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FINTECH ECOSYSTEM IN VIETNAM

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in Global Innovation Management

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1 INTRODUCTION

1.1 Description

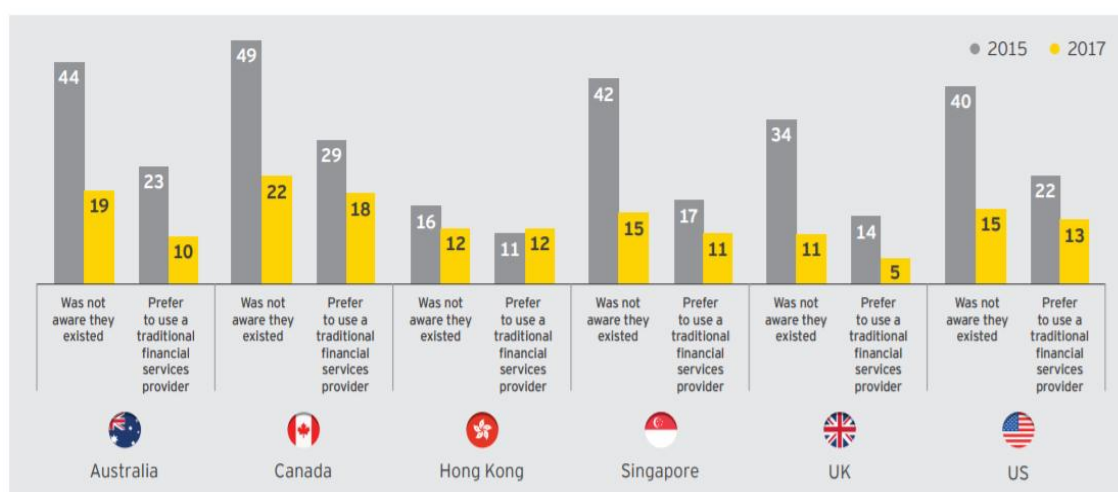
Recently, there has been a growing interest in financial technology (FinTech or fintech) in Vietnam. Fintech is growing rapidly all over the world and Vietnam is not out of scope under the influence of globalization. Though the products are primitive, fintech is expected to explode in the near future in Vietnam taking advantage of the large and young population, increasing flow of foreign investment into Vietnam and the effort of Vietnamese government in institutional improvement and legal reform.

Definition: The definition of fintech given by the Financial Stability Board is “technologically enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services” (Monitoring of FinTech 2018). Fintech describes the digitization of the financial sector mostly via internet-based technologies to provide modern financial services, such as mobile payments or early-stage crowd-based financing of startups (crowdfunding, crowdfinancing) (Dapp 2014). Philippon (2016) sees fintech as financial innovations which can disrupt existing structures and also pose “significant privacy, regulatory and law enforcement challenges”. Pollari (2016) points 7 major stimulators of the born of fintech: (1) changing consumer behavior, (2) maturing digital and mobile services, (3) accelerating pace of change, (4) declining levels of trust, (5) easier entry for digital disruptors, (6) accessible attractive profit pools, and (7) supporting policy and regulatory environment. Nicoletti (2017) raises two main aspects of fintech. The first one is about itself, emphasizing that fintech is not only about startups but also exists in mature and maturing companies because digitalization is a trend. The second one is about the scope involving many stakeholders.

Fintech is not a new term. Its progress can be divided into 4 stages: 1.0 (1866-1967), 2.0 (1967-2008), 3.0 (2008 to now in developed countries) and 3.5 (2008 to now in developing countries). Fintech 1.0 was marked by the transformation from analogue to digital. In fintech 2.0 was outstanding online banking. Online banking was digital version of the previous model without credit risk management. That risk is being mitigated in fintech 3.0 with startups joining with traditional banks to provide niche financial services to the general public, business and banks themselves. Fintech 3.0 is featured as high speed of development and now covering five subjects: investment (more services using algorithm and robot), internal operations and risk management (the main reason for investing in technology of financial institutions), payments and infrastructure (trying to remove middlemen), data security and monetisation (applying big data to boost effi-

ciency), consumer interface (giving fintech companies a tool to compete with traditional institutions). Together with fintech 3.0 is fintech 3.5 growing in emerging markets, e.g. Asia and Africa, as attempt of governments to improve their economies based on 7 reasons: (1) young population well-equipped with mobile devices, (2) a fast-growing middle class, (3) informal alternatives to inefficient financial and capital markets, (4) a shortage of physical banking infrastructure, (5) a behavioural pre-disposition in favour of convenience over trust, (6) new market opportunities, and (7) less stringent data protection and competition (Arner, Barberis and P Buckley 2016).

