financial industry, as consumers are co-creating value with financial service providers. Fourth, blockchain as disruptive technology may be understood as the most threatening digital technology for traditional financial institutions. In all categories of financial products and services – payment, asset management, and financing – we found blockchain-related Fintechs. Fifth, from an ecosystem perspective, blockchain has the potential to substitute many of the existing products and services, e.g. in the case of payments or financing. However, plenty of the traditional financial institutions and regulatory authorities are increasingly experimenting with this innovative technology. Sixth, we see that blockchain is not necessarily a *parallel universe* in this context. Nevertheless, many products and services are under strict regulation due to governmental authorities. Therefore, it remains uncertain how large the impact of blockchain on traditional financial institutions is.

Limitations and Future Research

Our study is subject to limitations. First, the model is limited by the information provided by the Crunchbase database and our coding of the generic roles. Second, drawing on the value streams between the roles, we relied on publicly available information, such as company websites, reports, press articles or annual reports. However, we established inter-coder reliability among two independent coders with an Alpha of 0.85. Third, we conducted four semi-structured interviews with experts from the financial industry or Fintech founders to validate the proposed generic ecosystem and the identified innovation patterns.

Following Puschmann (2017), we suggest future research to detect intra-organizational, micro-economic innovation patterns. Second, we would be curious to examine if the identified innovation patterns are observable in further industries, such as the automotive industry where the digital transformation is less mature. Third, many Fintechs are offering their services on digital platforms (Zavolokina et al. 2016), however, the success factors for digital platforms in the digital transformation process of the financial industry remain uncovered. Fourth, we invite scholars – not only due to the novelty of the technology – to examine the transformational impact of blockchain in qualitative and quantitative nature.

Conclusion

This paper presents the generic ecosystem for the financial industry based on 22 generic roles of traditional financial institutions and Fintechs, we identified by a structured content analysis of the Crunchbase data of 792 financial organizations. Digital transformation creates new roles for value creation in the financial industry and thus affects the whole ecosystem. The ecosystem shows that robo advisors, cryptocurrencies, or alternative payment providers penetrate the market and therefore threaten the value creation of traditional financial institutions. To discuss this, we derived seven inter-organizational patterns of the digital transformation in the financial industry, such as the elimination of intermediaries or the creation of a parallel universe. Our work contributes to Fintech literature and to the growing body of knowledge on digital transformation. We encourage traditional financial institutions to actively experiment with innovative technologies or to collaborate with emerging players in the market, just as Jack Ma did by introducing Alipay.

References

- Advisa.ru. 2018. "Company Website." Retrieved 03.02.2018, from <http://www.advisa.ru/>
- BaFin. 2018. "Virtuelle Währungen/Virtual Currency." Retrieved 11.02.2018, from https://www.bafin.de/DE/Aufsicht/FinTech/VirtualCurrency/virtual_currency_node.%20html
- Barnett, C. 2015. "Trend Shows Crowdfunding to Surpass Vc in 2016." Retrieved 03.02.2018, from <https://www.forbes.com/sites/chancebarnett/2015/06/09/trends-show-crowdfunding-to-surpass-vc-in-2016/#54b30c864547>
- Belleflamme, P., Lambert, T., and Schwenbacher, A. 2014. "Crowdfunding: Tapping the Right Crowd," *Journal of Business Venturing* (29:5), pp. 585-609.
- Biermann, R. 2017. "Fintech's Not Disrupting Financial Services. Consumer Are.", 03.02.2018, from <https://aws.amazon.com/de/blogs/startups/fintechs-not-disrupting-financial-services-consumers-are/>
- Bley, K., Leyh, C., and Schäffer, T. 2016. "Digitization of German Enterprises in the Production Sector - Do They Know How "Digitized" They Are?," *Proceedings of the 22nd Americas Conference on Information Systems (AMCIS)*, San Diego, CA.
- Bogner, A., Littig, B., and Menz, W. 2009. "Introduction: Expert Interviews—an Introduction to a New Methodological Debate," in *Interviewing Experts*. Springer, pp. 1-13.
- Böhm, M., Koleva, G., Leimeister, S., Riedl, C., and Krcmar, H. 2010. "Towards a Generic Value Network for Cloud Computing," *International Workshop on Grid Economics and Business Models*, Ischia, IT.
- Bradford, S. C. 2012. "Crowdfunding and the Federal Securities Law," *Columbia Business Law Review* (2012:1), pp. 1-150.
- Bullock, R., and Tubbs, M. E. 1990. "A Case Meta-Analysis of Gainsharing Plans as Organization Development Interventions," *The Journal of Applied Behavioral Science* (26:3), pp. 383-404.
- Cearley, D. W., Walker, M. J., Burke, B., and Searle, S. 2017. "Top 10 Strategic Technology Trends for 2017: A Gartner Trend Insight Report."
- Coinmarketcap.com. 2018. "Cryptocurrency Market Capitalization." Retrieved 17.02.2018, from <https://coinmarketcap.com/currencies/views/all/>
- Custer, C. 2015. "Jack Ma on the Origins of Alipay and Learning to Say No." Retrieved 13.01.2018, from <https://www.techinasia.com/jack-ma-origins-alipay-learning>
- da Silva Freitas, J. C., Macada, A. C. G., Brinkhues, R. A., and Zimmermann Montesdioca, G. 2016. "Digital Capabilities as Driver to Digital Business Performance," *Proceedings of the 22 Americas Conference on Information Systems (AMCIS)*, San Diego, CA.
- Deutsche Bank AG. 2014. "Fintech - the Digital (R)Evolution in the Financial Sector." Retrieved 01.02.2018, from https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD0000000000451941/Fintech_%E2%80%93_The_digital_%28r%29evolution_in_the_financia.pdf
- Dewispelaere, J. 2017. "The Non Bis in Idem Principle of National Regulatory Authorities," *European Competition and Regulatory Law Review* (1:4), pp. 334-337.

