

Taming the Beast: A Scientific Definition of Fintech

Patrick Schueffel¹

¹ Institute of Finance, School of Management Fribourg, Fribourg, Switzerland
Patrick.schueffel@hefr.ch

Abstract. There is currently no consensus about what the term Fintech means. This paper explores the complexity of Fintech, and attempts a definition, drawn from a process of reviewing more than 200 scholarly articles referencing the term Fintech and covering a period of more than 40 years. The objective of this study is to offer a definition which is distinct as well as succinct in its communication, yet sufficiently broad in its range of application. As the origins of the term can neither be unequivocally placed in academia nor in practice, the definition concentrates on extracting out the quintessence of Fintech using both spheres. Applying semantic analysis and building on the commonalities of 13 peer-reviewed definitions of the term, it is concluded that Fintech is a new financial industry that applies technology to improve financial activities. The implications as well as the shortcomings of this definition are discussed.

Keywords. Financial services, innovation, banking, financial institution, technology, research, terminology.

1 Introduction

The Fintech genie is out of the bottle. According to an industry report the value of investments in Fintech firms have grown by 75% in 2015 to USD 22.3 billion compared to the previous year (Skan et al., 2016). In total more than USD 50 billion have been globally invested in Fintech firms since 2010 (Skan et al., 2016). The population of Fintech firms is estimated to be currently beyond 12'000 worldwide (Drummer et al., 2016). What is more, the development has not peaked out and observers hailed the disruption that Fintech will bring about (Schneider et al., 2016).

Ever since its inception Fintech has been pivotal to innovation in the financial services industry. In their paper on the evolution of Fintech Arner et al. (2015, p.1) describe the development of Fintech as an ongoing process “during which finance and technology have evolved together” and which led to numerous incremental and disruptive innovations, such as Internet banking, mobile payments, crowdfunding, peer-to-peer lending, Robo-Advisory, online identification etc. In a similar vein editors Chishti and Barberis (2016) present an entire nexus of cases on how the marriage between finance and technology has led to innovation in the financial services sector, let that be through startup firms (e.g. eToro), at incumbent companies (e.g. Citi), at government level (e.g. Israel), or through supraorganizations (e.g. SWIFT). In each of these cases Fintech has significantly spurred innovation.

Due to its innovativeness and potentially disrupting effects on the financial services industry (Ferreira et al., 2015), Fintech is said to have a comprehensive and lasting impact on entire sector (Heap and Pollari, 2015). According to the industry augurs no area of the business will be spared (Grebe et al., 2016; Gulamhuseinwala et al., 2015):

offerings, i.e. products, services, and market segments will change. Operations, comprising middle- and back-office client support, product servicing, and risk management functions will be affected and so will be distribution, encompassing online and physical channels, agents, financial advisers, and other third-parties. Furthermore, Fintech will have its impact on customer experience, meaning the entirety of all experiences the customer has with the service provider. Besides it will have its implications on business economics, i.e. revenue, costs, and margins. Last but not least the sector experts predict Fintech to alter the Industry dynamics altogether, causing changes in the competitive structure and ecosystem of financial services (Deloitte, 2016). Moreover, no type of financial services provider will remain unscathed as Fintech will bring change to all types of banks, asset and wealth managers, fund and payment providers, brokers, exchanges, insurers alike (PWC, 2016). While the attention received in academia is nowhere close to the attention which is paid by practitioners, some scholars do perceive the phenomenon of Fintech as a fundamental shift. Kauffman & Ma, for instance, refer to the ongoing “global fintech revolution” (Kauffman and Ma, 2015, p.261) and so does Mackenzie when heading her article on innovators in financial service “The Fintech revolution” (Mackenzie, 2015, p.50).

What is striking, however, is that despite the consensus on the major impact that Fintech will have on the financial services industry, little academic literature has explored this area (Shim and Shin, 2016). Moreover, no common definition of Fintech has yet been derived. On the contrary, the question “what is fintech” currently ranks on place eight on the most searched queries related to Fintech according to Google (Google, 2016b). This result highlights the desperate need for a common understanding of the word Fintech.

The term Fintech has been applied in various business contexts, often inconsistently and ambiguously. No attempts have been made so far to extract a consensual meaning of Fintech. But if Fintech is truly meant to be meaningful and comparable, then the methodology and definitions used must be precise and uniform. Citing the works of Jakobson (1933), Waugh remarks that “[s]cience is a dialogue, not a series of monologues” (Waugh, 1997p. 103). Applied to the case at hand, however, this necessitates that some agreement must be reached as to what constitutes Fintech. A basic common understanding must be established to appreciate the nature of the developments in banking and financial services and to create a solid foundation for scientific research. Otherwise a meaningful conversation cannot emerge.

Apart from the scientific rationale, this paper is also motivated by the need for a common understanding of the word Fintech by practitioners. As pointed out above, the Fintech phenomenon has become too important and too pervasive over the past years to be neglected, neither by managers of the financial services industry or related fields, nor by consumers of financial services nor by policy makers. Only if there is minimal common understanding of the term Fintech, a straightforward communication about the topic can emerge which is as void of misunderstandings as possible. Correspondingly, management can only then make optimal decisions if there is a certain consensus on the subject to be decided on. As far as clients are concerned, a representative study among German consumers recently highlighted the need for definitional education: 70% of the respondents did not know the term Fintech at all (Absatzwirtschaft, 2017). This nescience of Fintech among consumers then raises the next question about

economic policies in general and consumer protection in particular: How can policy makers shape adequate rules and regulations in the interest of their constituents if there is no common understanding on the topic?

Hence, the objective of this article is to shed light on Fintech by constructing a definition of the term which is acceptable by academia but also firmly grounded in the practical world. By doing so this text aims at constructing intertextual coherence (K. Locke and Golden-Biddle, 1997) in a field which otherwise can be described as unstructured and scattered at best.

The remainder of this paper is organized as follows. First, the background of the term Fintech is expounded as it presents itself to us in the most recent times, but it is also put in an epistemological context and the historical background is derived. This elaboration on the background is followed by a methods section describing the methodology used to attain the objectives outlined above. The results segment that follows outlines the actual findings from surveying the literature on Fintech and conducting a semantic analysis. The discussion segment thereafter debates the findings before the conclusion paragraphs provides final thoughts on the research.

