“Systematic review of omni-channel banking and preview of upcoming developments in Germany”

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SYSTEMATIC REVIEW OF OMNI-CHANNEL BANKING AND PREVIEW OF UPCOMING DEVELOPMENTS IN GERMANY

Abstract

Banks have not come to rest since the 2008 banking crisis and have been struggling for their future ever since. In addition to serious market distortions, there are increasingly digital challenges and investments in the banks' platforms to remain competitive and continue to meet customer requirements. Other industries are showing the banks how to do it and investing heavily in the networking of distribution channels to form an omni-channel system, as this is where all interfaces converge. The banking industry has also recognized this groundbreaking approach in the distribution channel. Academic literature is also increasingly examining omni-channel management, but studies in the banking industry are still sparse. This study uses multi-method research in the form of a systematic literature review and semi-structured qualitative bank expert interviews to examine omni-channel management in the banking industry. Thereby, the state of scientific research and the future objectives of the banks are analyzed. Bank experts in Germany explain what bank customers will expect, how far German banks have progressed in implementing an omni-channel system, and how the bank-customer relationship will change. Findings show that banks will completely transform their distribution by omni-channel management by breaking with existing structures and creating a new customer experience and higher customer value. The paper provides critical insight into what omni-channel integration means for the banking sector.

Keywords distribution channel, financial services, digitalization, customer behavior, data management

JEL Classification M31, G21, L81

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INTRODUCTION

Banks have changed decisively in recent years because various serious problem areas and changes have occurred simultaneously and are still significant, virulent, and persistent today (Abhishek, Geng, Li, & Zhou, 2017; Wyman, 2018). On the one hand, the changes are extrinsically shaped by changing customer behaviors, new competition and governmental financial support to prevent bank insolvencies to poor performing banks, new regulations and institutions, and increasing digitalization (Efma & Backbase Report, 2015; Ernst & Young AG, 2018; Jovanović, Arnold, & Voigt, 2017; Wernicke, 2018). On the other hand, the changes are intrinsically motivated by the imperative to adjust costs and to increase profitability to regain completive structures (Gasser et al., 2017). Existing banking processes are dominated by regulatory bloated unit costs that customers are reluctant to pay because they do not have causal relationship with transactions and can be offered by fintechs at lower prices (Buchak, Matvos, Piskorski, & Seru, 2017; Pratz, Chikkova, Freddi, Castro, & Hewlett, 2015). The high production costs enable disruptive and lower-cost competitors to penetrate the banking sector (Alt, Beck, & Smits, 2018; Vasiljeva & Lukanova, 2016; Vives, 2017). To counteract this, forward-looking banks significantly invest in their own processes and platforms to op-

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erate more efficiently and in line with customer demand (Chikova, Freddi, & Kent, 2019; Hummel, Schacht, & Mädche, 2017; Pratz et al., 2015). Core element and hub of modernization is the distribution platform where all processes converge, and considerable time and money resources of banks are invested (Bocks, 2019; Röseler, 2018). Management of distribution channel and increasingly omni-channel management have high relevance in the disciplines of retailing, marketing, and information systems across all sectors (Mirsch, Lehrer, & Jung, 2016). All three disciplines are particularly important in the banks' application area; therefore, omni-channel management is equally important in the banking sector. Today, it is all about performance, low susceptibility, speed, and networking (Lee & Shin, 2018). Distribution channel management increasingly requires an integrated channel approach with a digital networked, seamless data exchange for an optimal customer approach in the individual purchasing and information process and no longer singular, isolated channel support as in the past (Beck & Rygl, 2015). Freely moving, customer-oriented and accessible use of channels by customers across all customer channels and touchpoints is not only expected but also demanded (Piotrowicz & Cuthbertson, 2014; Verhoef, Kannan, & Inman, 2015). In the past, physical channels had a unique selling point to offer products via touch and feel (Abhishek et al., 2017). Meanwhile, virtual channels convinced by wide product selections, access, low prices, and content such as product reviews, ratings, and customer convenience (Koskosas, 2011; Sharma, 2016). Omni-channel management changes this aspect and the distinction between branch and online will vanish, turning the world into a showroom without walls (Brynjolfsson, Hi, & Rahman, 2013). This approach is seen as a groundbreaking sales form in current literature and in practice (Deloitte, 2015; Efma & Backbase Report, 2015; McKinsey&Company Report, 2017; Verhoef et al., 2015). Unfortunately, very little research has been done in the scientific literature on the omni-channel in banking. Therefore, this paper addresses and further explores this aspect.

To analyze the importance of omni-channel management in banking, this paper clarifies the following research questions:

- RQ1: How intensively is omni-channel management already being investigated in scientific research, especially in the banking business?
- RQ2: Which behaviors are noticeable among bank customers in the use of distribution channels and touchpoints?
- RQ3: Which status/level has the implementation of omni-channel concept reached in banking business?
- RQ4: Which objectives does a bank pursue with the introduction of omni-channel management?

1. LITERATURE REVIEW

Current literature is ambiguous in the precise definition of the different companies' distribution channels. A conceptual distinction is made between the distribution channels single-, multi-, cross- and omni-channel. Sometimes, however, the terms overlapped, and scholars were inaccurate in their definition and application (Picot-Coupey, Huré, & Piveteau, 2016). A channel is a customer contact point or medium with which a bank interacts with an existing customer or prospect (Neslin et al., 2006). While virtual channels for interaction access the use of advanced telecommunication, information, and multimedia technologies (e.g., automated teller machines, online-banking, app-solutions, mobile-banking), physical channels have a physical infrastructure (e.g., physical branches) as means of communication with the customer (Sousa & Voss, 2004). Occasionally, literature with emphasis on banks' business classifies the interface used as a distinguishing feature. Froehle and Roth (2004) classified the terms "face-to-face" and "face-to-screen" for this purpose. While "face-to-face" refers to the physical channel, "face-to-screen" refers

Table 1. Description of the different distribution channel characteristics

Source: Author.