- Dorfleitner, G., Hornuf, L., Schmitt, M., and Weber, M. 2017. *Fintech in Germany*. Cham, Switzerland: Springer International Publishing AG.
- Downes, L., and Nunes, P. 2013. "Big-Bang Disruption," *Harvard Business Review* (91:3), pp. 44-56.
- Eaton, B., Elaluf-Calderwood, S., and Sørensen, C. 2015. "Distributed Tuning of Boundary Resources: The Case of Apple's Ios Service System," *MIS Quarterly* (39:1), pp. 217-243.
- European Supervisory Authorities. 2015. "Joint Committee Discussion Paper on Automation in Financial Advice." 01.02.2018, from https://www.esma.europa.eu/sites/default/files/library/jc_2015_080_discussion_paper_on_automation_in_financial_advice.pdf
- EvryLabs. 2015. "Blockchain: Powering the Internet of Value."
- Fitzgerald, M., Kruschwitz, N., Bonnet, D., and Welch, M. 2013. "Embracing Digital Technology: A New Strategic Imperative," *Sloan Management Review* (55:2), pp. 1-13.
- Glushko, R. J., Tenenbaum, J. M., and Meltzer, B. 1999. "An Xml Framework for Agent-Based E-Commerce," *Communications of ACM* (42:3), pp. 106-114.
- Goldberg, M., Satzger, G., and Fromm, H. 2016. "Adapting It Service Management for Successful Multi-Sourcing Service Integration," *Proceedings of the 24th European Conference on Information Systems*.
- Gordijn, J., and Akkermans, J. 2003. "Value-Based Requirements Engineering: Exploring Innovative E-Commerce Ideas," *Requirements Engineering* (8:2), pp. 114-134.
- Griffin, R. 2012. "Using Big Data to Combat Enterprise Fraud," *Financial Executive International* (28:10), pp. 44-47.
- Haffke, I., Kalgovas, B., and Benlian, A. 2016. "The Role of the Cio and Cdo in an Organization's Digital Transformation," *Proceedings of the 37th International Conference on Information Systems (ICIS)*, Dublin, Ireland.
- Havard Business Review. 2017. "Blockchain - What You Need to Know." *HBR Ideacast* Retrieved 23.02.2018, from <https://hbr.org/ideacast/2017/06/blockchain-what-you-need-to-know.html>
- Ho, A. T. 2017. "Tax-Deferred Saving Accounts: Heterogeneity and Policy Reforms," *European Economic Review* (97:3), pp. 26-41.
- Horlacher, A., Klarner, P., and Hess, T. 2016. "Crossing Boundaries: Organization Design Parameters Surrounding Cdos and Their Digital Transformation Activities," *Proceedings of the 22nd Americas Conference on Information Systems (AMCIS)*, San Diego, CA.
- Hull, J. C. 2009. *Options, Futures and Other Derivatives*. Harlow, UK: Pearson/Prentice Hall.
- Klöhn, L., and Hornuf, L. 2012. "Crowdinvesting in Deutschland - Markt, Rechtslage Und Regulierungsperspektiven," *Zeitschrift für Bankenrecht und Bankwirtschaft* (24:4), pp. 237-266.
- Krippendorff, K. 2004. *Content Analysis: An Introduction to Its Methodology*. Thousand Oaks, CA: Sage.
- Liu, Y.-Y., Nacher, J. C., Ochiai, T., Martino, M., and Altshuler, Y. 2014. "Prospect Theory for Online Financial Trading," *PLoS ONE* (9:10), pp. 1-7.
- Lucas, H. C., and Goh, J. M. 2009. "Disruptive Technology: How Kodak Missed the Digital Photography Revolution," *The Journal of Strategic Information Systems* (18:1), pp. 46-55.
- Mallat, N. 2007. "Exploring Consumer Adoption of Mobile Payments - a Qualitative Study," *Journal of Strategic Information Systems* (16:4), pp. 413-432.
- Marra, A., Antonelli, P., Dell'Anna, L., and Pozzi, C. 2015. "A Network Analysis Using Metadata to Investigate Innovation in Clean-Tech-Implications for Energy Policy," *Energy Policy* (86), pp. 17-26.
- Matt, C., Hess, T., and Benlian, A. 2015. "Digital Transformation Strategies," *Business & Information Systems Engineering* (57:5), pp. 339-343.
- Mayring, P. 2010. *Qualitative Inhaltsanalyse*. Wiesbaden, Germany: VS Verlag für Sozialwissenschaften.
- Meeker, M. 2017. "Kpcb C/O Mary Meeker's 2017 Internet Trends." Retrieved 13.01.2018, from <http://www.kpcb.com/internet-trends>
- Merritt, C. 2010. "Mobile Money Transfer Services: The Next Phase in the Evolution in Person-to-Person Payments." Retrieved 08.01.2018, from https://www.frbatlanta.org/-/media/documents/rprf/rprf_resources/wp0810.pdf

