

FinTech (Financial Technology): What is It and How to Use Technologies to Create Business Value in Fintech Way?

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Abstract—We define FinTech as a cross-disciplinary subject that combines Finance, Technology Management and Innovation Management. The definition had been presented to different audiences with different backgrounds, such as students and business professionals in various events, we found that the definition provides audiences better understanding on what is FinTech and its potential. Moreover, in order to discuss how FinTech would create value for businesses, we summarized various FinTech applications into four major categories: i) payment, ii) advisory service, iii) financing and iv) compliance. In addition, we also discuss what are the emerging technologies in FinTech and how they could possibility create business values. We believe that this study could serve as a reference for researchers, particularly from technology background, on how to identify and develop new Fintech solutions.

Index Terms—Financial technology, FinTech, emerging technology, business innovation.

I. INTRODUCTION

FinTech (i.e. Financial Technology) is an emerging topic in business world. According to [1], global investment in FinTech companies hit US\$24.7 billion across 1076 deals in 2016, while Garrick and Rauchs [2] indicated that the total crypto-currency market capitalization has increased more than 3 times since early 2016, reaching nearly US\$25 billion in March 2017. On the other hand, according to CrowdfunderHub [3], the volumes of donation-based, reward-based and equity-based crowdfunding markets in 2015 were £12 million, £42 million and £332 million, respectively. In addition, PwC [4] estimated that Artificial Intelligence (AI) would also automate a considerable amount of underwriting, especially in mature markets where data is readily available by 2020. Moreover, Citigroup estimated European and US banks would cut another 1.8m jobs in the next decade with the growth of FinTech [5].

On the other hand, as per the forecast from Innovate Finance [6], increasing investment in UK FinTech sector would help to create an additional 100,000 jobs in UK by 2020.

However, there is lack of related works on providing a general accepted definition of what is FinTech. Moreover, we found the public understanding on what is FinTech is very weak.

On this regard, we had opportunities to meet more than 200 teenagers (from the age 16-30) and business professionals in

different events, such as public talks, conferences and various meetings) during September 2016 to August 2017. In each event, we asked them "what are their understanding of FinTech", most of the responses were either i) unclear or even ii) don't know. For the remaining very few of the responses with views on FinTech, those responses were mainly focusing on some technical aspect such as blockchain, e-payment but without generalizable view. In fact, the lack of clear definition and weak public understanding of FinTech had led to many practical problems, for example, this had discouraged potential students to consider relevant FinTech educations, consequently the pipeline of FinTech talents to the markets have been negatively affected. The shortage of FinTech professionals had also raised concerns at international level [7].

Moreover, the poor awareness of FinTech caused by lack of clear definition also leads to other serious potential economic issues. In brief, we found that we are living in a gap between two sides. On one side, we can see that many governments, banks, insurance companies and financial institutions had invested huge amount of resources into FinTech innovations. Also, many new FinTech startups are desperately providing new products and services to the market, such as robo-advisor service. However, on the other side, we found many people have not realized existing financial system is changing rapidly because of FinTech innovations. We had even met some educators, financial participators and users who unintentionally resisted FinTech without realizing how their jobs or daily life will be affected by FinTech in short future.

This paper is organized as follows. Section II. reviews the brief history of FinTech development. Section III. provides a definition of FinTech. Section IV. summarizes how to create business value in FinTech way. Section V. is a conclusion of this paper.

II. BRIEF HISTORY OF FINTECH DEVELOPMENT

FinTech is a hot business topic in recent years, however its concept is not new. It can be traced back to July 1866 when the first communication through the Trans-Atlantic transmission cable occurred on 16 August 1958. The connection was not only reducing the communication time between North America and Europe from ten days (i.e. delivered a message by ship) to 17 hours, it also facilitated the development of the global telex and then improving related financial services, which is also considered as FinTech 1.0 [8].