2 Background

According to the Google the term Fintech receives currently monthly on average approximately 201'000 google searches worldwide (Google, 2016a). This count may not appear to be large, especially when comparing it to the term "banking", resp. "bank" which currently reach more than 2.24 million search requests per month. Yet, it is rather sizeable when comparing it with the search term "financial services" which reaches approximately 40'500 counts globally per month (Google, 2016a). What is more striking however, is the trend in the search popularity of the term Fintech. When normalizing the scale between the fewest search entries and the most search request over the past five years on a scale between 0 and 100, we can observe a significant increase in the interest in the term Fintech. From a count near zero in 2011 it has climbed to 100 in 2016 (Google, 2016b). Figure 1 depicts this trend.

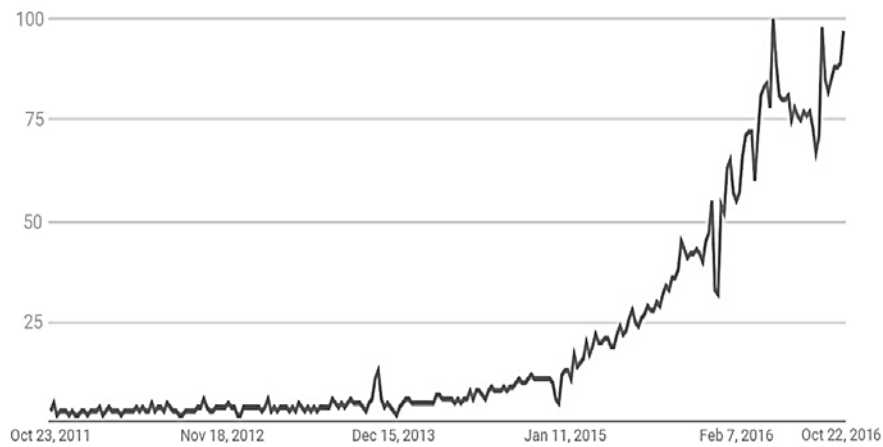


Fig. 1. Popularity of the search term “fintech” at Google

Hence, the term Fintech has long past the test of popularity with the broader business world. It has gained acceptance worldwide and is about to find its way into dictionaries. The most authoritative source for British English, the Oxford English Dictionary, for instance, suggests that Fintech are “Computer programs and other technology used to support or enable banking and financial services: fintech is one of the fastest-growing areas for venture capitalists” (Oxford English Dictionary, 2016). Another highly popular dictionary of our times, Wikipedia suggests that “[f]inancial technology, also known as fintech, is an economic industry composed of companies that use technology to make financial services more efficient.” (Wikipedia, 2016a).

2.1 Epistemological considerations

Yet, despite its existence in widely used lexicons the word “Fintech” has nonetheless to be tried for meaningfulness. In science that test is typically formal logic which commands that definitions be broad enough to capture the essential qualities of a class of objects defined, yet narrow enough to discriminate these objects from other objects (Copi et al., 2013). Deriving such a meaningful definition, however, requires us to broadly understand the types of definitions existing and their purpose (Robinson, 1963).

In his work “An essay concerning human understanding” John Locke divided definitions into two classifications: the first category comprises real or essentialist definitions and second one includes the so called abbreviatory, nominal or verbal definition (J. Locke, 1841). When saying a square is a 4-sided flat shape with straight sides where all sides have equal length, and every interior angle is a right angle (90°), it is considered to be a real or essentialist definition. By comparison when stating that a 4-sided flat shape with straight sides where all sides have equal length, and every interior angle is a right angle (90°) is a square, an abbreviatory, nominal or verbal definition is provided. The latter type of definition is particularly helpful to increase efficiency in science as they commonly replace a long expression with a shorter one. It

is acknowledged that variations exist of how philosophers used this distinction between types of definition. Immanuel Kant, for instance, claimed that nominal definitions “serve merely to distinguish a thing” whereas real definitions provided insight “into the possibility of things” (Kant, 1992, p.493). According to Kant concepts of experience could only be defined nominally whereas concepts of cognition could be defined using real definitions. Yet, for the purpose of this paper I will stick to the classification provided by J. Locke (1841).

Following the reasoning of Scherer (2005) on the nature of definitions I argue that we need sound definitions for the term Fintech primarily for two reasons: First, a real definition is a prerequisite of significant theoretical and empirical research. It is the basis of an efficient communication with others as the “systematic scientific approach” demands to “define central working concepts in universal, invariant, and consensual fashion” (Scherer, 2005, p.698). Secondly, a nominal definition of the expression Fintech is needed as a linguistic convention. Scherer pointed to this fact by stating that “definitions cannot be proven”. Rather than that, he argued that “ [t]hey need to be consensually considered as useful by a research community in order to guide research make research comparable” (Scherer, 2005, p.724).

Hence, a real definition of the term Fintech is especially important to the community of scholars in order to apply a systematic scientific approach to the research object(s). A sound real and nominal definition is required to enhance efficiency when communicating about the research object.

2.2 Historical background

In their 2015 research paper on the evolution of Fintech Arner et al. (2015) state that “[t]he term’s origin can be traced to the early 1990s and referred to the ‘Financial Services Technology Consortium’, a project initiated by Citigroup to facilitate technological cooperation efforts”. Indeed, the source that the authors provide, an article published by the media outlet *American Banker*, mentions a project by the name of “Fintech” initiated by Citigroup in the early 1990s (Hochstein, 2015a). The *American Banker* furthermore published yet another article on the term Fintech with the title “Friday Flashback: Did Citi Coin the Term 'Fintech'?”. This article is preceded by an editor’s note asserting that “[t]he article below appeared in *American Banker* on August 13, 1993 and contains the earliest use we could find of the now-trendy word ‘fintech.’” (Hochstein, 2015b). It is a reprint of an article published by the *American Banker* in August 1993 (Kutler, 1993) and it indeed mentions Fintech as a project label used by Citibank. This article is the original work that Hochstein (2015b) and later on Arner et al. (2015) refer to when suggesting that the term Fintech had its origins in the early 1990s.

Yet, the term Fintech was already used as early as 1972. In a scholarly article where he was detailing models on how he had analyzed and solved daily banking problems encountered at the bank Manufacturers Hanover Trust, the Vice President of the bank, Mr. Abraham Leon Bettinger (Prabook, 2016) provided the following definition “FINTECH is an acronym which stands for financial technology, combining bank expertise with modern management science techniques and the computer.” (Bettinger, 1972, p.62). An early citation of Bettinger’s work by Warschauer (1974) furthermore proves that Bettinger’s work did not go entirely unnoticed during his times. Yet, it still

may well be the case that the imitators of the Fintech project at Citibank in the beginning of 1990s did not know of Bettinger's research and used the identical term for their undertaking by coincidence. It is already noteworthy at this point that neither academia nor practice can unambiguously be identified as the birthplace of the term Fintech as a practitioner published a scholarly journal article first applying the term.