World fintech: The Fourth Industrial Revolution affects all industries. Financial system, blood vessel of an economy, sees substantial adjustments under the influence of technology. From 2010 to 2015, about 2500 companies received more than 50 billion USD investment (Fintech and the – – 2016). In 2016, 17.4 billion USD was invested in fintech all over the world (Browne 2017). Fintech plays a key role in changing customers' behavior. At some developed markets, the percentage of people who have no idea of fintech fell steadily; most of them showed less interest in traditional services for the same duration (see figure 1).



Notes: The figures show the percentage of all respondents who cited lack of awareness, versus a preference for traditional financial services providers, as barriers to using FinTech, by market. Survey respondents were allowed to choose multiple reasons for not using FinTech. Question was asked only to respondents who had used no FinTech services in the last six months, however, the analysis is re-indexed to show as a percentage of all survey respondents in each market.

Figure 1 Comparison of two selected barriers to adoption in six markets between 2015 and 2017 (EY FinTech – – 2017)

As can be seen on figure 1, all developed markets (Australia, Canada, Hong Kong, Singapore, UK and US) saw significant decrease in the per cent of people who was not aware of the existence of fintech by 4% at least (in Hong Kong) from 2015 to 2017. The largest decrease was 27% in Canada and Singapore. In the same period, only in Hong Kong was people still interested in traditional financial services with a slight increase by 1% while the number decreased in the other markets (by 13% maximum in Australia). Examples of those developed markets show growing popularity of fintech and weaken-

ing financial services provided by traditional institutions. That causes concern in traditional financial services providers. Figure 2 shows mounting concern all over the world.

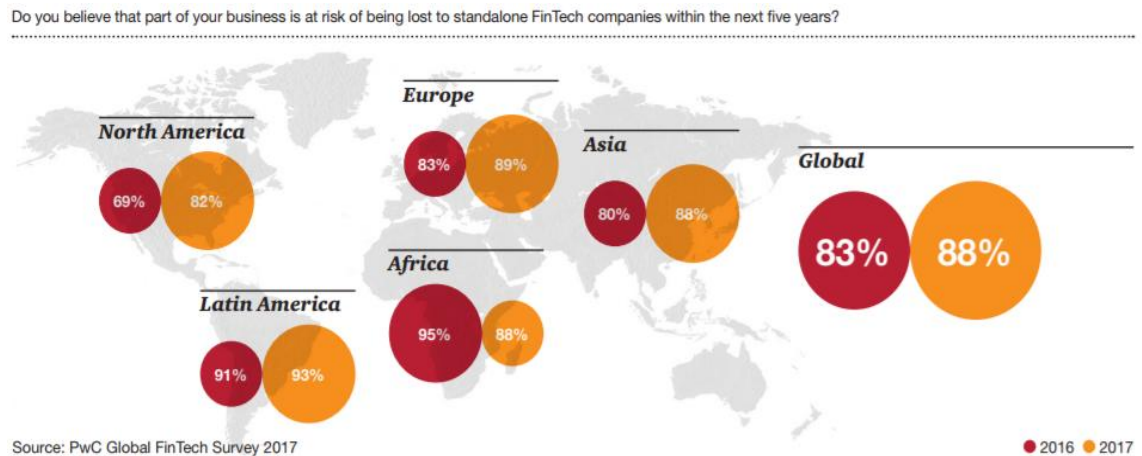


Figure 2 Percentage of incumbents who believe part of their business is at risk (Redrawing the lines – – 2017)

As in figure 2, only traditional financial service providers in Africa seemed to be more confident of their ability despite growing fintech companies. Traditional institutions in the rest of the world took fintech as a risk to part of their business, especially when they have known the purpose of fintech companies not “to build new chains of high-street banking services” but “to move into areas that financial institutions have always found particularly profitable, cutting the ground from underneath them” (Vasava 2015).

However, traditional financial services providers, e.g. commercial banks, still have opportunities in the fintech ecosystem as the dominant financial institutions, as long as they attempt to modify themselves to match other components of the fintech ecosystem (Oshodin et al. 2017). Cooperation with fintech startups can help traditional institutions improve their current business models (Teigland et al. 2018). From fintech companies’ side, they acknowledge their barriers in reaching customers and cross-border business which is banks’ advantage. Therefore, contrary to traditional institutions seeing fintech companies as risk, these companies discover their opportunity as a link in the whole banking system, not in opposition to anyone (Unleashing the potential – – 2017).