Characteristic	Single-channel	Multi-channel	Cross-channel	Omni-channel
Contact points customer/bank	One-dimensional	Different channels	Channel and touchpoints	Channels and touchpoints
Channel integration	One-dimensional	Channel switch is not supported	Channel and touchpoint switch possible with restrictions	Possible without restrictions
Management/support	Limited to channel	Disjunct	Individual. Channel and touchpoint pairing occurs	Across all channels and touchpoints
Interaction	One-dimensional	Two-way	Unlimited	Unlimited
Network	No data transfer	No data transfer across channels	Possible with limitations	Unlimited
Customer perspective	Per channel	Per channel	Per channel. Selectively holistic	Holistic
Bank perspective	Per channel	Per channel	Per channel	Holistic; however, sales planning and controlling for each distribution channel

to the virtual channel (Cortiñas, Chocarro, & Villanueva, 2010). Conceptual subtleties of the different sales channels were discussed by Beck and Rygl (2015), Bernon et al. (2016), and Reis et at. (2018). **Single-channel** approaches are often referred to in existing literature as singular virtual or physical customer contact points. Customers or interested parties interact with a bank, obtain information, carry out business and transactions, and use services (Aradhana, 2016; Chiu, Hsieh, Roan, Tseng, & Hsieh, 2011; Hsieh et al., 2012). In a **multi-channel** approach, banks go beyond these one-dimensional forms of a single-channel customer care and enable the customers and prospects to receive information, products, services, and support through two or more synchronized channels simultaneously (Coelho & Easingwood, 2008; Gassenheimer, Hunter, & Siguaw, 2007; Rangaswamy & Bruggen, 2005). Sousa and Voss (2004), Neslin et al. (2006), and Zhang et al. (2010) define multi-channel services through the connection of virtual and/or physical components within a distribution channel. Due to the still limited but often already digitally networked banking channels, **cross-channel** management as defined by Beck and Rygl (2015), and Jeanpert and Paché (2016) is currently still the most widely used channel approach in banking business, since customers can initialize impulses and requests in one channel and then be continued in another compatible channel. Finally, **omni-channel** management is the dominant development stage in distribution management in the future. This approach enables the complete networking and integration of channels into an overall, simultaneous, and seamless sales channel, which fully integrates information, communication, and sales of all existing channels (Aradhana, 2016; Rigby, 2011; Verhoef et al., 2015). The omni-channel concept is the development of cross-channel concept and, in the broader sense, multi-channel concept (Gao & Yang, 2016). Omni-channel concept addresses customer needs and networks the channels offered in such a way that the customer experiences sales as a whole rather than using individual, separate, disjunctive component of sales, as practiced before. Table 1 shows the key differences between these concepts.

Omni-channel concept integrates the decisive contact points to the customer and, thus, creates an external perception of the customer, which allows the channels and touchpoints to be perceived harmoniously and in one. Integration refers to the degree of interaction between the individual channels and touchpoints (Bendoly, Blocher, Bretthauer, Krishnan, & Venkataramanan, 2005).

1.1. Definition of omni-channel banking

Based on Verhoef's (2015) initially general definition, this paper defines omni-channel management for banking business much more specifically as follows: *synergetic management of all essential and long-term distribution channels and touchpoints of a bank and its essential cooperation partners, in such a way that the networked range of services can be perceived as optimal by the customer*

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Source: Author.

Figure 1. Data management in an omni-channel environment

throughout the entire financial services process. The customer decides independently and according to his present needs, which contact point is the most ideal for him. For the customer himself, the previously different bank channels are perceived as one, only the form of communication is of significance for the customer now.

Universal banks should provide their customers with a wide range of products to be able to react when competitors offer products to customers. For this reason (sources of income excluded here), banks offer their customers not only traditional banking services but also ancillary financial services like funds, insurances, special loans, savings solutions, custody services, and asset management, to name but a few, from close cooperation partners (Ogwueleka, Misra, Colomo-Palacios, & Fernandez, 2015). Omni-channel management in banking, as defined above, means connecting, networking, and integrating partner channels with one's own distribution channel to provide customers with a consistent, holistic, and comprehensive perception. However, the customer experience may vary as banks offer products and services for specific target groups and segments.

1.2. Bank-specific channels and touchpoints

Banks have very pronounced customer access via branches due to the special advisory requirements of many customers. This customer access has changed considerably in recent years, as customers are less intensively interested in personal support than in digital communication with their

bank (Sousa, Amorim, Rabinovich, & Sodero, 2015). The contact points between the bank and the customer are very extensive and, in some cases, sector- and region-specific (Deloitte, 2017; Reis et al., 2018). Figure 1 provides an overview of the available channels and touchpoints. The customer dialogue is classified in face-to-face interaction, digital communication, and mixed form of both, defined here as personal/digital banking. All channels and touchpoints are interconnected, and the network is compatible with third parties. Therefore, an application programming interface to cooperation partners is also displayed. While face-to-face (Froehle & Roth, 2004) channels of most banks are losing customer frequency despite their continuing high importance (Abhishek et al., 2017), digital channels are becoming increasingly important (Tesche, 2018), as customers increasingly operate hybrid and channel-independent in their banking business (Abhishek et al., 2017). Sousa (2015) found that a decrease in physical channel accessibility can lead customers to use virtual channels as a substitute to perform activities, especially those that are routine.

2. METHOD

This paper follows the approach of multi-method research – a systematic integration of quantitative and qualitative methods in a single study, as applied by Chen (2006). Mixed method research is increasingly used in research practice as it generates comprehensive, deep, and valuable insights that equalize the weaknesses of individual methods (Johnson et al., 2016; Reis et al., 2018; Wood, Daly, Miller, & Roper, 1999). This method was chosen for this study because the topic concerning omni-channel management in bank business is complex and not much researched so far. Many research questions about omni-channel management are still unanswered, but the approach is considered groundbreaking in the existing literature, as described above. By combining quantitative and qualitative methods, a deeper analysis of the object of investigation can be achieved (Chen, 2006; Johnson et al., 2016; Voss, Tsikriktsis, & Frohlich, 2002). The method will be implemented by a systematic literature review and an expert interview to question and deepen current research.

2.1. Systematic literature review

Rigby (2011), followed by Aubrey and Judge (2012), first described omni-channel management in detail. Rigby (2011), in particular, emphasizes networking of the various channels as a comparative competitive advantage and refers to the high predatory competition and too disruptive effects if channel management is neglected. Later, Beck and Rygl (2015), and Verhoef et al. (2015) described a much broader and optimized range of omni-channel activities, including all sales activities through all available channels in omni-channel management. Literature reviews on omni-channel management, in general, were provided by Lararis and Vrechopoulos (2014), Picot-Coupey et al. (2016), and Mirsch et al. (2016), and by the basic work of Verhoef et al. (2015). Supplementing and built upon these studies, and orientated to the literature review methodology proposed by Brocke et al. (2009), the following relevant literature (see results in point 4 and Table A1 in Appendix A) regarding the management of omni-channel in general and in the banking sector in particular were identified. The databases AISeL, Emerald Fulltext, InforSci IGI Global, Ingenta Journals, ScienceDirect, Springer, and Taylor & Francis were analyzed in July 2019 using the systematic literature search, and various phrase searches were used (phase 1.1.-3.2; cluster) (Table 4).

