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Fintech Trends Relationships Research: A Bibliometric Citation Meta-Analysis

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ABSTRACT

This paper presents a review among how scholarly research on Fintech trends relationships has evolved over the past years by conducting a bibliometric citation. This literature analysis was based on the publication journals and articles in the ISI Web of Science databases. We show the impact of cited journals, key articles and outline possible future research avenues. Also, we map how the top publications are related in terms of their citation relationships and identify six different research fields, or lines of enquiry: (1) Payments, (2) Insurance, (3) Deposit & Lending, (4) Capital Raising, (5) Investment Management, (6) Market Provisioning. The study explores rankings of fintech-related journals list the first six journals had contributed eighty percentage of published papers, and concerned with the roles of information and communication technologies in the economy and society. Focusing on the research frontiers in finance, our paper identifies emerging research trends. We highlight possible pathways for researchers to build on existing knowledge and pursue opportunities for innovative and exciting new research contributing to an expansion of the research frontiers.

Keywords: Bibliometric, Fintech, Financial technology, Digitization, Innovation, Financial services industry.
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INTRODUCTION

Along with more and faster accumulation of digitization on financial services industry impact, financial technology and the newer "Fintech" issues are attracting more attention (WEF, 2015). One major reason is that financial service and products are almost based on information, and the other reason is that most processes are almost entirely implemented without any physical interaction such as for example online payment or stock trading. Due to the recent development in the ongoing process of digitization, the fundamental reorganization of the financial services value chain with new business models (e.g., robo-advisors). The term ''Fintech'' is a contraction of ''financial technology'' and was most probably first mentioned in the early 1990s by Citicorp's chairman John Reed in the context of a newly founded ''Smart Card Forum'' (Kutler, 1993). There are three areas of recent Fintech applications in the financial services industry can be differentiated which reflect the development along five phases over the last decades. The first area of internal digitization (phases 1-3) use was focused on internal processes, such as payment transactions, or portfolio management. In the fourth phase of provider-oriented digitization (phase 4), financial service providers focused on the integration of standardize processes and application functions. Especially forward to the fifth phase of customer-oriented digitization (phase 5), Fintech application redefine today's product-centered logic towards new ecosystems. Individual channels may become obsolete with hybrid and overlapping forms of interaction based customer processes as the center of financial services design (Nüesch *et al*., 2015). Today omni-channel is a cross-channel that contends customer values the ability to be in constant contact with a company through multiple avenues at the same time. For example, electronic wallets which including not only payment, but also the option to collect, store and spend loyalty points and other personal data. The evolution of the financial services included the peer-to-peer business development as nonfinancial service providers from outside the industry. Table 1 summarizes the evolution of the digitization of the financial services industry (Arner, 2015).

Table 1: Financial services industry digitization versus Financial technology

Phases characteristics	Phase 1: until 1960	Phase 2: 1960-1980	Phase 3: 1980-2010	Phase 4: 2010-2020	Phase 5: from 2020
Strategy focus	Single customer channel	Two customer channels	Multi customer channels	Cross customer channels	Hybrid customer channels
Organization focus	Support processes	Back-office processes	Front-office processes	Provider processes	Customer processes
Systems focus	No systems integration	Partial internal systems integration	Internal systems integration	External financial services provider systems integration	External non-financial services provider systems integration

The term of bibliometric was first coined by Fairthorne (1969) and Pritchard (1969). Bibliometric is one of the most systematic measures for analyzing literature, and most often use quantitative approaches but not exclusively. Like many fields of research, bibliometric methods have been widely applied to assess in the field of finance has been reported although in limited numbers. However, publications citation is related to the categories of payments, insurance, deposit and Lending, capital raising, investment management and market provisioning, but no bibliometric analysis has focused on Fintech trends literature. By looking at Fintech relative publication metadata, linked between publications, and even the publication texts themselves, we can extract information about the characteristics, potential impact and offer multiple, different perspectives on a set of publications.

How is the distribution of the subject-specific journals and articles revealed in the literature? What are the most popular author countries, research areas, journal names, type and citation count of published journal articles? Does the literature analysis of the newly developed Fintech trend subject reveal something related to the Fintech subject? These are research questions to be addressed in this paper.