Next to the explanations of the word Fintech emanating from the seventies and nineties of the last century, a plethora of accounts for the term have been proposed in the most recent years. The following section describes how these definitions were sampled and processed.

3 Methods

The research method of choice for the investigations at hand was a comprehensive literature review combined with a thorough semantic analysis. The purpose was to capture the full scope of definitions of the term Fintech in a first step and to then distill the pivotal components of the explanations by semantic analysis in a second step. The corresponding sample frame applied and the analysis conducted are described in the subsequent paragraphs.

With regards to linguistics, semantics can be defined as the science of the meanings of words and of the changes in their meaning (Bréal, 1900). Broadly speaking semantic analysis is therefore about understanding language. It is the process of identifying the meaning of linguistic input. Its objective is to process language in order to produce common-sense knowledge about the world. It does so by extracting data from language, processing the data and subsequently building representations of the world (Bloch and Trager, 1942). As the term Fintech has been used for more than 40 years now (Bettinger, 1972) it is not my objective to reinvent the wheel by producing yet an entirely new definition of the term and thus to nullify large parts of previous research by making it incompatible. Rather than that I intend to build on the previous findings of scholars and apply semantic analysis in order to capture the meaning of this word as it was previously used by other scholars. By doing so I attempt to put forward a definition that is consensually considered useful as posited by Scherer (2005). Consequently, and since my intention is to develop a common denominator that can be used as widely as possible, I take into account the broadest possible variety of definitions from as many authors as possible.

3.1 Sample frame

For this literature review, I conducted a systematic search of all major literature databases related to Management Sciences as well as Economics for all papers published until October 16, 2016, using the keyword "fintech". Those data bases included EBSCO, Business Source Premier, Directory of Open Access Journals (DOAJ), Emerald Insight, JSTOR, SAGE, Science Direct, Springer Link, Taylor Francis, and Wiley Online Library. To be fully inclusive, I did not define a start date. In order to control for the quality of the articles a delimiter so set that only scholarly journal articles, i.e. peer-reviewed papers would be included in the results. Moreover, the relevant language was set to English. It was ensured that the searches were not case

sensitive so that all notations of the search term were included, i.e. “fintech”, “Fintech”, and “FinTech”.

The search was executed in six phases. During the first phase I solely searched for the term Fintech in the individual paper titles. During the second stage I extended the search to the corresponding abstracts and in the third phase I opened it up to title and/or abstract and/or full text. The purpose was to receive a quantitative overview of how many articles had been published thus far related to the term Fintech. Throughout step four I sorted out duplicated results as some articles are indexed in and accessible through more than one data base. In phase five I then carefully examined each one of the articles that I had identified in the previous phase for any potential definition of the term Fintech. The purpose of stage six was then to further extend the search beyond the literature databases listed above in case some of the identified articles had cited works that were not accessible through those sources. The objective here was to find any documented precedent of the definitions being applied. If these second level searches revealed yet additional referenced work, corresponding third level searches were executed for those sources.

3.2 Analysis

The definitions obtained were examined using semantic analysis (Goddard, 2011). The overall goal of this analysis was to set apart the definiendum, i.e. the defined term, which is Fintech, and the definientia, i.e. the defining formulas provided by the various authors (Tarski, 1969). In this context, it should be noted that I attached equal importance to any definition found. As the academic treatment of the topic is still in its infancy and thus very little scholarly output exists yet, I did not make further distinctions among ratings of journals or the number of citations an article has received etc.

Syntactic structures from definitions of the term Fintech were related to more abstract levels in order to derive a meaning that was as independent as possible from the specific wordings used in the individual definitions. Moreover, specific features were condensed or removed where necessary in order to lay the basis for developing a clear-cut, commonly acceptable definition of the term.

Throughout the analysis a particular emphasis was put on the objects that the authors used to define the term Fintech and attributes they applied to further characterize the object. It was further delineated what Fintech comprises / involves and which objectives were pursued by Fintech. Furthermore, note was taken of the results Fintech produces, in case this information was provided by the individual authors.

The subsequent results section provides an overview of the quantitative occurrences of the term Fintech but also about the specifications used to define the term. It furthermore offers a synthesis of the term.

4 Results

The number of counts of the word Fintech being used in article titles, abstracts and full text searched as well as the number of definitions provided for the term are presented in the table below.

Table 1. Counts of the word Fintech in databases

Sources	Hits in Title	AND/OR Abstract	AND/OR Full Text	No of definitions provided
EBSCO	10	12	60	-
Business Source Premier	16	25	28	-
DOAJ	2	3	4	1
Emerald Insight	-	-	-	-
JSTOR	2	2	11	-
SAGE	-	-	-	-
Science Direct	2	2	53	1
Springer Link	-	-	26	2
Taylor Francis	1	1	38	3
Wiley Online Library	2	2	3	1
Subtotal Literature Databases	35	47	223	8
others, peer-reviewed				3
Subtotal Scholarly Sources	42	54	354	11
others, non peer-reviewed				3
Subtotal all sources	35	47	223	14
Total corrected for duplicated results	28	37	203	13

The results vary strongly among the data bases consulted, yet the total sums are considerable as far as the pure word counts are concerned: Across all literature databases and prior to adjusting for duplicated entries 35 scholarly articles display the word Fintech in their title. 45 academic papers make use of that term in the title and/or abstract and a total of 223 peer-reviewed works make use or reference the expression one or multiple times throughout the full text, including footnotes and biographies. The count of 223 texts contrasts sharply with the number of definitions provided, i.e. 14.

After adjusting for repeated entries, still 28 peer-reviewed papers display the word Fintech in the title. 37 scholarly works make use of that term in the title and/or abstract and a total of 203 works scientific use the expression on one or multiple occasions throughout the entire text. Yet only 13 articles or 6% actually define the concept.

The definitions of the term Fintech along with the corresponding authors and a semantic analysis can be found in Table 2.