2.2. Further research demand

Due to the very young research field and despite very different new distribution approaches, omni-channel management research has many questions to answer. As in past research on multi- and cross-channel concepts, a sector-specific research approach in omni-channel management is indispensable because of many specific issues and, in particular, the integration of sector-specific channels and touchpoints is associated with many obstacles (Mirsch et al., 2016). The high complexity of the banking channel requires an in-depth sector-specific view on the activities, as in particular corporate strategy, customer behavior, and channel integration should not be adopted by other sectors, as different priorities may arise here. This is particularly important as the banking business differs significantly from the business with goods and commodities (McKechnie, 1992). Semi-

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structured qualitative expert interviews with banking experts were conducted within the scope of this study to examine banks' channel strategy, changed customer behavior, channel integration, and introduction of an omni-channel concept.

2.3. Semi-structured qualitative expert interviews

Increasing digitalization changes customer behavior, customer expectations towards banks, and bank offerings towards customers (Gasser et al., 2017). Advanced distribution channel research investigates the activities around omni-channel management (Verhoef et al., 2015). To investigate this issue more deeply, semi-structured qualitative expert interviews have been conducted to question the relevance of omni-channel concepts in banking business with responsible banking channel experts. According to the results, a high level of comprehension can be obtained (Parasuraman & Zinkhan, 2002). In this part of the project, the research questions *RQ2-RQ4* are addressed by interviewing the key experts in the banks who are centrally responsible for the orientation and implementation of the distribution channel in the banks. To clarify these questions, initial research examined whether omni-channel concept in the banking sector is important for banks that operate across channels. Subsequently, changed corporate strategies and workflow changes were questioned. Furthermore, involved products, customer groups, and channels were questioned. Clarity was gained on how customers have already changed their behavior and how banks reacted to this. Finally, the research questions addressed the problem of channel integration, and it is inferred why banks are concerned with omni-channel management.

The method of semi-standardized expert interviews was structured in a prepared guideline for this study, although the questions were open and left considerable space for the answers, according to Keuneke (2005). The experts answered the questions in their own words, around 60 minutes each, the interviewer gave no hints, according to Schnell, Hill, and Esser (2018). In this method, the interviewee was consulted as an expert, not as an individual, so that the answers were based on his experiences and knowledge in the professional context, thus, excluding private aspects (Meuser & Nagel, 2009). In comparison to quantitative methods, face-to-face interviews have the advantage of various answers and rich explanations (Hoffmeyer-Zlotnik, 1992; Keuneke, 2005). The guideline was defined to structure the interview, but the interviewer always could intervene and lead (Keuneke, 2005). Key questions were posed to every expert to enable evaluation, possible questions complemented the framework and were asked to prevent misunderstandings and to lead the interview purposefully (Kaiser, 2014; Keuneke, 2005; Schnell et al., 2018).

The expert interview was carried out in the following steps, according to Kaiser (2014) and Meuser and Nagel (2009):

1) development of concept and guideline;
2) pre-test of the interview;
3) expert selection;
4) experts interviews;
5) logging of the interview situation;
6) transcription;
7) coding;
8) identification of the core statements;
9) potential extension of the database and conceptualization;
10) theory guided generalization and interpretation.

The qualitative evaluation of the determined data was carried out with the MAXQDA "Analytics Pro" software (MAXQDA, Software for qualitative data analysis, 2018).

2.3.1. Data collection

The guideline has been developed for a small number of experts who can assess and describe the facts. These experts act as content representatives of the general opinion of a group and not of an individual case (Mayer, 2008). The selected experts are responsible for the process of solution development and specific problem-solving, according to Kaiser (2014). As the developments of an omni-channel management in the banking sector are examined more deeply, experts from banks were selected whose activities cover the operational knowledge of the bank, on the one hand, and process the necessary context knowledge as experts, on the other hand. They also ultimately fulfill the subjective

relevance in the sense of interpretative knowledge (Kaiser, 2014). Meuser and Nagel (2009) suggest interviewing not at top management level, but in middle management due to direct experience.

2.3.2. *Selection of relevant experts*

The selection of experts is crucial in this type of questionnaire. This sub-study aimed to examine the German banking market as a leading in the European Union.

Table 2. German top 5 banks: balance sheet total 2018 in EUR million

Source: https://de.statista.com/statistik/daten/studie/157580/umfrage/bilanzsumme-der-groessten-banken-in-deutschland/

Banking institution	Balance sheet in EUR million (total assets)	
	2018	2017
Deutsche Bank AG	1.348.137	1.474.732
DZ BANK AG	518.733	505.594
KfW	485.790	472.183
Commerzbank AG	462.369	452.495
Unicredit Bank AG	286.688	299.060

Experts are functionaries within their institutional and organizational contexts. This task combines both knowledge and ability. The selection of relevant experts for this study is based on research questions to be clarified (Kromrey, 2002) and the concepts of qualitative social research, according to Bogner et al. (2014).

The number of relevant experts that are suitable for this interview is very limited, which is why this study was concentrated on these four interviews so as not to dilute the experts' statements by smaller banks or less suitable experts. **A broad study with many respondents in different channels is superfluous in this case since the data of the selected experts responsible for channel development converge in the aggregated form anyway.** The interviews were conducted with the relevant and responsible heads of channel integration and channel expansion of banks. A questionnaire of experts in individual channels is redundant in this case since the channel integration managers in the respective banks have this information at their disposal for the channel development decision process. The quantity of questions is not decisive in this case, but the quality of the interviewees, e.g., the survey of a cooperative central bank for the implementation of omni-channel management in the affiliated. Since the German savings banks announced that they are working on a new "sales strategy of the future", which essentially meets the requirements for an omni-channel approach, no interviews were conducted within the scope of this study, as the data for this banking group are gradually becoming public (CP Consultingpartner AG, 2019; Deutscher Sparkassen- und Giroverband, 2019). The author of this study is convinced that an expansion of the study group, taking into account a possible saturation of the statements (Baker & Edwards, 2013), is no longer meaningful after the interviews carried out. To maintain anonymity, the experts are assigned the abbreviations E_1, E_2, E_3, and E_4 in the following, whereby the abbreviations are assigned randomly.

3. RESULTS

3.1. Systematic literature review

A total of 14,367 papers (Table 4) were analyzed and evaluated in more detail as they were the outcome of the analysis' initial result. After extensive elimination of unsuitable initial results,

Table 3. Characteristics of the experts

Source: Primary data.

Group	Industry	Bank ranking	Expert position	Field of expertise	Title (academic)	Title (profession)	Bank business for ... years	Topic distribution channel for ... years
Expert interview	Bank	Within top 5	Head of	Distribution channel	Doctor	Director	> 20	10
Expert interview	Bank	Within top 5	Head of	Distribution channel	Diploma	Director	20	20
Expert interview	Bank	Within top 5	Head of	Distribution channel	Doctor	Director	20	15
Expert interview	Bank	Within top 5	Head of	Distribution channel	Diploma	Director	11	4

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258 papers were recorded with an omni-channel approach. In detail, 196 contributions were published in scientific journals with a peer-reviewed process, and 62 contributions based on conferences and book publications. A list of relevant papers on omni-channel management in banking sector can be found in Table A1 in Appendix A.