- Miles, M. B., and Huberman, A. M. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. Newbury Park, CA: Sage.
- Mougayar, W. 2016. *The Business Blockchain: Promise, Practice, and Application of the Next Internet Technology*. Hoboken, NJ: John Wiley & Sons.
- Myers, M. D., and Newman, M. 2007. "The Qualitative Interview in Is Research: Examining the Craft," *Information and Organization* (17:1), pp. 2-26.
- Nakamoto, S. 2008. "Bitcoin: A Peer-to-Peer Electronic Cash System." Retrieved 23.02.2018, from <https://bitcoin.org/bitcoin.pdf>
- Nienaber, R. 2016. "Banks Need to Think Collaboration Rather Than Competition," in *The Fintech Book - the Financial Technology Handbook for Investors, Entrepreneurs and Visionaries*, S. Chishti and J. Barberis (eds.). Chichester: Wiley, pp. 20-22.
- Pentland, A. S. 2013. "Beyond the Echo Chamber," *Harvard Business Review* (91:11), pp. 80-86.
- Perotti, V., and Yu, Y. 2015. "Startup Tribes: Social Network Ties That Support Success in New Firms," *Proceedings of the 21st Americas Conference on Information Systems (AMCIS)*, Puerto Rico
- Phua, C., Lee, V., Smith, K., and Gayer, R. 2010. "A Comprehensive Survey of Data Mining-Based Fraud Detection Research," *Intelligent Computation Technology and Automation (ICICTA)*, Changsha, China: IEEE Press.
- Piccinini, E., Hanelt, A., Gregory, R., and Kolbe, L. 2015. "Transforming Industrial Business: The Impact of Digital Transformation on Automotive Organizations," *Proceedings of the 36th International Conference on Information Systems (ICIS)*, Fort Worth, TX.
- Puschmann, T. 2017. "Fintech," *Business Information Systems Engineering (BISE)* (59:1), pp. 69-76.
- RateSetter. 2018. "Peer to Peer Lending – P2p Investing and Borrowing." Retrieved 03.02.2018, from <https://www.ratesetter.com/>
- Riasanow, T., Galic, G., and Böhm, M. 2017. "Digital Transformation in the Automotive Industry: Towards a Generic Value Network," *Proceedings of the 25th European Conference on Information Systems (ECIS)*, Guimarães, Portugal.
- Riasanow, T., Soto Setzke, D., Hoberg, P., and Krcmar, H. 2018. "Clarifying the Notion of Digital Transformation in Is Literature: A Comparison of Organizational Change Philosophies (Working Paper)." <https://ssrn.com/abstract=3072318>
- Scalable Capital. 2018. "Die Vermögensverwaltung Der Zukunft." Retrieved 02.02.2018, from www.scalable.capital/
- Schlatt, V., Schweizer, A., Urbach, N., and Fridgen, G. 2016. "Blockchain: Grundlagen, Anwendungen Und Potenziale." Retrieved 01.10.2017, from <http://www.fim-rc.de/Paperbibliothek/Veroeffentlicht/642/wi-642.pdf>
- Sironi, P. 2016. "My Robo Advisor Was an Ipod - Applying Lessons from Other Sectors to Fintech Disruption," in *The Fintech Book - the Financial Technology Handbook for Investors, Entrepreneurs and Visionaries*, S. Chishti and J. Barberis (eds.). Chichester: Wiley, pp. 152-154.
- Statista. 2018. "Number of Internet Users in China from 2015 to 2022 (in Millions)." Retrieved 13.01.2018, from <https://www.statista.com/statistics/278417/number-of-internet-users-in-china/>
- Tapscott, D., and Tapscott, A. 2016. *Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business and the World*. New York, NY: Penguin Random House.
- Tiwana, A. 2015. "Evolutionary Competition in Platform Ecosystems," *Information Systems Research* (26:2), pp. 266-281.
- Yoo, Y., Henfridsson, O., and Lyytinen, K. 2010. "Research Commentary: The New Organizing Logic of Digital Innovation: An Agenda for Information Systems Research," *Information Systems Research* (21:4), pp. 724-735.
- Youseff, L., Butrico, M., and Da Silva, D. 2008. "Toward a Unified Ontology of Cloud Computing," *2008 Grid Computing Environments Workshop*, pp. 1-10.
- Zavolokina, L., Dolata, M., and Schwabe, G. 2016. "Fintech – What's in a Name?," in: *International Conference on Information Systems (ICIS)*. Dublin, Ireland.