Table 2. Definitions of term fintech, sources, and semantic analysis

Level	Definition	Authors	Source Type	Page	Citing	Object	Attribute(s)	Comprises / involves	Objective	Results
I.	"FINTECH is an acronym which stands for financial technology, combining bank expertise with modern management science techniques and the computer."	Bettinger, 1972	PJA	p.62		Technology	financial	bank expertise; modern management science; computer	n.a.	n.a.
I.	"Financial Technology, also known as FinTech, is a new sector in the finance industry that incorporates the whole plethora of technology that is used in finance to facilitate trades, corporate business or interaction and services provided to the retail consumer."	Micu & Micu, 2016	PJA	p.380		Sector	new	plethora of technology	Facilitation of financial activities	n.a.
I.	"Fintech is an emerging financial services sector that includes third-party payment, MMF, insurance products, risk management, authentication, and peer-to-peer (P2P) lending"	Shim & Shin, 2016	PJA	p.170	Barberis, 2014	Sector	emerging	third-party payment, MMF, insurance products, risk management, authentication, and peer-to-peer (P2P) lending	n.a.	n.a.

Table 2 (continued). Definitions of term fintech, sources, and semantic analysis

Level	Definition	Authors	Source Type	Page	Citing	Object	Attribute(s)	Comprises / involves	Objective	Results
I.	"Driven by technological advances, new service models have developed in the financial industry which offer additional opportunities to customers. Under the common denominator 'fintech', these new businesses aim to challenge existing financial institutions by using technology to deliver value to the customer in an alternative way."	Maier, 2016	PJA	p.143		Business	new	technology	Offering additional opportunities to customers	n.a.
I.	"FinTech is an economic industry composed of companies that use technology to make financial services more efficient".	Čížinská, Krabec, & Venegas, 2016	PJA	p.1	Wharton FinTech, 2014	Industry	economic	companies that use technology	Enhancing efficiency of financial services	n.a.
I.	"In addition to this, a particular evolution and use of technology (commonly referred these days as fintech) in finance is disrupting traditional business models in financial markets, as well as bringing about new and uncharted risk territories".	Lončarski, 2016	PJA	p.2		Evolution and use of technology	disrupting	new and uncharted risk territories	n.a.	n.a.

Table 2 (continued). Definitions of term fintech, sources, and semantic analysis

Level	Definition	Authors	Source Type	Page	Citing	Object	Attribute(s)	Comprises / involves	Objective	Results
I.	"Internet finance, which is often referred to as 'digital finance' and 'Fintech' outside China, was coined by Ping Xie and Chuanwei Zou (2012)."	Shen & Huang, 2016	PJA	p.221	Xie & Zou, 2012	Finance	Internet, digital	n.a.	n.a.	n.a.
I.	"Internet finance is a spectral concept. It covers all forms of financial transactions and financial intermediaries and markets, such as commercial banks, securities firms, insurance companies, and stock exchanges, to the scenario under Walrasian equilibrium (where neither financial intermediaries nor markets exist) caused by the impacts of internet technologies." and "We think internet finance and Fintech are essentially different words for the same concept"	Xie, Zou, & Lu, 2016	PJA	p.241 p.250		Concept	spectral	financial transactions and financial intermediaries and markets	n.a.	n.a.
I.	"Recent advances in information and communications technology (ICT) have led to the rapid development and expansion of new and innovative financial services, often termed FinTech."	Jun & Yeo, 2016	PJA	p.159		Services	financial, new and innovative	n.a.	n.a.	n.a.

Table 2 (continued). Definitions of term fintech, sources, and semantic analysis

Level	Definition	Authors	Source Type	Page	Citing	Object	Attribute(s)	Comprises / involves	Objective	Results
I.	"Fintech is a service sector which uses mobile-centered IT technology to enhance the efficiency of the financial system. As a term, it is a compound of 'finance' and 'technology', and collectively refers to industrial changes forged from the convergence of financial services and IT"	Kim, Park, & Choi, 2016	PJA	p.105 8		Sector	service	mobile-centered IT technology	Enhancing efficiency	industrial changes
II.	"Beside indirect financing via commercial banks and direct financing through security markets, a third way to conduct financial activities will emerge, which we call 'internet finance'"	Xie & Zou, 2013	PJA	p.1		Activities	financial	n.a.	n.a.	n.a.
II.	"FinTech refers to the application of technology within the financial industry. The sector covers a wide range of activities from payments (e.g. Contactless) to financial data and analysis (e.g. Credit scoring), financial software (e.g. risk management), digitized processes (e.g. authentication) and, perhaps most wellknown to the wider public, payment platforms (e.g. P2P lending)."	Barberis, 2014	Rep	p. 5	Langley, 2014	Technology	n.a.	industry, sector covering payments, financial data and analysis, financial software, payments	n.a.	n.a.

Table 2 (continued). Definitions of term fintech, sources, and semantic analysis

Level	Definition	Authors	Source Type	Page	Citing	Object	Attribute(s)	Comprises / involves	Objective	Results
II	"Fin Tech noun : an economic industry composed of companies that use technology to make financial systems more efficient"*	Wharton FinTech, 2014	Web	n.a.		Industry	economic	companies that use technology	Enhancing efficiency of financial services	n.a.
III	"Technology applied to financial services (Fintech) has a significant impact on our daily lives, from facilitating payments for goods and services to providing the infrastructure essential to the operation of the world's financial institutions."	Langley, 2014	Rep	p.1		Technology	n.a.	financial services	facilitating payments; providing infrastructure; operating financial institutions	impacts daily lives
Legend <div> <div>Technology</div> <div>Industry/Sector</div> <div>financial</div> <div>Efficiency enhancing / Facilitating</div> </div> <div> <div>-related</div> <div>-related</div> <div>-related</div> </div> <div> <div>PJA</div> <div>Rep</div> <div>Web</div> <div>*</div> </div> <div> <div>Peer reviewed journal article</div> <div>Report</div> <div>Web page</div> <div>double entry</div> </div>										

When looking at the “genealogical tree” of the definitions it becomes apparent that two scholarly articles actually cite practitioner work: Shim and Shin (2016) cite a report by Barberis (2014) and Čížinská et al. (2016) refer to the Web page of the Wharton Fintech Club (Wharton Fintech Club, 2014). One peer-reviewed article by Shen and Huang (2016) cites scholarly work by Xie and Zou (2012). The remaining eight definitions are explanations *sui generis*. The definition provided by Wharton Fintech Club was taken out of the total number count as it represented a double entry for it was quoted verbatim by Čížinská et al. (2016).