In total, three search clusters (omni-channel; bank distribution channels; omni-channel banking) were formed to distinguish the subject area in the existing literature. The first cluster in search phases 1.1 and 1.2 (Table 4) examined omni-channel concept across all sectors. The significance of the management approach in general was analyzed in this level of investigation. To get an overview of omni-channel approach, research was initially focused on the term in general. The relevant journals, conferences, and articles were filtered, and unpublished articles and non-English publications were excluded. To quantify the state of research more precisely, a distinction was made between papers published in journals with a peer-reviewed process, and papers from conferences and articles in books. In view of the new terminology of omni-channel management and the not yet identically used terminology of all researchers, all publications had to be examined exactly according to the concept, the meaning and the assignment to the omni-channel idea. A large number of publications was rejected because the assignment to the search term and concept was inconsistent. If the database enabled, keyword, title, and abstract searches were used; otherwise, a full-text search was conducted.

The second cluster (search phase 2) analyzed the distribution channel of banks in general in literature. The search term was extended around the phrase of the distribution channel (all known types of distribution channels in banking were searched for) to investigate to what extent the business field around banking has already been researched in existing litera-

Table 4. Results of literature research

Source: Author's calculation; examination status: July 2019.

Publications about	Omni-channel (all sectors)	Bank distribution channels	Omni-channel banking
Search phase	1 (1.1 and 1.2)	2	3 (3.1 and 3.2)
Research trigger	("omni-channel" OR "omnichannel")	("multi-channel" OR "multichannel" OR "cross-channel" OR "crosschannel" OR "omni-channel" OR "omnichannel" OR "multiple channel") AND ("bank" OR "banking")	*("omni-channel" OR "omnichannel") AND ("bank" OR "banking" OR "financial")*
Limitation to (if possible)	Keyword, title, abstract	Keyword, title, abstract	Full-text
Used database			
AISeL; http://aisel.aisnet.org/	51	274	47
Emerald full-text; https://www.emeraldinsight.com/	212	106	135
Infor-Sci IGI Global; https://www.igi-global.com/	52	32	17
Ingenta Journals; https://www.ingentaconnect.com/	38	174	29
ScienceDirect; https://www.sciencedirect.com/	183	163	177
Springer; https://link.springer.com/	722	9,661	499
Taylor & Francis; https://www.tandfonline.com/	105	1,641	49
Results and filter			
Limited to journals published in English since 2000	–	128	–
Limited to journals	196	–	25
Conferences + book articles	62	–	19
Unused due to inaccuracy of fit	1,105	11,923	909
Total identified material	258	128	44
Search Phrase 1.1.: Omni-channel (all sectors; journals only)			
Search Phrase 1.2.: Omni-channel (all sectors; journals + conferences + book articles)			
Search Phrase 2.: Distribution-channel + banking (journals only)			
Search Phrase 3.1.: Omni-channel + banking (journals only)			
Search Phrase 3.2.: Omni-channel + banking (journals + conferences + book articles)			

ture in total. The same procedure was used as described above in search phase 1, but a filter was set on papers only published in journals. During this more in-depth analysis, conferences and book articles were omitted in this context, since the scientific state of research, focused on published articles, was decisive. Again, a huge number of publications had to be rejected because the assignment to the search term and concept was inconsistent.

Finally, a further investigation with search phase 3.1 and 3.2 to omni-channel management in banking business was carried out. The objective of obtaining a statement on this status was achieved with this final step. Since this field of research is still very new, a full-text search was used in this context, and conferences and book articles were included for a more precise abstraction in this analysis.

This comprehensive study of literature enables to evaluate the topic field, analyze the status quo, and identify possible gaps in research.

Using the classification above, further analysis was carried out to understand how the research results were distributed by year of publication and to analyze how detailed and intensive the research already addressed the topics.

First, the analysis of the omni-channel concept in the cross-sectoral case shows that the research field omni-channel management is increasingly significant (Figure 2). Since 2014, literature has treated this area with increasing publication density and significantly higher intensity since 2016. More and more, the omni-channel concept has been reported in scientific journals, conferences, and scientific book articles. Scientific articles in journals showed considerable growth in 2018 and 2019 (study status ended in July 2019).

While first omni-channel papers were published in 2012, first publications in the banking sector did not take place until 2015. Since these first publications on this subject, a positive trend in additional published papers has developed, which is presented in Figure 3.

A time-series analysis using polynomial regression was carried out to study further developments, to understand the trend, and to identify a first regularity (Hüftle, 2006).

(4.1.1.) Development of published omni-channel papers (all sectors) with a second-degree

Source: Author's calculation.

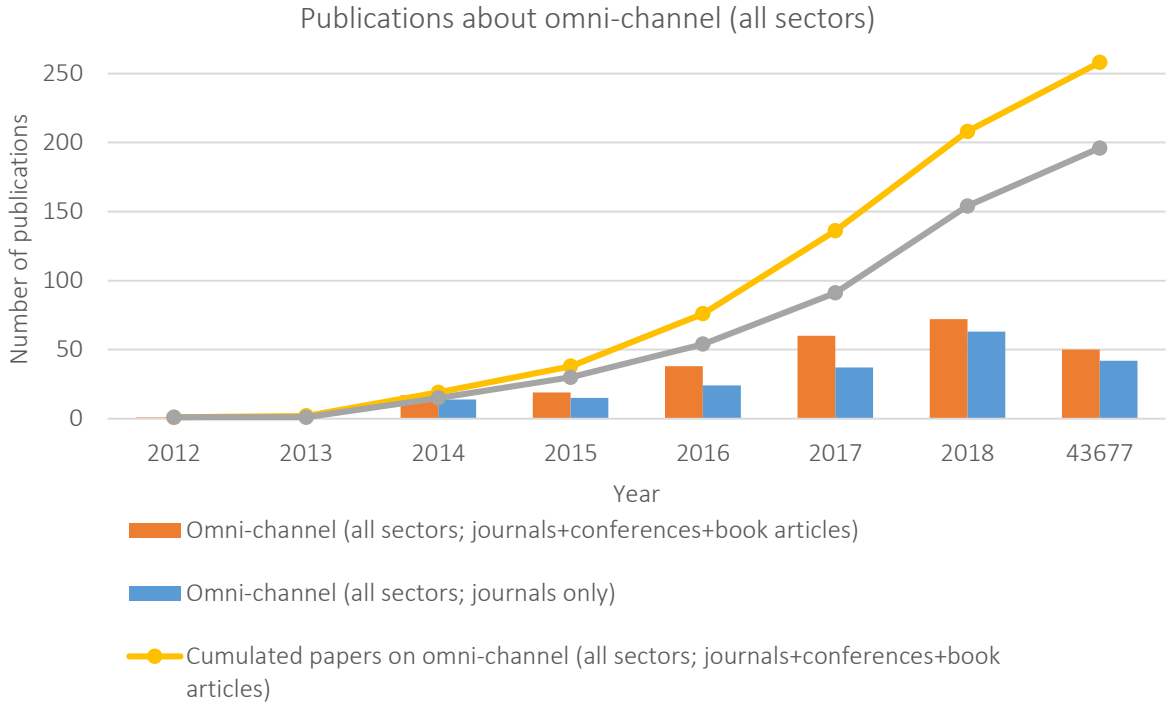

Figure 2. Development of omni-channel research (all sectors) in literature (2012 – July 2019)

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Source: Author's calculation.

