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Abstract

It is often stated that IT is able to transform entire industries. The emergence of digital technologies enables, among other things, new business models and therefore, obviously constitutes an industry transformation potential. However, IS research that actually deals with digitally enabled industry transformation is still rare. Motivated by its IT intensive nature, the research focus of this paper lies within the financial service industry. Prior research that deals with individual units or sectors is synthesized with the aim to draw inference on the financial service industry. The identified research articles are categorized into business, customer and technology relationship. The results include that digital technologies enables new business models, cause (dis-)intermediation and customer centricity becomes increasingly important for financial service providers. Additionally, the interaction between user and technology changes and information is increasingly digitized. Finally, possible future research questions are named.

Keywords: Literature Review, Financial Service Industry, Industry Transformation, Digital Technologies, Information Technology, Business Relationship, Consumer Relationship, Information and Technology Relationship

1 Introduction

An industry is an important construct for many stakeholders. Some examples among many others are regulations that affect whole industries, industry statistics are common in media, career path of individuals often show an affinity for a certain industry, specialized products and services from companies e.g. consulting firms are specialized on certain industries (Chiasson & Davidson, 2005). Out of this importance, it is obvious why classification schemes such as the "industry classification benchmark" or the "standard industrial classification" exist. In the IS field, it is frequently said that

information technology can transform entire industries, but only little research addresses this claim (Crowston & Myers, 2004). According to a recent Gartner (2012) report, the banking sector spends $445bn on IT measured in percent of the revenue in 2012. On average, this is approximately three times as much IT spending compared to all other industries. Therefore, the emergence of digital technologies i.e. "the combination of information, computing, communication and connectivity technologies" (Bharadwaj & Sawy, 2013, p. 471) affect especially IT intensive industries like the financial service industry.

The purpose of this paper is to identify, analyse and synthesise the diverse aspects of IT-enabled transformation in the financial service industry discussed in the literature. The findings will contribute to a better understanding of industry transformation in general. Moreover, another contribution is to reveal potential research gaps in the domain of IS that require further investigation. The corresponding research question is: *how do digital technologies shape the landscape of the financial service industry?*

2   Methodology

The following paragraph provides details on how the relevant literature is identified. The approach is mainly based on the suggestions of Webster & Watson (2002). At first, the appropriate search strings for the subject "digital transformation of the financial service industry" are considered. Since the subject addresses the aspect digital transformation and the financial service industry the search strings are developed independently. For digital transformation the following search terms are identified: for digital: digital*[1] and IT to include the IT context. As a transformation can also be seen as change or be part of a strategy, the following search terms are derived for transformation: transform*, change* and strateg* (Kotter, 1995). For the financial service industry, the Standard Industrial Classification (SIC) and Industry Classification Benchmark (ICB) provide a detailed classification. By considering both classifications (SIC codes 6000 to 6700 and ICB sectors 8350 to 8990) the search terms for the financial service industry are: bank*, insurance*, real estate*, fianc*, invest*, depositor*, broker*, dealer* and exchange*.

Table 1 below shows the derived Boolean search string that is used for the search in the databases. In total, the Boolean search leads to 54 permutations of search strings.

Industry context		IT context		Transformation context
("bank*" OR "insurance*" OR "real estate*" OR "financ*" OR "invest*" OR "*depositor*" OR "broker*" OR "dealer*" OR	AND	("digital*" OR "IT")	AND	("transform**" OR "change*" OR "strateg*")

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1 The asterisks were set to cover plural forms and variations of a word e.g. by searching for bank* the results contain bank, banks, banking etc.

"exchange*" OR "insurance*" OR "real estate*" OR "invest*")				

Table 1: BOOLEAN search string applied

The search was performed in the "Association for Information Systems electronic Library" (http://aisel.aisnet.org/do/search/advanced) and the "AIS Senior Scholars' Basket of Journals"[2]. This guarantees a broad selection of relevant IS journals and latest conference proceedings. The search strings are used on the title, abstract and key words.