The term Internet Finance that Shen and Huang (2016) referred to and which was - according to the authors - identical to the term Fintech, was mentioned in the article by Xie and Zou (2012). The original article by Xie and Zou (2012), however, was written in Chinese. I therefore reverted to another article by Xie and Zou which was published in 2013 and which also defined the term Internet finance aka Fintech [according to Shen and Huang (2016)], yet this time in English (Xie and Zou, 2013).

The semantic analysis yielded the following commonalities as far as the definientia are concerned: Four of the ten discriminable scholarly definitions claim Fintech to be a sector or industry. Two further explanations define it as a technology. Three sources are detailing Fintech as a type of action, let that be a business, a services and or very broadly activities. When looking at the attributes used in conjunction with the term Fintech five sources speak of Fintech as something novel, i.e. they describe it as new, emerging, innovative or disrupting. The attribute financial is used twice. When further investigating the peer-reviewed works what Fintech comprises or involves in a broader sense, technology is directly mentioned three times and one more time as “computer”. Two see Fintech as involving financial activities in the broadest sense. When examining the academic definitions for the objectives of Fintech, enhancing the efficiency of or facilitating financial services comes up as the common denominator three times. No common grounds could be identified regarding the results Fintech brings about.

With these most often mentioned commonalities of the scholarly definitions of Fintech in mind, the following definition for the terms Fintech is proposed:

Fintech is a new financial industry that applies technology to improve financial activities.

After proffering this definition it will be discussed in depth over the next paragraphs.

5 Discussion

The definition provided above is a synthesis building on commonalities of the definitions that have been applied to Fintech in literature. In its current form, it is a real or essentialist definition. Putting the definiendum at the end, it can also just be used as a abbreviatory, nominal or verbal definition. Hence, this definition can be expected to not only serve the research community as a real definition, but also the practitioner’s sphere by applying it as a nominal definition. Moreover, and as the epistemological guard rails suggest that I have presented above, the derived definition of Fintech is broad enough to capture the essential quality of the object, i.e. it is a new financial industry that applies technology to improve financial activities, yet it is narrow enough

to discriminate these objects from other objects. For instance, this definition is broad enough to capture financial services improving technologies which are incremental (APIs, device independent technology, signature scanning) as well as disruptive ones (Chat Bots, the Block Chain, artificial intelligence etc.). At the same time it clearly excludes the largely mainframe and paper-based old type of banking services which are oftentimes even delivered through a human interface.

Representing a synthesis of many previously suggested definitions, it may serve as a common denominator, yet it may not be comprehensive or distinct enough for all authors and under all circumstances. In this context it is important to note that building on the thoughts of Scherer (2005) I am of the opinion that a definition is never true or false per se, but more or less useful in a specific context. For instance, if we consider the term “power”. How would a physicist define it? How a politician? Which definition would a judge provide? Which explanation would an athlete give? Moreover, even within the domain of sports you are likely to receive different answers, depending on whom you ask. A weight lifter will most probably provide you with a different answer is than the fellow athlete from the same Olympic team who competes in synchronized swimming. Hence it has to be accepted that - contingent on the counterparty one asks - one may well receive varying answers on the identical question. There is no reason to believe that varying definitions of Fintech may be more or less useful under differing circumstances.

Another reason why the definition provided above can merely serve as a starting point for future explanations of the term is, because definitions change over time. Here, too, we can draw on analogies from other fields. Information technology or “IT” serves as a good illustration. In the early days of computing IT stood for items such punched tapes and cathode ray tubes (Ifrah et al., 2000; Metropolis, 2014; Williams, 1997). Today, however, we much rather associate things such as Motion User Interfaces, Bots and the Internet of Things with IT. Consequently, it is also safe to assume that the expression Fintech undergoes change. The definition of the term Fintech provided by the Web page Investopedia pays tribute to this fact: “Fintech is a portmanteau of financial technology that describes an emerging financial services sector in the 21st century. Originally, the term applied to technology applied to the back-end of established consumer and trade financial institutions. Since the end of the first decade of the 21st century, the term has expanded to include any technological innovation in the financial sector, including innovations in financial literacy and education, retail banking, investment and even crypto-currencies like bitcoin.”. Hence, for the authors of Investopedia, Fintech was originally an expression describing banking backend technology, but widened over time to also encompass technological innovations in financial services and related areas (Investopedia, 2016). Moreover, it must be stressed that the definition derived above asserts that “Fintech is a new financial industry [...]”. The word “new” is inherently hard to elucidate in this context and it is therefore safe to assume that this component of the definition will be altered in the near future. Hence, the definition for Fintech will then be the following “Fintech is a financial industry that applies technology to improve financial activities”.

However, other fields of business and academia have proved that science as well as practice can cope with a certain degree of definitional ambiguity. Terms such as “strategy”, “innovation” or “business model” are being used on daily basis by

practitioners and academics alike, yet we have not established one common definition for any of these words [insights in the definitional difficulties regarding the term strategy are provided by De Wit and Meyer (2010), for innovation see Baregheh et al. (2009), for business model consult Morris et al. (2005) respectively]. Thus, having not one single static definition for the word Fintech has so far not prevented scholar and practitioners from using it. However, when applying the term Fintech one should make clear to the audience or readership what is meant by it. Providing such an explanation significantly improves the efficiency of communication and reduce the potential for misunderstandings. Moreover, only a shared definition will permit the emergence of a meaningful which is fundamental to science (Waugh, 1997).

6 Conclusion

The overall claim of this article is that no one single definition of Fintech exists. After more than 40 years that the term has been used in practice as well as literature there is no agreement as to what Fintech entails. The process of deriving a shared language for business phenomena has long been recognized to be a daunting task (Daft and Wiginton, 1979). By demonstrating elusiveness of Fintech as a concept this paper corroborated this assertion. The differences in definitions revealed by the literature review, underscore that there are definitional problems with Fintech. This is often compounded by the interchangeable use in the practice, but also in scholarly literature.

In order to nevertheless derive commonalities among definitions of the term Fintech, I pursued the most comprehensive review of definitions of the term Fintech that has thus far been published. By applying a semantic analysis, I then closely examined the similarities of the definitions of Fintech that have been used in scientific literature and pointed out the major commonalities. On the quest for a common understanding of the term Fintech I also ventured into the spheres of practice as the notion of Fintech seems to be repeatedly crisscrossing the boundaries between academic and practical domains. Building on the common grounds that these definitions possess, I extracted a new definition as the least common denominator.