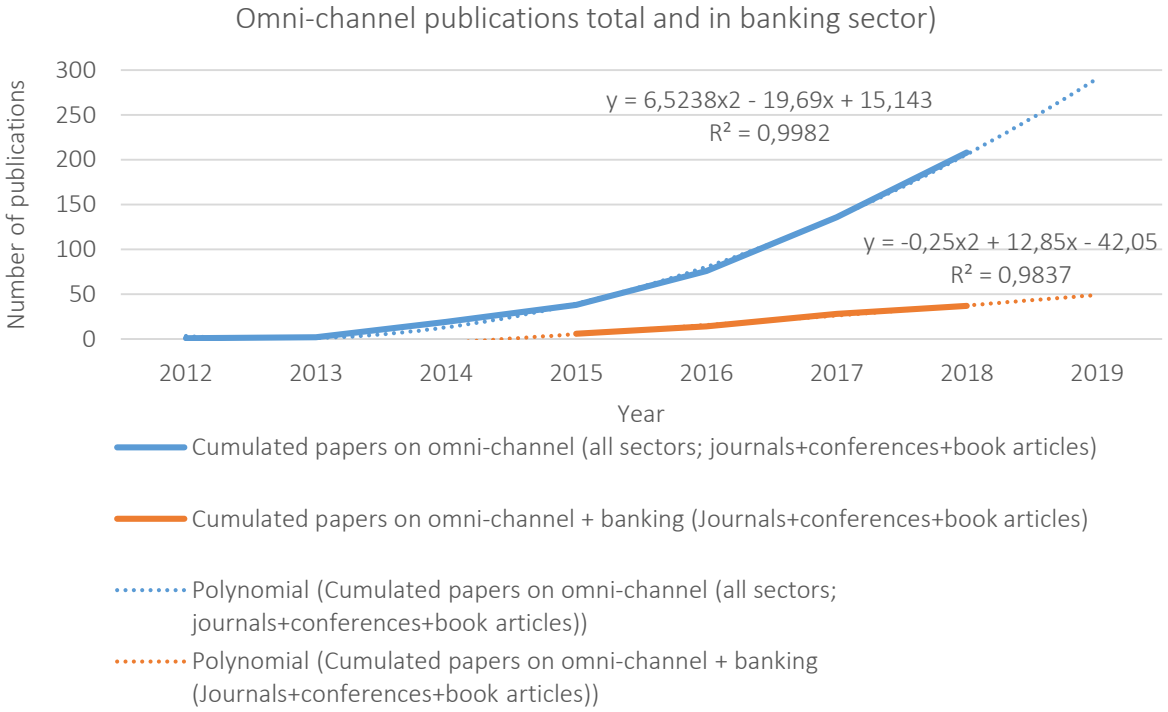

Figure 3. Published omni-channel papers total and in banking sector between 2012 and 2018

polynomial regression in the period 2012-2018: $y = f(x) = 6.5238x^2 - 19.69x + 15.143$

with $R^2 = 0.9982$.

(4.1.2.) Development of published omni-channel papers in the banking sector with a second-degree polynomial regression in the same period $y = f(x) = -0.25x^2 - 12.85x - 42.05$

with $R^2 = 0.9837$.

The parameter time is the finite, discrete set of equidistant points in time. The times are to be treated with $x = 1, 2, \ldots k$ for the respective years.

3.2. State of research in omni-channel management

Current research in omni-channel concepts concentrate in substance on three key aspects (Bang, Lee, Han, Hwang, & Ahn, 2014; Beck & Rygl, 2015; Böckenholt, Mehn, & Westermann, 2018; Trenz, 2015; Verhoef et al., 2015):

- omni-channel strategy and the impact on performance;
- consumer behavior across channels;
- channel integration.

Research around **omni-channel strategy** is concerned with the change of present business models, the influence of virtual channels on the physical channel, the critical success factors of omni-channel strategy, the organizational structure and the workflow, change in management, and product offerings within channel infrastructure (Böckenholt et al., 2018; Grewal, Roggeveen, Runyan, Nordfält, & Vazquez Lira, 2017; Griffin, Dunne, & Green, 2017; Verhoef et al., 2015).

While **consumer behavior** in multi-channel has already been extensively investigated (Ansari, Mela, & Neslin, 2008; Venkatesan, Kumar, & Ravishanker, 2007), and selectively different phases of customer journey (Lemon & Verhoef, 2016), behavior of customers in an omni-channel environment still plays a minor role due to the time aspect of present implementation. Chatterjee and Kumar (2017) examined customer behavior in the product level in the respective distribution channels and concluded that a higher degree of complexity and a higher purchasing risk among customers triggers a different behavior (as in banking).

Finally, another important and less studied research stream is channel **integration**. A major challenge in channel integration is data networking, price management, and channel coordination, a challenge that does not allow internal competition between channels (Pantano & Viassone, 2015; Trenz, 2015). Bang et al. (2014) emphasize that there is no uniform product channel fit and that respective omni-channel concept plans have to include the current and, in particular, the future product portfolio.

The existing scientific publications on omni-channel concept **in the banking sector** can also be classified similarly to the format mentioned above:

- omni-channel banking strategy;
- customer behavior;
- channel design and integration.

Seventeen papers with strategic considerations on omni-channel approaches in the banking business have been published so far based on the study criteria applied here. The other 14 papers discuss customer behavior in the context of omni-channel management. Furthermore, 13 papers addressed channel design and integration. Details can be found in Table A1 in Appendix A.

Table 5. Distribution of omni-channel management papers by classification

Source: Author's calculation.

Journal	Number of papers	In % to total
Omni-channel banking strategy	17	38.64%
Customer behavior	14	31.82%
Channel design and integration	13	29.55%

3.3. Semi-structured qualitative expert interviews

RQ2: Which behaviors are noticeable among bank customers in the use of distribution channels and touchpoints?