The aim of this study was to use bibliometric citation analysis to answer the following questions: (1) which journal contribute the most to the Fintech trend literature and how has the output evolved over the 3-year period between 2015 and 2017, (2) which WEF categories have higher journal paper after the articles mapping the WEF category.

METHOD

Many scholars (Hood & Wilson, 2001; Osareh, 1996a, 1996b; Tsay, 2005) have recognized three major laws in bibliometrics. According to Hood and Wilson (2001), the earliest of these is Lotka's Law (Lotka, 1926) which provides a relationship between authors and papers. Bradford's Law (Bradford, 1934) deals with the problem of the scatter of papers on a scientific subject through the scientific journals. Zipf's Law (Zipf, 1949) is concerned with the word frequency or occurrences.

Therefore, articles with keyword of Fintech-related (in the title, abstract and author keywords of the article) from databases of SSCI (Social Sciences Citation Index) databases were collected for analysis. Since the first article found was published in 2015, the time span for the literature analysis is set to 2015-2017.

There were two major sources of databases for bibliometric studies, Web of Science (WoS) and Scopus. For more than 40 years, the Institute for Scientific Information (ISI, now part of Thomson Reuters) produced the only available bibliographic databases from which bibliometricians could compile large-scale bibliometric indicators. Thomson's databases - the SCI (Expanded), the SSCI and the AHCI, then regrouped under the WoS - were the major sources of bibliometric data until 2004, when Scopus was launched by the publisher Reed Elsevier (Archambault, Cambell, Gingras & Larivière, 2009). A lot of scholars compared with these two databases for several papers (Bosman, Mourik, Rasch, Sieverts & Verboeff, 2006; Falagas, 2008; Gavel & Iselid, 2008).

These two sources of databases also offer robust tools for measuring science at the country level. Due to its representation, this paper uses the older one - WoS - as the major source of bibliometric databases to study the literature distribute in financial technology. The collected literature data were analyzed based on dimensional analyses of article count by cited journal, keyword, research area and journal name were conducted to observe various aspects of the literature analyses.

For the fintech subject, the compliance examination was not conducted because of the lack of enough journals and articles to reveal a meaningful mathematical pattern. Only short-term analyses were conducted and part of them were compared with those for fintech subject to observe their literature linkage.

RESULTS

Fintech is an economic industry composed of companies that use technology to make financial services more efficient. Financial technology companies are generally startups founded with the purpose of disrupting incumbent financial systems and corporations that rely less on software.

Rankings of fintech-related journals on total citations Table 2 lists the fourteen journals in ISI Web of Science with the greatest number of total citations, ranked from highest to lowest. The first six journals had contributed eighty percentage of published papers, with 96; 72; 70; 51; 50 and 42 total citations, respectively. Approximately one-third of the total citations for first two journals are Environment and Planning A and Telecommunications Policy, which focuses on urban and regional issues, and concerned with the roles of information and communication technologies (ICT) in the economy and society.

Overall citations of Fintech-related papers are all in business and information engineering fields. The few field on the journal of financial studies and financial analysis. Most of Fintech-related papers is emerging financial application and uses in the actual service, and has started to be used for broader applications of technology in the space - to front-end consumer products, to new entrants competing with existing players, and even to new paradigms such as Bitcoin. The term is used starting from 2014, and the National Digital Research Centre in Dublin, Ireland defines financial technology as innovation in financial services.

Table 2: Fintech -Related Journals Ranked by Total Citations

Cited Journal	Article title	Cited Reference Count
Environment and Planning A	Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding	96
Telecommunications Policy	Analyzing China's Fintech Industry from the Perspective of Actor-Network Theory	72
New Political Economy	The digital revolution in financial inclusion: international development in the fintech era	70
Journal of Management Information Systems	Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	51
Ecological Economics	Can Financial Technology Innovate Benefit Distribution in Payments for Ecosystem Services and REDD plus?	50
Information Systems Frontiers	Who can get money? Evidence from the Chinese peer-to-peer lending platform	42
Business & Information Systems Engineering	Fintech	31
Asia-Pacific Journal of Financial Studies	Asia-Pacific Journal of Financial Studies	27
International Journal of Information Management	Nurturing a FinTech ecosystem: The case of a youth microloan startup in China	20
Electronic Commerce Research and Applications	Special issue: Contemporary research on payments and cards in the global fintech revolution	7
	Digital blockchain networks appear to be following Metcalfe's Law	
Communications of the ACM	Economic and Business Dimensions	5
Financial Analysts Journal	The FinTech Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries	1
Forbes	The Fintech 50 THE FUTURE OF YOUR MONEY	0
Fortune	Predicting and Deterring Default with Social Media	0
	Good Luck	

Table 3 shows the main research areas in fintech analysis for ISI Web of Science. The top 3 ranks already occupy 68.47% of the total count. The distribution of fintech research journals in the recent year is dispersed normally, especially in the recent three years.