In brief, the development of FinTech is closely related to

the development of enabling technologies. During FinTech 1.0, the key enabling technologies included Trans-Atlantic transmission cable and mainframe computers, etc. These technologies breed related products of financial technology, such as SWIFT and ATMs. During FinTech 2.0, the related technologies included the Internet and Internet of Things whereas during FinTech 3.0, more and more data technologies will be developed. Currently, we are in the transition period in between FinTech 2.0 to FinTech 3.0

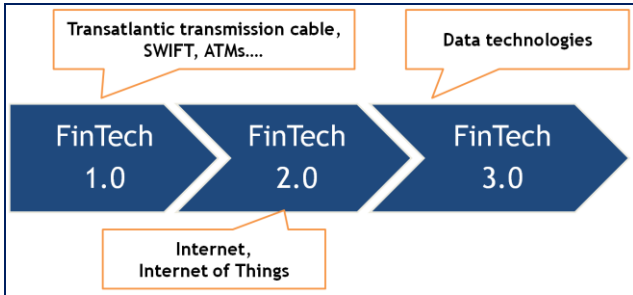


Fig. 1. The development of FinTech and key technologies in each stage.

III. DEFINITION OF FINTECH

In order to generalize the understanding of FinTech (Financial technology), we define FinTech is:

"a cross-disciplinary subject that combines Finance, Technology Management and Innovation Management."

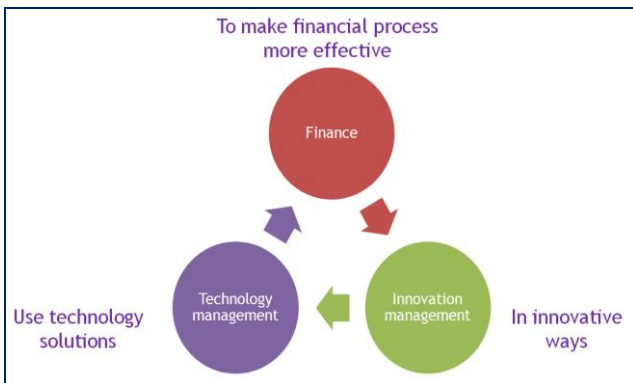


Fig. 2. FinTech is a cross-disciplinary subject.

The definition can further be elaborated as

"any innovative ideas that improve financial service processes by proposing technology solutions according to different business situations, while the ideas could also lead to new business models or even new businesses"

Above mentioned understanding of FinTech can also provide new points of view for evaluating business model. A real world example is Uber. By using the definition, Uber can be considered as a FinTech business because the company provides non-traditional (i.e. innovative ideas) transportation services by using technology (i.e. mobile apps) to improve ordering (financial services) taxi services. In fact, in most cities, Uber offers "upfront pricing"; the rider is quoted the fare that he or she will pay before requesting the ride.

In other words, the suggested definition and elaboration of

FinTech can also serve as innovative reference in helping businesses to rethink their business models or even to suggest new businesses. In following sections, we will further discuss how to create business value in FinTech way.

IV. HOW TO CREATE BUSINESS VALUE IN FINTECH WAY

There are various applications of FinTech and those applications could be classified under different categories. In this paper, we classify the FinTech applications into four major operational business processes: i) payment, ii) advisory service, iii) financing and iv) compliance. According to the classification, we further discuss what would be the emerging technologies in FinTech and how such technologies could possibility create business value.

A. FinTech on Payments

On payment aspects, cashless payment is the key development trend. More and more companies have developed related payment solutions for their customers. For example, Starbucks had developed their own payment Apps. According to the data from the company's Q3 financial report [9], its mobile payments increased to 30% of transactions in U.S. company-operated stores. As more payment solutions allow users for seamless e-payment process, under this topic (i.e. payment), the emerging directions for future studies include data transmission technologies, security issues, user experiences, data analytic techniques, etc. Moreover, we suggest that the future studies related to e-payment solutions should have focus on how to improve the process in terms of convenience, efficiency, traceability or security [10]-[12]. A practical example is an empirical research [13] that compared Quick Pay and Union Pay, the finding suggested that Quick Pay is more popular than Union Pay because Quick Pay has better performance in ease access, usability, reputation and secure protection.

As a sub-topic under payment, blockchain has widely been studied, many relevant techniques and applications had been proposed by different scholars. For examples, decentralized smart contract system based on blockchain called "Hawk" [14], a protocol using blockchain to protect personal data [15]. As a summary, a study [16] was conducted to review the main principles behind blockchain technology and some of its cutting-edge applications. Furthermore, digital currency, such as Bitcoin, is also an emerging topic. There are many debates about the pros and cons of Bitcoin, for examples, William & Lawrence [17] discussed if Bitcoin become a major currency. Florian [18] studied what are users' intentions when changing their domestic into a digital currency, etc.

