Research Report

The Status Quo of Research on Digital Finance and FinTech

THE FINANCIAL INDUSTRY HAS EXPERIENCED A CONTINUOUS EVOLUTION IN SERVICE DELIVERY DUE TO DIGITALIZATION. THIS CHANGE MANIFESTS ITSELF IN EXPANDED CONNECTIVITY, ENHANCED SPEED OF INFORMATION PROCESSING, A MULTITUDE OF NEW FINANCIAL PRODUCTS, AND NOVEL FORMS OF CUSTOMER INTERACTION. AGAINST THIS BACKDROP, ACADEMIC RESEARCH HAS ANALYZED THE IMPACT OF DIGITAL PROGRESS IN THE FINANCIAL SECTOR. IN ORDER TO PROVIDE AN OVERVIEW ON THIS RESEARCH AND TO IDENTIFY POSSIBLE GAPS, WE HAVE REVIEWED THE RELEVANT LITERATURE IN THIS FIELD APPLYING A SYSTEMATIC AND COMPREHENSIVE SEARCH.

Peter Gomber
Jascha-Alexander Koch
Michael Siering

Introduction

Nowadays, customers in the financial sector demand intelligent, however easy-to-use financial services independent of location and time, and at continually decreasing costs. An increasing Internet-based economy, new usage patterns of digital (especially mobile) devices and media, as well as a decreasing reluctance to use online channels for financial information search and for financial transactions (even among the elderly, more wealthy Internet users) are key structural changes driving these developments. New business models and technological concepts provide a basis for innovative solutions in finance. Thereby, Digital Finance challenges existing financial service providers, such as established banks or insurance providers, due to new competition by FinTechs. In parallel, Digital Finance offers new opportunities for the incumbents to reach their younger and more technology-savvy clientele.

Academic research on Digital Finance and FinTech have developed in parallel to the emerging business models and technologies. In a comprehensive overview article (Gomber et al., 2017), we structure this relatively new field and systematically analyze the existing academic literature. Therefore, we propose to orientate in the field based on the three central Digital Finance dimensions: (I) Digital Finance business functions, (II) relevant technologies and technological concepts as well as (III) institutions providing Digital Finance solutions. These three dimensions can be arranged in form of a cube (Figure 1). This Digital Finance Cube enables the arrangement of academic research relative to each other and to identify cross-linkages and research gaps. Concerning the first dimension, i.e., Digital Finance business functions, we consider (1) Digital Financing, (2) Digital Investments, (3) Digital Money, (4) Digital Payments, (5) Digital Insurances, and (6) Digital Financial Advice. The second dimension embraces all technologies and technological concepts, for example, blockchain technology, near field communication (NFC), mobile devices, and many other. Finally, the third dimension of the Cube consists of the Digital Finance institutions embracing both FinTechs, i.e., startups as well as established IT companies entering the financial domain, and traditional service providers.

The three dimensions are arranged orthogonal to each other so that each area inside the Cube can be described by certain properties of the three dimensions. All areas inside the Cube represent smaller sub-cubes that refer to a specific combination of one business function, a certain technology, and a specific type of institution. Not all sub-cubes need to be occupied. A number of sub-cubes is neither researched nor touched by practitioners of the financial industry.

Research Methodology

In order to identify the state of research and possible future research directions in the field of Digital Finance, a literature review was conducted following the methodology proposed by Webster and Watson (2002). Therefore, we conducted a systematic search based on a predefined list of keywords in a pre-selected list of high-ranked international outlets including journals as well as conferences. As a measure of outlet quality, we consider the ranking regularly published by the "Verband der Hochschullehrer für Betriebswirtschaft" (VHB, 2016). Here, all journals and conference proceedings ranked A+, A, and B in the areas of (i) business administration, (ii) financial research, and (iii) information systems research were selected in order to take into

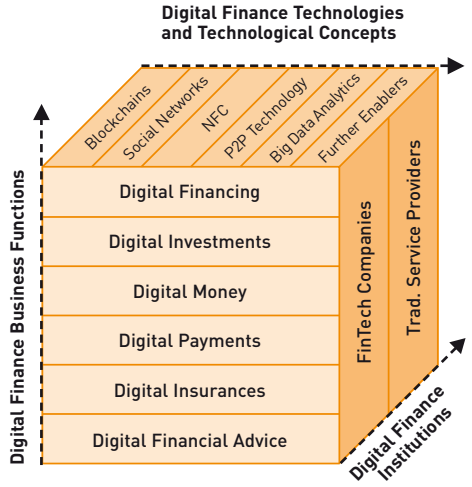

Figure 1: The Digital Finance Cube

account a comprehensive number of outlets representing the interdisciplinary nature of the Digital Finance field. We also considered the Annual Meetings of the American and the European Finance Association (AFA & EFA) which are not contained in the VHB ranking. All papers published between 2009 and 2015 were taken into account.