In total, 1525 articles are found. However, this number contains a large amount of irrelevant results caused by the general search strings like ("invest*" AND "IT" AND "strateg*"). Therefore, the abstracts are read to eliminate articles that do not deal with the subject at all, narrowing the number down to 168 pre-selected articles. Since the phenomenon of digitization is still an emerging research field, only articles from this millennia are considered. To decide whether an article is relevant the pre-selection is read by two researchers independently. Each article is either categorized as relevant or non-relevant. The classification results are compared and mismatches discussed to achieve a higher objectivity within the selection process. The final sample consists of 17 research articles. The last step is to sort the articles according to their similarities to create emerging categories (Agarwal et al., 2010; Gregory, 2010). In summary, three major categories emerged from the identified literature: the business relationship, the information and technology relationship and the consumer relationship. For the general setup of this literature review, a narrative review is selected. Figure 1 displays the most common review methodologies in IS research on a qualitative/quantitative continuum (King & He, 2005).
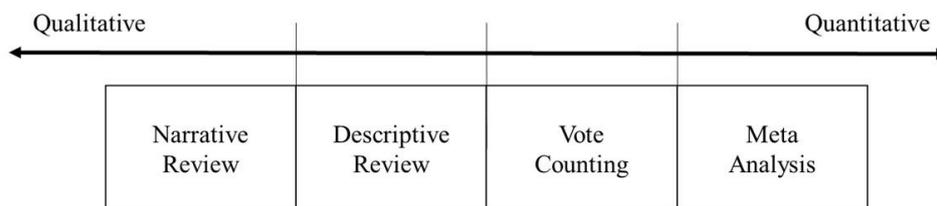
Figure 1: Review methods on a qualitative-quantitative continuum (based on King & He, 2005)

Narrative reviews are usually qualitative by presenting verbal descriptions of previous research. They are suited when it comes to e.g. guidance of future research in a domain. There is no common procedure of how to conduct a narrative review. Therefore, authors conducting a narrative review are relatively independent in the setup i.e. article selection and categorization process in their research paper. Descriptive reviews have some quantification in it. A common approach in descriptive reviews are frequency analyses. Thereby, authors are able to reveal e.g. the extent and patterns in a particular research stream. Generalizability can be achieved for example by using the grounded theory methodology. In summary, descriptive reviews present the state of the art of a domain.

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2 The AIS Basket of eight consists of the following journals: European Journal of Information Systems, Information Systems Journal, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS Journal of Strategic Information and Systems MIS Quarterly.

A vote counting review is conducted when an author wants to draw quantitative inferences. This is done by examining the outcomes of multiple studies that deal with a similar problem. For example, by looking at the reported p-values of the different studies. If the outcomes are similar in direction and significance the overall support for a hypothesis is more powerful. Obviously, homogeneity of the sample articles is a crucial requirement for vote counting. A meta-analysis is a statistical review tool that synthetizes prior quantitative studies. Therefore, it is relatively more objective than other review methods and in line with the positivist view. A meta analyses can lead to a greater understanding and completes a picture on a certain topic (King & He, 2005).

Since the transformational influence of digital technologies in the financial service industry is a relatively new phenomenon discussed in the IS literature, it requires a synthesis of the existing knowledge and an identification of gaps in the literature. Therefore, a narrative review is the first choice since the methodology is especially suitable when it comes to future development in a domain.

3 Results

The categories emerged out of the content similarities of the identified articles. One category that emerged is the business relationships. It deals with any transformation of business relationships caused by digital technologies. For example the disruption of a traditional value chain. Another major similarity is the change of the relationship towards the customers. Digital technologies enable new ways of approaching the customers and allows companies to be more intimate with them. The third category is the information and technology relationship. It contains the change of the human-technology interaction and digitization of information.

Table 2 provides an overview on the articles identified by author and year. Furthermore, the sector, research type and positioning in the categories is given. One can easily see that the majority of the articles in the IS literature deal with the banking sector, followed by exchanges. Brokers, real estate and electronic markets are the least covered sectors in the sample. Comparing the results with the keyword search, insurances do not appear in the sample at all. The dominant type of research is of quantitative nature.

Author(s)	Year	Sector	Research Type	Information and Technology Relationship	Business Relationship	Consumer Relationship
Bakos et al.	2005	Brokers	Quantitative			x
Banker et al.	2009	Banks	Quantitative		x	
Banker et al.	2010	Banks	Quantitative		x	
Crowston & Myers	2004	Real Estates	Quantitative / Qualitative		x	
Ende	2010	Exchanges/ Institutional Investors	Quantitative		x	
Gharavi et al.	2005	Exchanges	Qualitative		x	