The collaboration between incumbents and startups offers benefit to each other. Incumbents own the biggest advantages in finance industry: firm customers base together with their loyalty, convenient processes and network, but they have cumbersome procedures. Startups show their ability to innovate and act flexible in the power of focus, although they are inexperienced and limited in resources. The collaboration will make way for new market trends and technologies, and both parties need to be clear and concise in each other’s responsibility and be conscious of building mutual trust. (Karagiannaki, Vergados and Fouskas 2017)

Fintech in Asia: In Asia, value of investment in fintech achieved impressive growth (see figure 3). During 2010 and 2013, investment in fintech in Asia was discreet, notably the year 2011 and 2012 with almost no investment displayed in the graph. The number then rose dramatically, from 0.9 billion USD in 2013 to 14.4 billion USD in 2016. From a trivial amount compared to North America and Europe from 2011, the investment amount was twice as much as that of North America and about seven times as much as that of Europe.

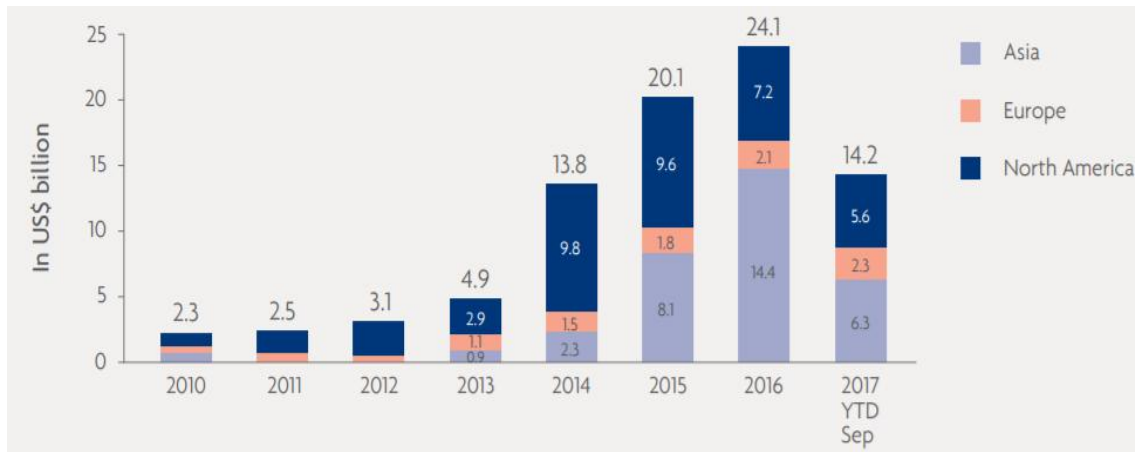


Figure 3 Global FinTech investment activity (State of Fintech in ASEAN 2017)

Fintech in Vietnam: According to Mr. Vu Viet Ngoan, Chairman of the National Financial Supervisory Commission of Vietnam, at Vietnam E-Payment Forum 2016, fintech is a huge unstoppable wave. The born of fintech helps reconstruct the financial services industry in general and expand the limit that banks can satisfy existing customers and reach potential customers. In the future, fintech will be as successful as the Internet in the past, based on the changing customer behavior which adapts more quickly to mobile appliances and services. Fintech will create great opportunity for each people and the whole society just with a smart phone. (Hang 2016)

Data of Zion Limited (a payment intermediary known with 123Pay gateway and ZaloPay e-wallet) shows that there are more than 40 million smart phone users in Vietnam in 2017 and this number will rocket to 60 million by 2018. Of about 50 million ATM cards and 8 million Visa cards, 95% are to withdraw cash. Banking services still have not addressed the need of the majority of customers, with approximately 70-80% of the residents out of banks' reach. Compared with the need of money transferring estimated at 35 billion USD and the average value of one transaction 200 USD, fintech has enormous potential. That potential is even bigger with the encouragement from the government. The Prime Minister did sign Decision 2545/QĐ-TTg on non-cash payment in Vietnam between 2016 and 2020, in which focuses on electronic methods to transform more than 90% of current transactions into non-cash. (Tuan 2017)

The primitive market, demographic advantage and government support has attracted big sources of investment. Many investment funds and foreign technology companies have poured hundreds of millions of dollars to invest or gain control of promising services. In 2016, Standard Chartered Private Equity Limited and Goldman Sachs invested 28 million USD in MoMo e-wallet. In 2017, UTC Investment paid nearly 24 million USD to own 65% of shares of VNPT EPay (Khang 2017). Besides these two typical deals, there are many other deals various in value (see figure 4).