Meta Analysis

In total, 142 journals and conferences were screened. These outlets are composed of 13 venues that are ranked A+, 31 venues that are ranked A, and 96 venues that are ranked B – plus AFA and EFA. After elimination of irrelevant articles, the search resulted in a set of 83 relevant articles consisting of 49 journal and 34 conference articles.

We observe an increasing number of articles concerning Digital Finance topics over time (Table 1). While in the years 2009-2011 only very few articles addressed one of the six Digital Finance business functions, from 2012 on, numbers began to rise. In 2015, already 30 relevant articles were published. Digital Financing, Digital Investments, and Digital Payment were addressed by publications already in 2009. The first identified paper relating to Digital Financial Advice was published in 2010, with more activity on this topic observed in the last years. Concerning Digital Money, we find the first relevant article in 2014. In contrast, Digital Insurance has not been addressed in this time period.

The articles were also categorized concerning their main methodology applied (Table 2). The majority of the articles apply an empirical methodology. Among these 58 empirical articles, we find that 50 were based on archival data which had been acquired, for example, from data bases, repositories, or platforms. Only eight papers were based on survey data. The second most commonly applied methodologies are of qualitative nature and embrace, e.g., case studies and interviews (12 papers).

Year	2009	2010	2011	2012	2013	2014	2015	total
Total	7	2	5	8	12	19	30	83
Digital Financing	3	1	3	6	6	8	14	41
Digital Investments	2	–	–	–	1	–	4	7
Digital Money	–	–	–	–	–	1	6	7
Digital Payment	2	–	1	2	2	5	5	17
Digital Insurance	–	–	–	–	–	–	–	–
Digital Advice	–	1	1	–	3	5	11	11

Table 1: Classification of Articles by Digital Finance Business Functions and Year

Methodology	Articles
Empirical	58
– thereof, articles using archival data	50
– thereof, articles using survey data	8
Qualitative (Case Study/Interviews/Qual. Analysis)	12
Experimental	4
Conceptual	3
Simulative	2
Theoretical	2
Design Science	1
Literature Review	1

Table 2: Classification of Articles by Methodology

Results Concerning the Different Digital Finance Business Functions

In the following, we briefly describe some key results of the analysis concerning the state of the art in academic literature. This description refers to the respective Digital Finance business function.

1. RESEARCH ON DIGITAL FINANCING

Digital Financing allows individuals, firms, and startups to become independent from traditional ways of financing, like bank credits, by using the Internet. Digital Financing embraces all digital types of acquiring capital. About half of all relevant papers identified (41 of 83 papers) deal with this topic. While reward-based (20 papers) and lending-based crowdfunding (20 papers) make up the biggest part of considered crowdfunding types, equity-based crowdfunding is rarely addressed (5 papers). Moreover, only one paper regarding digital invoicing was discovered. The papers can be classified into three sub-categories: platforms and models (4 papers), user behavior of participants (21 papers), and performance of crowdfunding campaigns (16 papers). The topics of digital invoicing, electronic factoring, as well as electronic leasing deserve more attention of research in the future.

2. RESEARCH ON DIGITAL INVESTMENTS

Digital Investments support individuals or institutions in making investment decisions and in arranging the required investment transactions. Digital Investments include mobile trading, social trading, online brokerage, and online trading in the B2C area as well as high-frequency and algorithmic trading in the B2B context. Since substantial literature reviews on high-frequency and algorithmic trading are already available, we excluded this field and refer to the respective existing literature overviews (e.g.: Gomber et al., 2011; Menkveld, 2016; O'Hara, 2015).

Concerning Digital Investments in the B2C area, only seven relevant research articles were identified. These research papers can be categorized into articles dealing with online platforms and providers (2 papers), articles focusing on user behavior (2 papers) as well as articles focusing on performance of users (3 papers). Most strikingly, studies only rarely focus on the recently emerged social trading platforms. Especially here, we see high potential for future research.

3. RESEARCH ON DIGITAL MONEY

The terms digital currency, virtual currency, e-money, and cryptocurrency describe a type of currency that fulfills (more or less) all typical functions of money but exists only digitally. Such Digital Money serves as a medium of

exchange, unit of account, and store of value. We only identified seven papers concerning Digital Money that match our criteria. These papers can be categorized into articles investigating the behavior of individuals using cryptocurrencies (1 paper), studies investigating whether cryptocurrencies should be used to increase trading performance (4 papers), and papers providing conceptual discussions (2 papers). While the main focus of research is on Bitcoin, other cryptocurrencies are mostly disregarded.

4. RESEARCH ON DIGITAL PAYMENTS

In the last years, innovative and easy-to-use solutions came up that fit well the needs of merchants (e.g., Internet shops) and customers, such as mobile payments or peer-to-peer payments. Furthermore, so-called digital wallets were proposed, which do not only store money, but fulfill also the tasks of holding identification information (e.g., ID cards) and storing temporary tokens (e.g., bus tickets).