Grandos et al.	2006	Electronic Markets	Qualitative / Case Study	x		
Gsell & Gomber	2009	Exchanges	Quantitative	x		
Lucas Jr., Oh, & Weber	2009	Exchanges	Qualitative / Case Study	x	x	
Möwes, Puschmann, & Alt	2011	Banks	Framework Development			x
Nüesch, Puschmann, & Alt.	2012	Banks	Framework Development			x
Pole et al.	2011	Banks	Qualitative/ Design Science			x
Sachse, Puschmann, & Alt.	2012	Electronic Markets	Quantitative		x	x
Setia, Venkatesh, & Joglekar	2013	Banks	Quantitative			x
Tallon	2010	Banks	Quantitative			x
Wang et al.	2009	Banks	Qualitative		x	
Zhang & Rhiodan	2011	Exchanges	Quantitative	x		

Table 2: Summary of the analysed articles

3.1 Business Relationship

It is evident that the real estate sector is undergoing an IT enabled change. A real-estate agent is a typical intermediary profession because agents seek to reduce the transaction costs and perceived risk for their customers. Typical tasks are listing services, standardized contracts, monitoring services, transaction support i.e. specialized knowledge. Since IT can provide the majority of these tasks at lower costs, the existence of real estate agents can be questioned. For example, internet platforms enable buyers and sellers to bypass real-estate agents. Over the years, the "for-sale-by owner" figures increased which goes along with the disintermediation of real-estate agents (Crowston & Myers, 2004). The effect of disintermediation is also noticeable in the brokerage sector. Institutional investors make use of algorithmic trading, smart order routing or direct market access. These technologies enforce self-directed trading and mean lower costs for institutional investors. Therefore, they tend to skip the traditional broker in the value chain. Trading control, urgency and anonymity are further intentions for institutional investors to adopt these technologies (Ende, 2010). Additionally, e-brokers are offering self-service brokerage services like trade execution for a lower price than traditional retail brokers. This challenges the business model of traditional retail brokers, too (Bakos et al., 2005; Gharavi, Love, & Sor, 2005). The case is similar for exchanges. New alternative electronic trading platforms attack incumbent exchanges.

Lucas Jr., Oh, & Weber (2009) conducted a case study of the New York Stock exchange. A key finding is that at some point incumbent companies have to radically modify their business model or adapt the one of the new entrant to survive. In the end, the superior technology and business model becomes dominant. IT-enabled business models like person-to-person lending platforms challenge banks and credit card companies. These intermediary functions were traditionally a competency of banks and credit card companies (Wang, Greiner, & Aronson, 2009). In this context, Moewes, Puschmann and Alt (2011) raise the term "open point of banking". Non-banks starting to compete with traditional players in the financial service industry. In a survey-based study among digital natives, already half of the participants are willing to use financial services from non-banks. This underlines the trend towards a more heterogeneous market with further disintermediation of traditional banks (Sachse, Alt, & Puschmann, 2012).

3.2   Customer Relationship

People become more and more familiar with digital technologies. Especially with the existence of digital natives, i.e. the future customers, this trend will continue. Digital natives is a term that describes people that are born after 1980 and show an affinity towards technology (Prensky, 2001). "With the growing recognition of the customer's role in service creation and delivery, there is an increased impetus on building customer centric organizations" (Setia, Venkatesh, & Joglekar, 2013, p. 565). It becomes inevitable for financial service providers to co-create value with customers to respond to the change in customer behaviour and needs, which is topic in the customer relationship category.

In a survey based study among CIO/IS executives in the US, Tallon (2010) finds support for the banks' desire to become more intimate with their customers i.e. the strategic move from operational excellence to customer intimacy. The author differentiates between small and large banks and finds that large banks' IT focusses more on transaction efficiency and costs, which obviously is at odds with a more service-oriented strategy. Therefore, "for customer intimacy to succeed, the primary locus of alignment needs to move to other parts of the value chain" (Tallon, 2010, p. 243). One way to become more customer-centric is the use of web 2.0 technologies. Nüesch, Puschmann and Alt (2012) develop a framework for assessing the web 2.0 adoption of banks. Their findings indicate that only a few companies use web 2.0 to support the interaction with their customers. Pole and Puschmann (2011) develop a classification framework for web 2.0 applications in private banking. The framework dimensions are application fields, potentials, relevance and risks. All in all, their findings are similar to Nüesch, Puschmann and Alt (2012). Banks are starting to explore the potentials of web 2.0 technologies in customer-related processes in order to become more customer intimate. But most banks only provide basic services such as instant messaging, wikis, blogs and rating applications. This means fewer risk but also fewer business potentials e.g. client acquisitions, bank-client relationship, loyalty and cross selling products. Moewes, Puschmann and Alt (2011) call the trend to use web 2.0 technologies the "interactive point of banking". Further trends towards an increased customer centricity are the mobile point of banking, configurative point of banking, integrated point of banking, multifunctional point of banking and open point of banking. Mobile point of banking refers to the increased number of mobile devices used by the