Table 3: Research areas in fintech analysis for ISI Web of Science(WoS)

No.	Research area	Article count	Article percentage (%)
1	Payments	227	25.65%
2	Deposit & Lending	226	25.54%
3	Insurance	153	17.29%
4	Capital Raising	127	14.35%
5	Investment Management	121	13.67%
6	Market Provisioning	31	3.50%

Table 4 is the keywords distribution within the fintech articles. The top 2 keywords used are Business & Economics, and Fintech, Financial technology &Fintech industry.

Table 4: Keywords distribution

Keyword	Article title	Article count
actor network	Analyzing China's Fintech Industry from the Perspective of Actor-Network Theory	1
Behavior behavioral economics	· Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending · The digital revolution in financial inclusion: international development in the fintech era	2
big data	Who can get money? Evidence from the Chinese peer-to-peer lending platform	1
Blockchain cryptocurrency	Digital blockchain networks appear to be following Metcalfe's Law	1
Business & Economics	· Can Financial Technology Innovate Benefit Distribution in Payments for Ecosystem Services and REDD plus? · Digital blockchain networks appear to be following Metcalfe's Law · Entry of FinTech Firms and Competition in the Retail Payments Market · Good Luck · Predicting and Deterring Default with Social Media · Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending · Special issue: Contemporary research on payments and cards in the global fintech revolution · The digital revolution in financial inclusion: international development in the fintech era · The Fintech 50 THE FUTURE OF YOUR MONEY · The FinTech Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries	10
case study	Nurturing a FinTech ecosystem: The case of a youth microloan startup in China	1
China	Who can get money? Evidence from the Chinese peer-to-peer lending platform	1
communication community	· Analyzing China's Fintech Industry from the Perspective of Actor-Network Theory · Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	2
Computer Science	· Digital blockchain networks appear to be following Metcalfe's Law · Economic and Business Dimensions · Fintech · Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending · Special issue: Contemporary research on payments and cards in the global fintech revolution · Who can get money? Evidence from the Chinese peer-to-peer lending platform	6
credit	· Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding · Who can get money? Evidence from the Chinese peer-to-peer lending platform	2
crowdfunding	Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding	1
default probability	Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	1
developing-countries development devices	· Can Financial Technology Innovate Benefit Distribution in Payments for Ecosystem Services and REDD plus? · Nurturing a FinTech ecosystem: The case of a youth microloan startup in China	2
difference-in-differences	Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	1
digital digital networks digitization	· The digital revolution in financial inclusion: international development in the fintech era · Digital blockchain networks appear to be following Metcalfe's Law · Fintech	3

Keyword	Article title	Article count
distributed ledger distributed transaction processing	Digital blockchain networks appear to be following Metcalfe's Law	1
diverse economies economics economy devices	· Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding · Entry of FinTech Firms and Competition in the Retail Payments Market · The digital revolution in financial inclusion: international development in the fintech era	3
Ecosystem	Nurturing a FinTech ecosystem: The case of a youth microloan startup in China	1
End-to-end	Entry of FinTech Firms and Competition in the Retail Payments Market	1
Entry	Entry of FinTech Firms and Competition in the Retail Payments Market	2
Environmental Sciences & Ecology environmental services	· Can Financial Technology Innovate Benefit Distribution in Payments for Ecosystem Services and REDD plus? · Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding	2
equity	Can Financial Technology Innovate Benefit Distribution in Payments for Ecosystem Services and REDD plus?	1
exclusion	The digital revolution in financial inclusion: international development in the fintech era	1
financial financial inclusion financialisation	· Fintech · Nurturing a FinTech ecosystem: The case of a youth microloan startup in China · The digital revolution in financial inclusion: international development in the fintech era	3
Fintech, Financial technology Fintech industry	· Fintech · Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding · Digital blockchain networks appear to be following Metcalfe's Law · Entry of FinTech Firms and Competition in the Retail Payments Market · Nurturing a FinTech ecosystem: The case of a youth microloan startup in China ·Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending · The digital revolution in financial inclusion: international development in the fintech era · Analyzing China's Fintech Industry from the Perspective of Actor-Network Theory	8
offline authentication	Who can get money? Evidence from the Chinese peer-to-peer lending platform	1
front-end	Entry of FinTech Firms and Competition in the Retail Payments Market	1
geography geographies	· Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding · The digital revolution in financial inclusion: international development in the fintech era	2
Government & Law Governance governmentality	· Analyzing China's Fintech Industry from the Perspective of Actor-Network Theory · Can Financial Technology Innovate Benefit Distribution in Payments for Ecosystem Services and REDD plus? · The digital revolution in financial inclusion: international development in the fintech era · The digital revolution in financial inclusion: international development in the fintech era	4
impact	Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	1
information asymmetry Information Science & Library Science imperfect information	· Who can get money? Evidence from the Chinese peer-to-peer lending platform · Nurturing a FinTech ecosystem: The case of a youth microloan startup in China ·Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	3
innovation	Fintech	1