This research has implications for scholars, practitioners and policy makers alike. With regards to the first group of stakeholders, this study solidifies the basis for scientific research on Fintech by crafting a network of existing scholarly works to constitute a single definition for the term Fintech. In this way it contributes to constructing intertextual coherence in a novel area of studies and thus helps to lay the foundation for sound scientific work in this area. Moreover, it will facilitate teaching the subject of Fintech as the area can now be delimited to a higher degree. This delineation will increase focus and efficiency of passing on subject-related knowledge. As far as practitioners are concerned, the clear definition of the subject will also decrease the likelihood of misunderstandings and increase the efficiency of communication on the topic. It is safe to assume that many board room meetings in the financial services industry and beyond nowadays revolve around the topic of Fintech, yet participants may not have a common understanding of this term. Finding common grounds on the subject will facilitate any Fintech related discussion. In a similar vein, this clarification of the term Fintech will provide policy makers with a more tangible accord of this subject. Fintech has various ramifications to be observed by policy makers. Being a

means of job creation is certainly one of them, yet topics such as consumer protection will also become increasingly important. Having a common denominator for discussions will certainly help policy makers shaping their discussions. However, what should be kept in mind by all stakeholders using the term Fintech, is that differing definitions may still continue to exist, especially amongst languages. Clarifying and communicating one's own definition of the term prior to any decisive discussion thus becomes paramount, should any dialog on Fintech be meaningful and efficient.

Nonetheless, the definition of Fintech offered above should be seen as a mere starting point for harmonizing and encompassing all the varied perceptions in order to obtain consensus, if only in operational terms. Once this is settled researchers and educators may begin researching and teaching this concept using the same definitional backdrop.

7 Limitations and future research directions

Obviously, no research is without limitations and this paper is no exception. In this study the term Fintech was examined without prefixed article. However, during the research for this paper I have also encountered the expression “a Fintech” in texts as well as in conversations. This leads to the questions whether a difference exists between “Fintech” and “a Fintech”. To my experience people typically refer to a Fintech company or more specifically to a Fintech start-up when they talk about “a Fintech” (e.g. see Treasury Today, 2016). Hence, the difference is to be located on the level of analysis: “Fintech” without article typically to industry whereas “a Fintech” is just one single entity belonging to this industry. This apparently small difference by the prefix “a”, can give rise to serious misunderstandings. To a policy maker, for instance, it will make a large difference, whether he or she is asked to support creating an industry cluster or even entire industry or just one single firm. The same goes for a venture capitalist albeit with opposite signs. Another semantical limitation results from the fact that this study considered Fintech solely to be a noun. However, Fintech is also being used as an adjective. The business press progressively talks about fintech hubs, fintech suppliers, fintech businesses, even about fintech Careers (Hughes, 2016).

Another limitation of the paper emerges from the fact that the research solely focused on the English language. Yet, the term Fintech may substantially vary across languages. To illustrate this fact, definitions of the term Fintech were polled from different language versions of Wikipedia. Relating to the Wharton Fintech Club's definition of the term, the English version of Wikipedia, states that “[f]inancial technology, also known as fintech, is an economic industry composed of companies that use technology to make financial services more efficient.” (Wikipedia, 2016a). The Italian site by comparison asserts that Fintech is the “provision” of financial products and services using information technologies [“La tecnofinanza, o tecnologia finanziaria (in inglese Financial Technology o FinTech) è la fornitura di servizi e prodotti finanziari attraverso le più avanzate tecnologie dell'informazione (TIC)”] (Wikipedia, 2016d). By contrast, the German Wikipedia definition of Fintech suggests that Fintech is an umbrella term for “modern technologies in the area of financial services” [“Finanztechnologien (auch verkürzt zu Fintech bzw. FinTech) ist ein Sammelbegriff für moderne Technologien im Bereich der Finanzdienstleistungen”] (Wikipedia, 2016b). The French Wikipedia version is much closer to the English one, yet it does not define Fintech as an industry,

but more loosely as an “area of activity” [“La technologie financière, ou FinTech, est un domaine d'activité dans lequel les entreprises utilisent les technologies de l'information et de la communication pour livrer des services financiers de façon plus efficace et moins coûteuse”] (Wikipedia, 2016c). Hence, just by comparing across a small random sample of languages one can already fathom the potential for misunderstandings. While the Frenchman may be talking about Fintech as a business segment, the German may be speaking about technologies, the Italian about a delivery channel and the native English speaker may refer to an entire industry. Being aware of potential pitfalls is all the more important as the term Fintech has been derived from the English words financial technology, yet it is also used as such in various other languages. Thus people may automatically assume that they talk about identical things whilst they are not. In addition one should bear in mind that Fintech is a global phenomenon (Mackenzie, 2015). Running into questions of semantics across languages may happen easier than anticipated. An in-depth study of the applications of the term Fintech in different languages would undoubtedly be of interest.

A third shortcoming of this article emanates from the fact that the term Fintech is already showing offsprings. Especially in the popular press as well as on Internet media outlets one can regularly come across terms such as Wealthtech (see e.g. Cheok, 2016), Insurtech (see e.g. Ralph, 2016), Regtech (see e.g. Crosman, 2016) etc. in the context of Fintech. These expressions have not been touched upon in this article. As Fintech will grow more mature it would certainly be beneficial to established common definitions for these terms, too.

Last but not least definitional problems with the term “definition” should be noted. In his article “what is a definition” James Brown attempted to provide some explanation on what a definition is. After lengthily discussion the problems of defining a definition his article ends with the words “The question in the title – what is a definition? Remains. It’s a wide open problem” (Brown, 1998, p.131). Hence, if - from a scientific perspective - the term definition is already standing on shaky grounds, one always needs to bear in mind that any new definition derived will be standing on at least as instable lands.

From an academic point of view Fintech is still an untilled field. Hence, plentiful new research strands are perceivable. One of the most pressing one is surely the relationship between Fintech firms and incumbent players. Do they view each other as complements or competitors? Would mergers and acquisitions make sense or would strategic alliances yield more value? Another research question on industry level could be what sets apart Fintech firms from incumbent players. They oftentimes serve identical clients, yet Fintech firms and incumbent companies are in general fundamentally different. How do they differ in terms of vision and strategy, organizational structure, processes, and culture? Moving down the value chain, additional research questions arise from marketing and sales, i.e. How do Fintech firms approach clients? Which client segments are they typically targeting? What is their pricing model? Valuable insights could also result from investigating the support functions of Fintech firms: How is finance ensured? Which kind of HR model do Fintech firms pursue?