customers. The customer does not only want to do banking anytime but also anywhere. The configurative point of banking allows customers to customize their banking products. Integral point of banking is the increased transparency for the customer. That means the same information is provided for the customer and for the advisor. Multifunctional point of banking can be understood as the trends towards multifunctional devices i.e. paying with mobile phones. In a survey based study about banking, Sachse, Alt and Puschmann (2012) find that the electronic channels gain in significance. At the same time, services like advisory are still important for the customers. Obviously, this is an additional challenge for banks. They are expected to provide their services electronically but, at the same time, customers want to choose from different channels. Moreover, the results show that a web 2.0 presence is expected. However, customers are not willing to use this channel for banking activities like money transfer. The effect of IT-based service channels on firm performance is analysed by Banker et al. (2009). The results show that internet banking adoption increases cost efficiency but not revenue efficiency. The gain is not able to compensate for the loss, which leads to an overall negative effect. In contrast, the traditional branch-based channel leads to higher operating costs but, at the same time, higher revenues are documented. The revenues are able to cover the extra costs, resulting in a positive overall effect. The same applies for IT investments in ATM networks. Moreover, the traditional channel and Internet banking channel are both positively associated with market share in the loans and deposits business. Further research confirms these findings and shows that Internet banking is important for a long-term competitive advantage. Therefore, due to channel complementariness and customer centricity, banks should consider these insight in their channel strategy (Banker et al., 2010). Setia, Venkatesh and Joglekar (2013) examine the impact of digital technologies on the customer service performance. They study the local Indian banking sector and introduce a theory to "understand the effectiveness of a customer-side digital business strategy focused on localized dynamics" (Setia, Venkatesh &,Joglekar, 2013, p. 565) . The authors present two constructs, customer orientation capability and customer response capability that companies need to consider in order to respond to the customers' needs. Customer orientation capability is the ability to monitor the customers' needs and enable a business strategy that focusses on the customers' needs (Slater & Narver, 1994). Customer response capability is the ability to respond efficiently and quickly to the customers' needs (Jayachandran, Hewett, & Kaufman 2004). Both capabilities can be subsumed under customer service capabilities. They are hypothesized to influence the overall customer service performance that means the customers' evaluation of the services offered (Fornellet al., 1996). Information quality as a part of digital design is hypothesized to have an impact on both constructs. Process sophistication is expected to act as a mediator. The results show that information quality has an impact on the customer service capabilities. Additionally, the more sophisticated the customer service process are, the stronger is the relationship between information quality and customer service capabilities. The findings indicate that there is a direct impact of digital technologies on the customer service performance.

3.3   Information and Technology Relationship

Another category is the information and technology relationship. First, the technology and the interaction between user and technology is changing. For example, the competition between financial investors shifted from trading floors to electronic trading

venues (Lucas et al., 2009). Furthermore, humans are not only competing against each other anymore, they are facing sophisticated technology innovations such as high frequency trading and algorithmic trading, too. Algorithmic trading is "the use of computer algorithms to automatically make trading decisions, submit orders, and manage those orders after submissions" (Hendershott, Jones, & Menkveld, 2011). High frequency trading can be viewed as a subcategory of algorithmic trading, that is considered to be more complex and especially targets at connection and processing speed (Zhang & Riordan, 2011). Gsell and Gomber (2009) prove that algorithmic trading behaves differently concerning the positioning of limits, order types and the order modification or deletion. The authors conclude that algorithmic trading has an advantage over human trading in terms of the processing speed of data feeds. Humans cannot compete with these instantaneous order submission or modification. In the US the trading volume for high frequency trading makes accounts for 60% of all orders in 2009 (Tabb, Iati, & Sussman 2009). Second, information becomes increasingly digitized. For example, a bank account is almost completely digital and one does not rely on the local branch for banking services anymore. This transformational impact applies especially for the financial service industry because in most cases the value-creating component of a financial product or service can be displayed via 1s and 0s i.e. it can be digitized. Consequently, there is a shift from a physical to a digital nature in the financial service industry. The digitization of information can also be observed in the real estate sector. The obvious difference is that the product real estate is physical. Nevertheless, the information about real estates can be digitized. This means that it is "[…] impacted by information technology and resulting change, including the assembly, analysis and transfer of information." (Crowston et al., 1998, p. 288). Granados, Gupta and Kauffman (2006) suggest a continuum where one can classify products based on their digital product characteristics. At one end, there are physical goods and at the other end, there are information goods. The authors state equity markets and bond markets as an example for information goods. Both security types are easy to display electronically but the nature of equities is less complex relative to bonds. Hence, it is easier for non-traditional firms to enter the equity market e.g. the brokerage company E*Trade. Ultimately, the equity markets are relatively more transparent than bond markets.