Keyword	Article title	Article count
interchange	Entry of FinTech Firms and Competition in the Retail Payments Market	1
international development international Relations	The digital revolution in financial inclusion: international development in the fintech era	1
Internet-based service	Analyzing China's Fintech Industry from the Perspective of Actor-Network Theory	1
lending lending industry	Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	1
matching	Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	1
Microfinance	The digital revolution in financial inclusion: international development in the fintech era	1
monetary and financial ecologies	Capitalizing on the crowd: The monetary and financial ecologies of crowdfunding	1
Network effects payment networks	Digital blockchain networks appear to be following Metcalfe's Law	1
online microloan online P2P lending online payments online self-disclosure	· Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending · Nurturing a FinTech ecosystem: The case of a youth microloan startup in China · Digital blockchain networks appear to be following Metcalfe's Law · Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	4
payments for Ecosystem Services services industry	· Can Financial Technology Innovate Benefit Distribution in Payments for Ecosystem Services and REDD plus? · Fintech	2
Peer-to-peer Peer-to-peer (P2P) lending	· Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending · Who can get money? Evidence from the Chinese peer-to-peer lending platform	2
retail payment	Entry of FinTech Firms and Competition in the Retail Payments Market	1
Telecommunications theory	Analyzing China's Fintech Industry from the Perspective of Actor-Network Theory	1
two-sided markets	Entry of FinTech Firms and Competition in the Retail Payments Market	1
Weibo	Predicting and Deterring Default with Social Media Information in Peer-to-Peer Lending	1

FUTURE RESEARCH

FinTech is emerging in the industry but as the term little mentioned in science, exploding popularity of FinTech suggests that collection of knowledge is highly required and should not be limited only to technological aspects (Zavolokina, L., 2016). The specific future researches are suggested as following: First, the data sample from WoS is not enough for large sample validation. Second, the articles founded in WoS are mostly the business and management journal. Since Fintech is technology innovation, so it is essential to find more data samples from technology-related database and journals. In the other words, the researcher can try to map the technology-related articles to fintech innovation type. Third, bibliometric citation analysis is a well-established form of meta-analytical research or a so called "meta-review" of literature (Garfield, 1983; Kim & McMillan, 2008). Bibliometric analysis unveils pivotal articles and objectively illustrates the linkages between and among articles about a certain research topic or filed by analyzing how many times they have been co-cited by other published articles. Finally, data from these analyses can be used not only to determine the popularity but also the impact of specific authors and their publications. Consequently, bibliometric citation analysis allows evaluating meta-analytically the development of a given research field or discipline as well as it helps to identify key research streams and their underlying theoretical frameworks.

Citation analysis considers a citation to be the basic unit of analysis and therefore goes beyond a simple counting of publications to include centers of influence and maps out the linkages between and among articles of a certain research field (Kim & McMillan, 2008). Consequently, a meta-analysis of citations reflects the usefulness of research to other researchers conducting related work (Garfield, 1983). As the focus of our study is to shed light on the research stream of Fintech trends relationships, bibliometric citation analysis is an appropriate meta-analytic approach to reach the three outlined goals of this research.

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