All experts agree that **branches** will continue to play an important role in customer contact in future. This channel offers the potential for decisive differentiation. For economic reasons, branches will be further optimized and adapted to customer demands. E_4 explained that a branch used to be a complete bank in the past, but in future, it will only be a shop with different focuses. All experts agree that important customer decisions for complex products in particular will continue to be made in branches, which is why the banks' advisory expertise will continue to be most pronounced here. E_3 added that quantitative and qualitative changes have been made in channel staffing and will continue to take place regularly according to customer potential. Customer entry will tend to take place **digitally** in future. In particular, simple transactions will be processed and handled completely digitally. E_2 added that individual advisory has to be enriched digitally and medially even more. E_4 explained that customers are not willing to pay for standard processes, which is why branch processes and staffing had to be adapted. E_2 elucidated that a complete digital offer had to be provided. Today, mobile and online channels are already extremely important. In future, processes will be digital and, thus, standardized not only in the frontend but also in the backbone.

All experts stated that most customers **would act hybridly** in future and select the bank channel they need for a specific moment. All channels of the bank will offer all services, naturally differentiated according to relevance. Ultimately, the customer decides on the use of channels. The bank offers channel choice and products and will adjust them according to customers' demands. The age of customers is relevant in this context as well. E_3 emphasized that young customers prefer digital channels, whereas older customers tend to use branches further. The demand-dependent use of the channels will prevail. Individual customer contact will only take place if suitable for the bank. If a contact does not generate any value or is value-neutral, the customer will be referred to the digital channels. Digital and analog services will be offered depending on customer potential.

In addition to the changed channel behavior of the customers, the experts surveyed are preparing for a higher level of **availability** (this does not have to be "24/7" in banking business, according to the experts), for a significantly higher **response speed** to inquiries and greater **transparency** of the process steps for customer orders. The benchmarks here are the suppliers of the wholesale and retail

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sectors outside the banking industry. E_3 and E_4 added that **channel diversity** is very pronounced. The developments within the channels are very dynamic. New forms of communication are already being implemented via voice channel, augmented reality, and virtual reality. The banking platform must become flexible for new channels and interfaces. In this context, experts' opinion about the role of the **account manager** in the future was inconsistent. While some experts still see the account manager being responsible for the customer, others consider digital customer management (digital CRM) crucial.

The experts were then questioned about their impressions on **new entrants.** The consensus among experts exists that the opening of one's own platform to value-adding external platforms is worth considering. However, the experts have not yet found a conclusive opinion on this. All experts agree that opening one's own platform has advantages and disadvantages. Banks no longer see fintech as a disruptive competitor and integrate these companies into their own platforms as sales partners. Banks rather regard fintech as the missing link in the previously neglected R&D of banks. The threat situation is different for the Tech-Giants, in which all experts recognize a considerable risk.

RQ3: Which status/level has the implementation of omni-channel concepts reached in banking business?

The results described above confirm that the introduction of an omni-channel approach for banks makes sense due to the market changes perceived by the experts and the omni-channel requirements revealed above. Although various experts do not agree with the term of "omni-channel management", the oral description of the experts is fully consistent with the omni-channel concept description. All experts agreed that the **introduction of omni-channel management is crucial and of the highest priority.** Various banks are still at different process levels, but all banks have **already** reached the **implementation phase**. In this process, the banks differ in such a way that not all banks will offer all products and services via all channels. Some banks will take a more target-specific approach first. In general, all experts agree that the omni-channel concept is a compulsory concept and not a freestyle concept. A disregard would be highly problematic for the banks' future in general. The initial implementation has already started and is reflected in the introductory standardization and digitization of processes. The final rollout is crucial for the employees. The profile of the consultant will change towards an increase in quality for the benefit of the customer. E_2 summarizes that the process will become purified and standardized. Customers will cover part of it themselves, making it more convenient for both the customer and the banker. Bankers will have more time for valuable topics. E_1 notes that different pricing is basically not the target of omni-channel concept. Exceptions may be payment transactions and account models. E_2 states that lead and signal detection will change and will also be standardized. Impulses are enriched via Smart Data and generated via the digital CRM and the Service Desk.

RQ4: Which objectives does a bank pursue with the introduction of omni-channel management?

Experts agree that omni-channel concept and new media offer the potential for more efficient value creation. However, with the price of losing the proximity to customer relationships as E_2 has added. There is no alternative to an investment as **demanded by the customer** and **exemplified by other industries**. The investment costs will amortize quickly, and the unit costs will be significantly lower. Banks will be able to increase their **efficiency** decisively by introducing an omni-channel management. The processes in the back office will be further digitalized and, thus, automatized. All in all, the majority of customers want a sales diversity according to the experts, which is why there is **no alternative** to its introduction in the banking business. Customers will be positively surprised and quickly get used to the processes. Other industries are the benchmark. Service for the customer will get better, and customer **loyalty** will potentially increase. Thus, the introduction of the omni-channel concept leads to an increase in customer satisfaction, which can be used to acquire new customers and retain existing ones.

4. DISCUSSION

The study shows that omni-channel management is an increasingly important field of research. In

banking business, which often differs from other branches, omni-channel management is also of crucial importance. The interviews show that changes in customer behavior and increasing desire to do banking business in a digital, situation-dependent, barrier-independent, and time-independent form means that the banks have to revise their distribution channels. Customers simply demand higher availability, faster reaction times, and more transparency in the banking process, as non-banking sectors are already exemplifying this. Today, customers are no longer willing to pay for standard transactions, which is why they standardize and digitize these transactions. Human resources that are no longer needed to increase digitalization are either further reduced or used to create value for the customer and the bank. The statements confirm the study results of Gasser et al. (2017) and Shivakumar and Sethii (2019).

The changes in customer behavior identified in this study and changed banking processes reflect that the requirements for an omni-channel management, as defined above in this study, are fulfilled. Interviewed bank managers also confirm the introduction of an omni-channel concept for their banks and even describe that the introduction is without alternative. With the introduction of an omni-channel management, banks intend to increase efficiency, improve quality, enhance customer loyalty and, in particular, meet customer requirements. Mirsch (2016) points out that companies should follow an omni-channel approach in future, but notes that companies even pursue different approaches within the same sector (Müller-Lankenau, Wehmeyer, & Klein, 2006; Trenz, 2015). Few papers on omni-channel management in the banking industry have been published so far, examining bank-specific channel strategy, customer behavior, and channel integration.

This paper reveals that the main banks in Germany are introducing omni-channel management that integrates and networks the contact points for their customers. This paper also points out that bank customers act across channels even for more complex products, informing themselves progressively in advance, collect data and then expect the information supplied to be available for further processing across channels in real time. The study also identifies that in near future, complex products that are advised today in the branches can also be handled via digital channels, face-to-screen. According to this study, there is no need for 24/7 support in the banking sector, as the virtual channels cover the bank contact, particularly as in future, according to the banking experts, customers will increasingly operate hybridly across all channels. This paper also provides evidence that against the background of intensifying competition, customer satisfaction, and customer loyalty are becoming increasingly important and omni-channel approach can support this aim. This relationship is confirmed by Hamouda (2019).