So what has Fintech in store for us? Fintech is poised for further growth. So far, we have been witnessing individual Fintech startups that have just begun seizing individual parts of the financial services value chain and optimizing them. This puts incumbent

players in a difficult position as parts of their oftentimes most lucrative businesses are breaking away whilst they are left with the regulatory burden and the associated costs. At the same time, Fintech still needs to prove that it is not just a fleeting star. Despite its remarkable growth in the recent years, Fintech still needs to provide evidence that it is a sustainable phenomenon even in markets which are on the downturn.

Developing at a very high pace, it is safe to say that parts of current Fintech momentum will slow down in the years to come. Some market observers even go as far to say that there is a Fintech bubble building up which is likely to burst soon. However, the Internet and eCommerce did not disappear with the burst of the Dot-Com bubble. On the contrary, the innovations made in the years leading up to the bubble burst prevailed. Web technologies have never been as pervasively applied as today. A Web sales channel or at least an information outlet has become a standard for most enterprises in the western world. Hence, Internet technology did not disappear with the burst of the Dot-Com Bubble. Rather than that, it was absorbed, transformed, and adopted by the majority of firms in the western world and turned into a business standard.

It is likely that similar things will happen to Fintech. Turning into an outcast in the eyes of investors in the event of a bubble burst, Fintech will then disappear as a label. However, a good share of the innovations brought forward by Fintech firms will then be absorbed by other players, such as by incumbent banks, insurers and software companies and be kept alive. In other words, even if the Fintech genie deflates it will still continue to live in its bottle. And this time we will be able to stick a proper label on it.

References

- Absatzwirtschaft. (2017, 19 January). *Ein Großteil der Deutschen kann mit dem Begriff „Fintech“ noch nichts anfangen*. Accessed 23rd January 2017. <http://www.absatzwirtschaft.de/ein-grossteil-der-deutschen-kann-mit-dem-begriff-fintech-noch-nichts-anfangen-96619/>
- Arner, D. W., Barberis, J. N., & Buckley, R. P. (2015). *The Evolution of Fintech: A New Post-Crisis Paradigm?*, (2015/047). Hong Kong.
- Barberis, J. (2014). *The rise of Fintech: Getting Hong Kong to lead the digital financial transition in APAC*. Retrieved from Hong Kong:
- Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision*, 47(8), 1323-1339.
- Bettinger, A. (1972). FINTECH: A Series of 40 Time Shared Models Used at Manufacturers Hanover Trust Company. *Interfaces*, 2(4), 62-63.
- Bloch, B., & Trager, G. L. (1942). *Outline of linguistic analysis*. Baltimore: Waverly Press.
- Bréal, M. (1900). *Semantics: Studies in the science of meaning*. London: William Heinemann.
- Brown, J. R. (1998). What is a Definition? *Foundations of Science*, 3(1), 111-132.
- Cheok, J. (2016). *PwC Singapore launches Venture Hub to connect entrepreneurs, investors*. Accessed 24th October 2016. <http://www.businesstimes.com.sg/technology/pwc-singapore-launches-venture-hub-to-connect-entrepreneurs-investors>
- Chishti, S., & Barberis, J. (2016). *The FinTech Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries*. Chichester, UK: John Wiley & Sons Ltd
- Čižinská, R., Krabec, T., & Venegas, P. (2016). FieldsRank: The Network Value of the Firm. *International Advances in Economic Research*, 1-3.
- Copi, I. M., Cohen, C., & McMahon, K. (2013). *Introduction to Logic* (New International Edition ed.). London: Pearson Education Limited.
- Crosman, P. (2016). *IBM buying Promontory clinches it: Regtech is real*. Accessed 24th October 2016. <http://www.americanbanker.com/news/bank-technology/ibm-buying-promontory-clinches-it-regtech-is-real-1091692-1.html>
- Daft, R. L., & Wiginton, J. C. (1979). Language and organization. *Academy of Management Review*, 4(2), 179-191.
- De Wit, B., & Meyer, R. (2010). *Strategy: process, content, context; an international perspective*. Andover: Cengage Learning EMEA.
- Deloitte. (2016). *Disaggregating fintech: Brighter shades of disruption*. Retrieved from New York:
- Drummer, D., Jerenz, A., Siebelt, P., & Thaten, M. (2016). *FinTech: Challenges and Opportunities -How digitization is transforming the financial sector*. McKinsey, Dusseldorf.

- Ferreira, J. J. P., Mention, A.-L., & Torkkeli, M. (2015). Illumination in times of Uncertainty: Fifty Shades of Innovation for Societal Impact. *Journal of Innovation Management*, 3(1), 1-4.
- Goddard, C. (2011). *Semantic analysis: A practical introduction*. Oxford: Oxford University Press.
- Google. (2016a). *Google AdWords - Keywords*. Accessed 17th October 2016. <https://www.google.com/adwords>
- Google. (2016b). *Google Trends - fintech search term*. Accessed 22nd October 2016. <https://www.google.com/trends/>
- Grebe, M., Mönter, N., Noakes, B., T'Serclaes, J.-W. D., Wade, B., & Walsh, I. (2016). *Banking on Digital Simplicity. Global Retail Banking*. Accessed 10th October 2016. https://www.bcgperspectives.com/Images/BCG-Banking-on-Digital-Simplicity-May-2016_tcm80-209207.pdf
- Gulamhuseinwala, I., Bull, T., & Lewis, S. (2015). FinTech is gaining traction and young, high-income users are the early adopters. *The Journal of Financial Perspectives*, 3(3), 16-23.
- Heap, T., & Pollari, I. (2015). *FINTECH 100 - Leading Global Fintech Innovators Report 2015*. Accessed 10th October 2016. <https://www.kpmg.com/FR/fr/IssuesAndInsights/ArticlesPublications/Documents/Etude-Fintech100-2015.pdf>
- Hochstein, M. (2015a). *Fintech (the Word, That Is) Evolves*. Accessed 19 October 2016. <http://www.americanbanker.com/bankthink/fintech-the-word-that-is-evolves-1077098-1.html>
- Hochstein, M. (2015b). *Friday Flashback: Did Citi Coin the Term 'Fintech'? Gems from our archives*. Accessed October 19 2016. <http://www.americanbanker.com/bankthink/friday-flashback-did-citi-coin-the-term-fintech-1076875-1.html>
- Hughes, J. (2016). *Is a Fintech Career in Your Future?* Accessed 21 October 2016. http://www.masterstudies.com/Schools_and_Universities/Contact-us.html
- Ifrah, G., Harding, E. F., Bellos, D., & Wood, S. (2000). *The universal history of computing: From the abacus to quantum computing*: John Wiley & Sons, Inc.
- Investopedia. (2016). *Fintech*. Accessed 19 July 2016. <http://www.investopedia.com/terms/f/fintech.asp>
- Jakobson, R. (1933). La scuola linguistica di Praga. *La cultura*, 12(1933), 539-546.
- Jun, J., & Yeo, E. (2016). Entry of FinTech Firms and Competition in the Retail Payments Market. *Asia-Pacific Journal of Financial Studies*, 45(2), 159-184.
- Kant, I. (1992). *Lectures on Logic*, ed. and trans. J. Michael Young. Cambridge: Cambridge University Press, 557, 561.
- Kauffman, R. J., & Ma, D. (2015). Special issue: Contemporary research on payments and cards in the global fintech revolution. *Electronic Commerce Research and Applications*, 14(5), 261-264.
- Kim, Y., Park, Y.-J., & Choi, J. (2016). The Adoption of Mobile Payment Services for "Fintech". *International Journal of Applied Engineering Research*, 11(2), 1058-1061.