4   Conclusion and Discussion

For the business relationship, one insight when comparing the different sectors of the financial service industry is, that nearly every traditional business model of companies in the financial service industry is challenged by the increasing digitization. New players, financial but also increasingly non-financial companies enter into incumbent's markets and offer services at a cheaper rate and/or better service quality. Moreover, whole business models become obsolete by bypassing an intermediary financial service provider in the value chain. Eventually, we can observe an increasing rate of disintermediation of traditional financial companies. Another finding is that the lines between IT and business become more and more blurred. In the past, the role of IT had a rather business supporting function. Today, IT often acts as an enabler of new business models like person-to-person lending. With the further increase of digital technologies, one can assume that these trends will continue.

The category customer relationship shows that there is strong evidence towards customer centricity by using digital technologies in the banking industry. It is also evident, that digital technologies have an impact on customer service performance. However, the pace at which banks approach customer centricity can be describes as rather reluctant and cautious. This may have several reasons. For one, IT is not set up to support customer centric solutions in every company. Additionally, becoming customer centric is obviously involved with up-front expenses but the payoff remains uncertain. Implementing low cost solutions such as low intensity level applications can be interpret as a risk averse way of becoming more customer-centric. However, these findings are limited to the banking sector. The inference for other sectors is limited due to the different business model. However, research on this topic is emphasized.

The conclusion for the information and technology relationship is that there is a trend from "physical to digital" in the financial service industry. To be able to digitize a product or service means the cost for information processing decrease. Markets tend to become more transparent in a digital environment. Additionally, there is some evidence that the interaction between user and technology changes. Therefore, further research could for example take a closer look at the change in human-machine interaction.

A literature review should not only be limited to analysing the past, it is also supposed to identify possible research gaps and outline corresponding questions that can be helpful for future research (Webster & Watson, 2002). Given the findings in this research article above, the following possible research questions are derived in table 3.

Business Relationship
How do companies in the financial service industry handle the various challenges caused by digitization? For example, how do incumbents react to new business models entering the market and the threat of disintermediation?
How and where can digital technologies enable new business models?
How does the digitisation affect processes and internal structures of certain organizations? For example the differentiation between business and IT departments (especially in digital technologies enabled business models such as p2p-lending)?
How much should be digitized and where are the limits of digitization in terms of the return on invest?
Consumer Relationship
How do different approaches of becoming customer centric e.g. the adoption of web 2.0 technologies affect the customer service performance and ultimately the firm performance?
How do financial service providers deal with the changing demands of their customers?
How do financial service providers react to the challenge to provide digital services for people with an affinity for technology and satisfy "traditional" customers at the same time? And how do does this challenge impact their business models, internal structures and processes?
Is the trend towards customer centricity evident for other financial service sectors aswell, besides banking?
Is customer-centricity a business-to-customer phenomenon, or is it also observable in business-to-business, why or why not, what do they have in common, where do they differ?
Technology and Information Relationship

Which characteristics (e.g. complexity) make a product or services suitable for digitization?
How does the digital transformation affect physical and information goods? What do they have in common where do they differ?
How and where do digital technologies affect the human-machine interaction, and why? What are the consequences?
What are the effects of an increasing digitization? For example, equity markets tend to be more transparent, but how does digitization influence other sectors?

Table 3: Possible Future Research Questions

Limitations. Clearly, this research article has its limitations. One limitation lies within the presentation of the results. The categories emerged from a sample that only represents a snapshot from the time the research was conducted. Therefore, the categories cannot be treated as rigid and it is likely that future research alters the content of the categories or the categories itself when new sample data is available. Additionally, the categories should not be treated as distinct but rather be seen as complementary to each other. For example, the digitization of products (technology and information relationship) can lead to new business models, which can results in possible disintermediation of incumbents (business relationship). The narrative review style certainly has its advantages when creatively conducting a review on an emerging topic. But at the same time the author has to handle the given freedom cautious with respect to the reproducibility of the results. Independently selecting the sample articles by two researchers aims to keep this issue at a minimum. Finally, the proposed research questions envision potential future research directions but do not claim to be complete.

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