In summary, from the business point of view, the new developments of related technologies and studies should, directly or indirectly, improve business process, such as enhancing sales, improving automation efficiency, improving customer retention and others. For examples, it could be a new interface design that involves HCI (Human-Computer Interactions) studies, it could relate to secure data transmission over wireless networks because it would affect customer trust and customer retention. Moreover, future studies related to payment should not be limited to B2C aspect, but future direction should also cover B2B aspect. For

example, how to enable more effective seamless settlement transaction between suppliers and buyers? This could involve many enabling technologies such as ERP, CRM, RFID, Internet-of-Things, database management, distributed ledger and others.

B. FinTech on Advisory Service

Advisory service refers to provide suggestions to users according to a set of rules and criteria. In this paper, advisory service covers all kind of related services, such as investment advice, asset management consultation, insurance service, customer supports and management decision makings.

FinTech has been considered as disrupting innovation for advisory service sector. Previous findings [19] indicate that the participants from asset management and insurance had serious concerns on how FinTech would disrupt their businesses - 74% of insurance companies and 51% of asset managers suggested their industry will be disrupted. The developments of internet-of-things, wearable computers, advanced sensors, artificial intelligence, machine learning, big data, advanced algorithms, and automations, etc. are the emerging directions for future studies under this topic (advisory services). Furthermore, we suggest that the future studies related to advisory services solutions should have focuses on how to improve the process in terms of personalization, cost reductions, flexibility, automation, users' experience enhancement and any kinds of financial decision making, etc.

As a sub-topic under advisory service, robo-advisor, is now an emerging topic in investment sector. Robo-advisor serves as financial adviser that provides automated financial advice or investment management for clients. Based on advanced technologies, such as artificial intelligence, big data and machine learning, Robo-advisor can provide personalized suggestions to clients in more effective ways, while the suggestions can also be updated according to real-time data (e.g. the latest oil price fluctuation or stock index, etc.). There are also existing applications of insurance services that involve using wearable computers (e.g. hand belt with digital device) to send users' health data to insurance company, so that personalized insurance package could be designed. A more practical example is the pensions industry stands to benefit from implementing FinTech to address problems such as scheme member under-saving and not finding tailored retirement solutions as per [20]. Besides, Paolo [21] also provided a comprehensive review and suggested relevant principles about robo-advisor.

In summary, from business point of view, new developments of related technologies should, directly or indirectly, improve efficiency, enhance profits or increase market share. Future studies related to advisory services should not be limited to B2C and financial consultancy aspects, but future direction should also cover different opportunities. For examples, how to enable robo-advisor to integrate customer enquiries to ordering system? How to link a company's database to support automated financial decision making? How to facilitate more effective seamless settlement transactions between suppliers and buyers? These could involve many enabling technologies such as ERP, CRM, RFID, Internet-of-Things, database management, distributed

ledger and others.

C. FinTech on Financing

Financing refers to any acts of obtaining funds for business activities from different sources. There are various traditional sources of finance, such as family, bank borrowing, profit, venture capital, franchising, government funds, stocks market, debenture, bonds and others, etc. The developments of FinTech provide many new alternative financing ways, that is, a financing channel which is outside the traditional systems. For example, crowdfunding provides an alternative way for businesses to obtain funds at lower cost or in a way that was not possible traditionally. In fact, crowdfunding is also considered as one of the most popular type of alternative finance [22]. Moreover, crowdfunding is also an effective tool for start-ups and entrepreneurs to bridge the funding gap between earliest stages of funding and later growth of capital [23]. As per the statistic of Massolution report [24], the total global crowdfunding industry was US\$34 billion (equivalent to £27 billion) in 2015, that is, 2.1 times greater than 2014's figure. According to a report [25], a significant amount of £473 million had been raised for various projects and ideas from crowdfunding in the U.K. in 2015. On the other hand, there were US\$ 430 million (i.e. £341 million) raised via crowdfunding in the developing world excluding China [26].

The developments of mobile device, on-time communication, CSCW (Computer-supported cooperative work), artificial intelligence, machine learning, big data, advanced algorithms, and automations, etc. are the emerging directions for future studies under this topic (financing). Furthermore, we suggest that the future studies related to financing solutions should have focuses on how to improve the process in terms of personalization, information sharing, lowering transaction costs, speed, effectiveness, flexibility, automation, users' experiences and any kinds of financial decision making, etc.