Omni-channel management will be more effective and productive for the bank and also for customers, according to the studies, provided that the processes and channels are networked and data exchange is carried out seamlessly and without manual intervention by bank employees (bridging activities excluded). Since not all channels can be supplied with full data intensity, the analysis of the customer journey inside the channels will be of particular importance. This is also confirmed by Hosseini, Merz, Röglinger, and Wenninger (2018).

However, the introduction of the omni-channel concept will not be easy, as the concept differs considerably from previous concepts, particularly in structure, networking, and integration of the channels. Previous concepts did not provide data exchange in the intended form, which is why processes and workflows are usually disjunct. The majority of banks still have a fragmented channel and product approach with an inconsistent channel integration, which makes the break-up of this approach a huge feat of strength for the banks (Adobe & Econsultancy, 2018). For reasons of competition, it is expected that banks will initially bridge the integration of the channels internally via manual intervention, although this can only be maintained in the short term due to cost pressure. This critical success factor and the cooperation of the different channels to date are crucial for the successful introduction of the concept (Saghiri & Wilding, 2016). Omni-channel concept requires a vision and a cultural change in a company, which is why the introduction must undoubtedly be desired and specified by top management (Saghiri & Wilding, 2016). In this way, it is possible to break the silo of thinking because it is not the person responsible for the channel, which is entitled to the customer, but the bank as a whole.

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CONCLUSION

This study reviewed a large number of published papers to examine omni-channel approach in general and the distribution channel of banks in particular. It was established that omni-channel concept in the non-banking sector has already been examined in various publications, but that banking that differs significantly from these sectors is even less studied. It is also found that a sector-specific research approach is necessary for omni-channel research. In literature, omni-channel approach in non-banking sector is increasingly gaining importance among scholars, and the number of publications increased. In order to analyze banks' positioning in the future, the author interviewed highly specialized and responsible banking-channel experts about their assessment of omni-channel management in banking and stated that banks are already working intensively on the introduction of omni-channel concepts in banking and that the introduction is even of fundamental importance for banking. Based on the above findings, it can be assumed that the number of omni-channel publications with a banking context will increase significantly in the near future, also because research can close the existing research gap in the banking sector with implemented omni-channel study objects.

The results of the analysis, based on the expert interviews conducted, show that the customer requirements to their bank do not allow any alternative to the implementation of an omni-channel concept. The introduction of omni-channel management is confirmed by all experts interviewed. Banks are lagging behind other industries that have already set a benchmark, banks have to compete with. The introduction of omni-channel concept combined with considerable digitalization activities will significantly change the banking business processes in future. While the banks are currently still experiencing different channel usage behavior among their customers, all banking experts agreed that the majority of customers will show a hybrid channel behavior in the future and will use the bank channels depending on the specific situation.

In summary, it can be stated that omni-channel management will influence bank sales, staff, processes, and, on the customer side, customer satisfaction, and loyalty. Banking process will change significantly, so that banks will operate completely differently in customer business. Customer business is becoming increasingly standardized, and retail business banks face the risk of becoming interchangeable for customers due to a lack of customer contact.

However, the introduction of an omni-channel concept also offers many opportunities for banks. Banks can increase perceived customer satisfaction, enhance customer loyalty, and work more efficiently in their customer business.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Omni-channel in the context of banking literature, search phases 3.1, 3.2

Comments				Category		Comments	Category
X= Hits the mindset of omni-channel but is not 100% omni-channel				S= Omni-channel banking strategy B= Customer behavior D&I= Channel design and integration			
No.	**No.**	**Reference**	**Author(s)**	**Year**	**Conference paper/ books**		
1	1	Transforming Legacy Banking Applications to Banking Experience Platforms	Shivakumar S.K., Sethii S.	2019	Building Digital Experience Platforms. Apress, Berkeley, CA		D&I
2	2	Omni-Channel Service Architectures in a Technology-Based Business Network: An Empirical Insight	Reis J., Amorim M., Melão N.	2018	In: Satzger G., Patrício L., Zaki M., Kühl N., Hottum P. (eds) Exploring Service Science. IESS 2018. Lecture Notes in Business Information Processing, vol 331. Springer, Cham		D&I
3	3	Multi-channel choice in retail banking services: Exploring the role of service characteristics	Hummel D.; Schacht S.; Mädche A.	2017	13th International Conference on Wirtschaftsinformatik		D&I
4	4	Success Factors for Effective Customer Interaction in Digital Sales: A Case from the Digital Investment Service Industry	Nitzsch R. von; Braun D.; Bons; R. W. H.	2017	BLED 2017 Proceedings		D&I
5	5	Disentangling the Fuzzy Front End of Digital Transformation: Activities and Approaches	Berghaus Sabine; Back Andrea	2017	ICIS 2017 Proceedings	X	D&I
6	6	Business Process Model Reuse In A Multi-Channel / Multi-Product Environment– Problem Identification And Tentative Design	Veitch R.; Seymou L. F.	2017	Mediterranean Conference on Information Systems		D&I
7	7	Big Data Analytics Enabled Smart Financial Services: Opportunities and Challenges	Ravi V.; Kamaruddin S.	2017	Reddy P., Sureka A., Chakravarthy S., Bhalla S. (eds) Big Data Analytics. BDA 2017. Lecture Notes in Computer Science, vol 10721. Springer, Cham		S
8	8	New Ways to Deal with Omni-Channel Services: Opening the Door to Synergies, or Problems in the Horizon?	Reis J., Amorim M., Melão N.	2017	In: Za S., Drăgoicea M., Cavallari M. (eds) Exploring Services Science. IESS 2017. Lecture Notes in Business Information Processing, vol 279. Springer, Cham		S
9	9	Digitalization of the Banking Industry: A Multiple Stakeholder Analysis on Strategic Alignment	Schmidt Julian; Drews Paul; Schirmer Ingrid	2017	Twenty-third Americas Conference on Information Systems	X	S
10	10	Whether Adoption Drivers Differ between Click-and-mortar and Pure-play E-payment Services?	Pei Y.; Wang S.; Guo T.	2017	WHICEB 2017 Proceedings		D&I
11	11	Omni-channel service operations: Building technology-based business networks	Reis João; Amorim Marlene; Melão Nuno	2017	2017 IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI)		D&I
12	12	Exploring affordances of business intelligence & analytics with regard to customer-oriented work practices	Wieneke A.; Lehrer C.; Jung R	2016	Pacific Asia Conference on Information Systems		B

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Table A1 (cont.). Omni-channel in the context of banking literature, search phases 3.1, 3.2