In our set of research literature, the business function Digital Payment covers the second highest number of articles (17). This can be attributed to the fact that this topic was one of the first to be established, discussed, and researched. We identified three main streams of research in this field: First, there are studies investigating Digital Payment platforms and providers (6 papers). A second stream of research deals with the behavior of users of Digital Payment systems (8 papers), specifically with adoption decisions. Finally, a third stream investigates the competition between different Digital Payment systems (3 papers). Especially the new possibilities of payments using smartphones or smartwatches as well payments using NFC solutions or even biometric methods deserve more attention in research.

5. RESEARCH ON DIGITAL INSURANCES

Online platforms, like friendsurance.com, enable individuals seeking for insurances to digitally ally with other Internet users – typically friends and family members – and reduce insurance costs at the same level of protection. Moenninghoff and Wieandt (2012) argue that such alliances are likely to reduce information asymmetry and moral hazard. However, in our literature review, we did not identify any research article on Digital Insurances. Consequently, topics like the adoption of Digital Insurance concepts or user behavior remain underexplored so far.

6. RESEARCH ON DIGITAL FINANCIAL ADVICE

Multiple review sites and comparison portals are available, on which products and services are rated, scored, ranked, evaluated, and compared. The academic work in this field (11 papers) can be grouped into papers focusing on the behavior of users in trading communities (2 papers) and into papers analyzing such communities in order to relate the communication within the communities to financial markets and, thereby, to make predictions of market reactions (9 papers). Interestingly, in the set of top-journal articles we analyzed, there is a lack of research regarding the impact of automated tools for financial advice that suggest specific portfolio structures to retail clients, like robo-advice.

Conclusion

We have conducted a substantial literature review in the field of Digital Finance and FinTech, and have organized the field based on three central dimensions: Digital Finance business functions, relevant technologies and technological concepts as well as institutions providing Digital Finance solutions. Based on the three dimensions, we propose the Digital Finance Cube that enables the arrangement of existing academic research in the field relative to each other and to identify cross-linkages and research gaps. For each business function, we analyzed the respective research and formed sub-categories of papers addressing similar topics.

The full article concerning this study (Gomber et al., 2017) provides a detailed overview of all 83 relevant articles identified. A detailed discussion is provided on future research directions that have been identified based on the sub-categorization and by applying the Digital Finance (Research) Cube. Moreover, we provide a substantial online appendix that contains all papers categorized by the six business functions and by the respective sub-categories: *http://www.efinance.wiwi.uni-frankfurt.de/forschung/jbe-tables.html.*

References

Gomber, P.; Arndt, B.; Lutat, M.; Uhle, T.:
High-Frequency Trading.
In: SSRN Journal, (2011).

Gomber, P.; Koch, J.-A.; Siering, M.:
Digital Finance and FinTech: Current Research and Future Research Directions.
In: Journal of Business Economics, 87 (2017) 5, pp. 537–580.

Menkveld, A. J.:
The Economics of High-Frequency Trading: Taking Stock.
In: Annual Review of Financial Economics, 8 (2016), pp. 1–24.

Moenninghoff, S. C.; Wieandt, A.:
The Future of Peer-to-Peer Finance.
In: Schmalenbachs Zeitschrift für betriebswirtschaftliche Forschung, 65 (2012) 5, pp. 466–487.

O'Hara, M.;
High frequency market microstructure.
In: Journal of Financial Economics, 116 (2015), pp. 257–270.

Webster, J.; Watson, R. T.:
Analyzing the Past to Prepare for the Future: Writing a literature Review.
In: MIS Quarterly, 26 (2002) 2, pp. xiii–xxiii.

VHB:
Complete list of the journals in VHB-JOURQUAL3 in alphabetical order.
http://vhbonline.org/en/service/jourqual/vhb-jourqual-3/complete-list-of-the-journals/, accessed on March 22th, 2016.

The E-Finance Lab is a proud member of the House of Finance of Goethe University, Frankfurt.
For more information about the House of Finance, please visit www.hof.uni-frankfurt.de.

THE E-FINANCE LAB IS AN INDUSTRY-ACADEMIC RESEARCH PARTNERSHIP BETWEEN FRANKFURT AND DARMSTADT UNIVERSITIES AND PARTNERS DEUTSCHE BOERSE GROUP, DZ BANK GROUP, FINANZ INFORMATIK, IBM, 360T, FACTSET DIGITAL SOLUTIONS, AND USD LOCATED AT THE HOUSE OF FINANCE, GOETHE UNIVERSITY, FRANKFURT.

For further information please contact:

Prof. Dr. Peter Gomber
Vice Chairman of the
E-Finance Lab
Goethe University Frankfurt
Theodor-W.-Adorno-Platz 4
D-60629 Frankfurt am Main

Phone +49 (0)69 / 798 - 346 82
Fax +49 (0)69 / 798 - 350 07
E-mail gomber@wiwi.uni-frankfurt.de

Press contact
Phone +49 (0)69 / 798 - 338 62
Fax +49 (0)69 / 798 - 339 10
E-mail presse@efinancelab.com

or visit our website
http://www.efinancelab.com