As a sub-topic of financing, FinTech also helps on promoting equity and social cohesion. In fact, many successful cases of FinTech innovation originated in low-end or new market, and the initial customers of many FinTech enterprises are deemed unprofitable by incumbents. For example, many SMEs are facing liquidity shortage and unable to finance enough funds from existing banking system even if they are willing to pay higher interest. On this, a French enterprise, Finexkap, offers businesses a quick, flexible and entirely digitalised factoring process. It has facilitated over €50 million account receivables financing. More importantly, it helps many SMEs in their difficult times. Another example is gender discrimination in financial access, women are often been excluded from existing financial system in many developing countries and FinTech has the potential to change this situation. Above are only two of the many examples about how FinTech can enhance financial inclusion.

In Summary, from the business point of view, the future developments of FinTech technologies should, directly or indirectly, related to improving information sharing process, lowering transaction costs, enabling new financing alternatives or supporting better financing decision making. In practice, there are many possibilities to improve financing, for examples, one company can improve financing by better

managing its inventory level, therefore an RFID system can also be considered as a solution that improve business model in FinTech ways.

D. FinTech on Compliance

Compliance refers to conforming to a set of regulations, such as specifications, policy, standard or law. Nowadays, compliance becomes a key business process for many businesses. On this, using technologies to enhance regulatory processes is also referred to RegTech (Regulatory Technology) [27].

Although compliance processes can reduce risks, enhance trust and reduce transaction costs (e.g. a company with reliable financial records could borrow money at lower costs), compliance processes are often not directly adding value to the business. Therefore, from business point of view, we suggest that the future studies related to compliance should be related to how to improve the effective of compliance processes, how can use lower costs to complete related tasks or how to use technologies to conduct compliance works that could not be easily done by human in traditional ways. For example, there is already a FinTech case that EY, one of the four biggest audit firms in the world, has revealed plans to expand its use of drones to improve the audit process [28]. In summary, robot, drone, mobile device, CSCW (Computer-supported cooperative work), Artificial Intelligence, Data, Advanced Algorithms, etc. are the emerging directions for future studies under this topic (compliance).

V. CONCLUSIONS

This paper defined FinTech as a cross-disciplinary subject that combines Finance, Technology Management and Innovation Management. More specifically, we suggested FinTech refers to any innovative ideas that improve financial service processes by proposing technology solutions according to different business situations, while the ideas could also lead to new business models or even new businesses. We had presented this definition to different audiences with different backgrounds, such as students and business professionals in various events, we found that the definition provides audiences with better understanding on what is FinTech and its potential.

Furthermore, in order to discuss how FinTech would create values for businesses, we summarized various FinTech applications into four major categories: i) payment, ii) advisory service, iii) financing and iv) compliance. Moreover, we also discussed what are the emerging technologies in FinTech and how they could possibility create business values.

Fig. 3 provides a summary of suggested emerging directions for future studies of related technology topics. In fact, we suggest that any research aiming to improving financial process can be categorized as FinTech related research. For examples, studies related to i) a data transmission technology that makes billing process more secure, ii) a data analytic model that learns customer payment behavior, iii) a mobile device that enables on-time peer-to-peer financing, iv) using drones for audit works, or v)

other contributions aiming to improving financial process can all be considered as FinTech related research.

FinTech categories:	Suggested emerging directions for future studies of related technology topics
Payments	Data transmission technologies, security issues, user experiences, data analytic techniques
Advisory service	Internet-of-Things, wearable computers, advanced sensors, artificial intelligence, machine learning, big data, advanced algorithms, and automations
Financing	Mobile device, on-time communication, CSCW (Computer-supported cooperative work), artificial intelligence, machine learning, big data, advanced algorithms, and automations
Compliance	Robot, drone, mobile device, CSCW (Computer-supported cooperative work), artificial intelligence, data, advanced algorithms

Fig. 3. A summary of suggested emerging directions for future studies of related technology.

We believe this is the first time that a study like this had been conducted to review and discuss i) the definition of FinTech, ii) the expected technologies in FinTech and iii) how they could possibility create business value. With this study, we have shed some lights on future directions of FinTech development. We believe this study could be served as a reference for researchers, particularly from technology background, on how to identify and develop new Fintech solutions.

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