- Kutler, J. (1993). *Citibank Is Shedding Individualistic Image*. Accessed. <http://www.americanbanker.com/bankthink/friday-flashback-did-citi-coin-the-term-fintech-1076875-1.html>
- Locke, J. (1841). *An essay concerning human understanding*.
- Locke, K., & Golden-Biddle, K. (1997). Constructing opportunities for contribution: Structuring intertextual coherence and “problematizing” in organizational studies. *Academy of Management Journal*, 40(5), 1023-1062.
- Lončarski, I. (2016). Risk Management (2016). *Risk Management*, 18(1), 1-3.
- Mackenzie, A. (2015). The Fintech Revolution. *London Business School Review*, 26(3), 50-53.
- Maier, E. (2016). Supply and demand on crowdlending platforms: connecting small and medium-sized enterprise borrowers and consumer investors. *Journal of Retailing and Consumer Services*, 33, 143-153.
- Metropolis, N. (2014). *History of computing in the twentieth century*: Elsevier.
- Micu, I., & Micu, A. (2016). Financial Technology (Fintech) And Its Implementation On The Romanian Non-Banking Capital Market. *SEA-Practical Application of Science*(11), 379-384.
- Morris, M., Schindehutte, M., & Allen, J. (2005). The entrepreneur's business model: toward a unified perspective. *Journal of Business Research*, 58(6), 726-735.
- Oxford English Dictionary. (2016). *fintech*. Accessed 19 July 2016. <http://www.oxforddictionaries.com/definition/english/fintech>
- Prabook. (2016). *Abraham Leon Bettinger*. Accessed 25 October 2016. <http://prabook.com/web/person-view.html?profileId=669232>
- PWC. (2016). *Blurred lines: How FinTech is shaping Financial Services - Global FinTech Report*. Retrieved from New York: <http://www.pwc.com/gx/en/advisory-services/FinTech/PwC%20FinTech%20Global%20Report.pdf>
- Ralph, O. (2016). *Insurance sector worried as insurtech start-ups cosy up to customers*. Accessed 24 October 2016. <https://www.ft.com/content/00168c14-7384-11e6-bf48-b372cdb1043a>
- Robinson, R. (1963). *Definition*. Oxford: Oxford University Press.
- Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social science information*, 44(4), 695-729.
- Schneider, L. A., Shaul, M. A. X., & Lascelles, C. K. (2016). Regulatory Priorities for FinTech Firms--and Investors--in the Coming Year. *Journal of Taxation & Regulation of Financial Institutions*, 29(4), 5-14.
- Shen, Y., & Huang, Y. (2016). Introduction to the special issue: Internet finance in China. *China Economic Journal*, 9(3), 221-224.
- Shim, Y., & Shin, D.-H. (2016). Analyzing China's Fintech Industry from the Perspective of Actor–Network Theory. *Telecommunications Policy*, 40(2–3), 168-181.
- Skan, J., Dickerson, J., & Gagliardi, L. (2016). *Fintech and the evolving landscape: landing points for the industry*. Retrieved from London:
- Tarski, A. (1969). Truth and proof. *Scientific American*, 220(6).
- Treasury Today. (2016). *Think like a fintech*. Accessed 21 October 2016. <http://treasurytoday.com/2016/07/think-like-a-fintech-tttech>

- Warschauer, C. L. (1974). A programação financeira das sociedades de financiamento, crédito e investimento. *Revista de Administração de Empresas*, 14(1), 33-57.
- Waugh, L. R. (1997). Roman Jakobson's work as a dialogue: The dialogue as the basis of language, the dialogue as the basis of scientific work. *Acta Linguistica Hafniensia*, 29(1), 101-120.
- Wharton Fintech Club. (2014). *What is FinTech?* Accessed Jul 18 2016. <https://medium.com/wharton-fintech/what-is-fintech-77d3d5a3e677#.kczb2jawk>
- Wikipedia. (2016a). *Financial Technology*. Accessed 18 July 2016. https://en.wikipedia.org/wiki/Financial_technology
- Wikipedia. (2016b). *Finanztechnologie*. Accessed July 19 2016. <https://de.wikipedia.org/wiki/Finanztechnologie>
- Wikipedia. (2016c). *Technologie financière*. Accessed 19 July 2016. https://fr.wikipedia.org/wiki/Technologie_financi%C3%A8re
- Wikipedia. (2016d). *Tecnofinanza*. Accessed Jul 18 2016. <https://it.wikipedia.org/wiki/Tecnofinanza>
- Williams, M. R. (1997). *A history of computing technology*. Los Alamitos: IEEE Computer Society Press.
- Xie, P., & Zou, C. (2012). Research on Business Models of Internet Finance. *Financial Research*, 12, 11-22.
- Xie, P., & Zou, C. (2013). The Theory of Internet Finance. *China Economist*, 8(2), 1-15.
- Xie, P., Zou, C., & Liu, H. (2016). The fundamentals of internet finance and its policy implications in China. *China Economic Journal*, 9(3), 240-252.