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No.	**No.**	**Reference**	**Author(s)**	**Year**	**Conference paper/ books**		
13	13	Data analytics on consumer behavior in omni-channel retail banking, card and payment services	Geng D.	2016	20th Pacific Asia Conference on Information Systems: PACIS 2016, Chiayi, Taiwan, 2016 June 27-July 1. Research Collection School Of Information Systems.		B
14	14	Multi-device UI Development for Task-Continuous Cross-Channel Web Applications.	Yigitbas E.; Kern T.; Urban P.; Sauer S.	2016	In: Casteleyn S., Dolog P., Pautasso C. (eds) Current Trends in Web Engineering. ICWE 2016. Lecture Notes in Computer Science, vol 9881. Springer, Cham		D&I
15	15	The Impact of Mobile Adoption on Customer Omni-Channel Banking Behavior	Liu Jun; Abhishek Vibhanshu; Li Beibei	2016	Thirty-Seventh International Conference on Information Systems		B
16	16	End-users` perspective on digitalization: A study on work order processing in the German banking industry	Schmidt Julian; Drews Paul; Schirmer Ingrid	2016	Twenty-Second Americas Conference on Information Systems		B
17	17	The Influence Of Mobile Channel On Customer Behavior In Omni-Channel Banking Services	Liu J.; Abhishek V.; Li B.	2015	2015 International Conference on Mobile Business		B
18	18	When the Bank Comes to You: Branch Network and Customer Multi-Channel Banking Behavior	Geng; D.; Abhishek; V.; & Li; B.	2015	Thirty Sixth International Conference on Information Systems		B
19	19	Rethinking Multichannel Management in a Digital World - A Decision Model for Service Providers	Hosseini S.; Oberländer A.; Röglinger M.; Wolf T.	2015	Wirtschaftsinformatik Proceedings 2015		S
					Wide interpretation includes this papers		
					Journals		
20	1	Omni-channel banking integration quality and perceived value as drivers of consumers' satisfaction and loyalty	Hamouda Manel	2019	Journal of Enterprise Information Management		D&I
21	2	Omni-script: Device independent user interface development for omni-channel fintech applications	Ulusoy Simge; Batıoğlu Alper; Ovatman Tolga	2019	Computer Standards & Interfaces		S
22	3	Multichannel service failure and recovery in a O2O era: A qualitative multi-method research in the banking services industry	Reis João; Amorim Marlene; Melão Nuno	2019	International Journal of Production Economics	X	S
23	4	Effects of customer perceptions in multichannel retail banking	Bravo Rafael; Martínez Eva; Pina José Miguel	2019	International Journal of Bank Marketing	X	B
24	5	Essence of digital transformation—Manifestations at large financial institutions from North America	Pramanik Himadri Sikhar ; Kirtania Manish; Pani Ashis K.	2019	Future Generation Computer Systems	X	S
25	6	A meta-synthesis approach to specify components of future banking	Sedaghatparast Eldar	2019	foresight, vol. ahead-of-print no. ahead-of-print	X	S

Table A1 (cont.). Omni-channel in the context of banking literature, search phases 3.1, 3.2

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No.	No.	Reference	Author(s)	Year	Conference paper/ books		
26	7	EMERGING TRENDS IN BANKING	Kamble Prashant R.; Afza Noor	2018	International Journal of Management Research & Review	X	S
27	8	Smart locker bank design optimization for urban omnichannel logistics: Assessing monolithic vs. modular configurations	Faugère Louis; Montreuil Benoit	2018	Computers & Industrial Engineering		S
28	9	Customer experience in omni-channel banking services	Komulainen Hanna; Makkonen Hannu	2018	Journal of Financial Services Marketing		B
29	10	End-customer value restructuring the financial service supply chain	Komulainen Hanna; Saraniemi Saila; Ulkuniemi Pauliina; Ylilehto Marianne	2018	Marketing Intelligence & Planning	X	S
30	11	Mindfully going omni-channel: An economic decision model for evaluating omni-channel strategies	Hosseini Sabiölla; Merz Marieluise; Röglinger Maximilian; Wenninger Annette	2018	Decision Support Systems		S
31	12	Mobile banking and AI-enabled mobile banking: The differential effects of technological and non-technological factors on digital natives' perceptions and behavior	Payne Elizabeth Manser; Peltier James W. ; Barger Victor A.	2018	Journal of Research in Interactive Marketing	X	D&I
32	13	Multichannel service failure and recovery in a O2O era: A qualitative multi-method research in the banking services industry	Reis Joao; Amorim Marlene; Melao Nuno	2018	International Journal of Production Economics	X	B
33	14	FinTech and the transformation of the financial industry	Alt Rainer; Beck Roman; Smits Martin T.	2018	Electronic Markets	X	S
34	15	Service-Channel Fit Conceptualization and Instrument Development	Hoehle H.; Kude T.; Huff S.; Popp K.	2017	Business & Information Systems Engineering	X	D&I
35	16	Building customer loyalty in digital banking: A study of bank staff's perspectives on the challenges of digital CRM and loyalty	Larsson Anthony; Viitaoja Yamit	2017	International Journal of Bank Marketing		B
36	17	Impact of customers' assessment of website attributes on e-relationship in the securities brokerage industry: A multichannel perspective	Toufaily Elissar; Pons Frank	2017	Journal of Retailing and Consumer Services		D&I
37	18	When the Bank Comes to You: Branch Network and Customer Omni-Channel Banking Behavior	Abhishek Vibhanshu; Geng Dan; Li Beibei; Zhou Mi	2017	SSRN		B
38	19	Is the Blockchain the Cure for the Omni-Channel Blues? A Provocation	Batiz-Lazo Bernardo	2017	Bangor Business School Research. Available at SSRN		S
39	20	Are multichannel customers really more valuable? An analysis of banking services	Cambra-Fierro Jesús; Kamakura Wagner A.; Melero-Polo Iguacel; Sese Javier	2016	International Journal of Research in Marketing	X	B
40	21	New Factors Inducing Changes in the Retail Banking Customer Relationship Management (CRM) and Their Exploration by the Fintech Industry	Kotarba Marcin	2016	Foundations of Management The Journal of Warsaw University of Technology		S
41	22	Message framing and acceptance of branchless banking technology	Jonila Kurila; Lambros Lazuras; Panagiotis Ketikidis H.	2016	Electronic Commerce Research and Applications	X	B

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No.	**No.**	**Reference**	**Author(s)**	**Year**	**Conference paper/ books**		
42	23	Interview with Wolfgang Gaertner on "Digitalization in Retail Banking: Differentiation and Standardization Through IT"	Mädche A.	2015	Business & Information Systems Engineering		S
43	24	Hybrid Customer Interaction	Nüesch R.; Alt R.; Puschmann T.	2015	Business & Information Systems Engineering		B
44	25	Demystifying the benefits and risks of Lean service innovation: a banking case study	Gong Yiwei; Janssen Marijn	2015	Journal of Systems and Information Technology		S