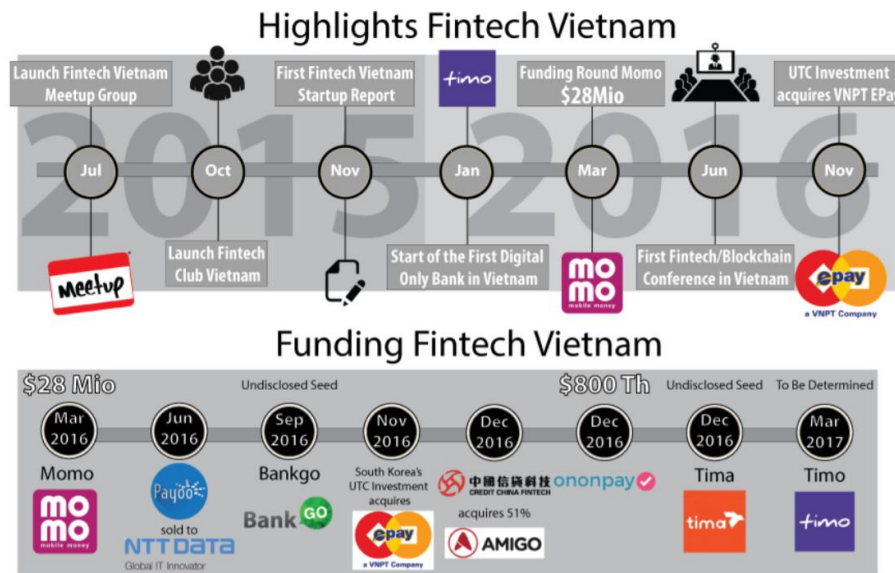


Figure 4 Highlights Fintech Vietnam (Fintech Vietnam Ecosystem Report 2017)

Some outstanding events can be seen in figure 4 are: the establishment of the first digital bank in Vietnam Timo in January 2016, MoMo receiving 28 million USD in March 2016, ononpay got 800 thousand USD in December 2016. Besides two disclosed-value deals (MoMo and ononpay), five fintech companies are invested within one year from March 2016 to March 2017. This proves the dynamism and attraction of fintech ecosystem in Vietnam despite its immaturity.

The government acknowledges the necessity of an ecosystem to nurture and control fintech in Vietnam. On March 2017, Steering Committee on Fintech was established by Governor of the State Bank of Vietnam (SBV). The responsibility of this committee is to propose its annual action plan, develop strategy to promote fintech in Vietnam, and advise the Governor in building a complete ecosystem in line with the orientation of the government. (SBV establishes – – 2017)

At the first Meeting of SBV Fintech Steering Committee in 2017, Chairman cum Deputy Governor of SBV Nguyen Kim Anh emphasized the existence of an ecosystem with connectivity among fintech's actors such as government agencies, financial institutions, fintech companies, investment funds and telecommunications infrastructure. More

than 40 fintech companies are operating and nearly 60% of them focus on payment services. This has not met customer expectation about the scale and diversity. (40 công ty – – 2017)

Fintech ecosystem: Studies of fintech ecosystem are concerned with structure of the ecosystem and role of each component, of which fintech startups are seen as the heart responsible for innovative products with lower costs and larger approaching range (Lee, 2016). Banking still has key role in the current fintech ecosystem, no matter how much attention the media gives emerging tools such as blockchain technology (Banking to be – – 2016).

Related to finance, fintech receive careful attention from regulator. Ensuring both innovation and compliance to local regulations is of top challenges of fintech startups. Strength of each component contributes to strength of the whole ecosystem, and, conversely, a strong ecosystem adds more power to each component then enhances innovation. One of the benefits is that a good ecosystem stimulates collection of customer data, based on which a company can improve its products and better customer experience. (Leong et al. 2017)

Research on fintech ecosystem explores virtual currencies and the ecosystem in different markets. Comizio (2017) studies the development of virtual currencies (mainly bitcoin), opportunities for fintech companies, challenges relating to regulation, and updates regulatory effects of some countries on global financial system.

In India, the government aims to make Mumbai become a fintech hub. In the Indian government's vision, this hub provides skills and jobs needed in the future, growth capital and sustained demand, creating an enabling ecosystem. India has recorded increasing cooperation between banks and fintech startups. Fintech is expected to add 700 billion USD and create 21 million new jobs by 2025. (Pani 2018)

In Abu Dhabi, the software specialist for banking and finance Temenos has collaboration with Abu Dhabi Global Market (ADGM), which is expected to boost the development of fintech ecosystem for itself and even the whole Middle East. In this relationship, Temenos gives ADGM a sandbox service to help startups access banking data, and ADGM hosts Temenos events with technical assistance sponsored by Temenos (United Arab Emirates – – 2017). Abu Dhabi has expanded its contribution to fintech growth into Africa through a memorandum of understanding with TechPreneur Africa, creating an emerging hub connecting Middle East and Africa with huge demands and opportunities for financial services (Okonji 2017).

In Hong Kong, Cyberport – a digital community wholly owned by Hong Kong Government and a cluster of about 200 fintech companies – joins hands with University of Hong Kong (HKU) to form a platform covering fundamental aspects of a tech ecosystem, including human capital, innovation and technologies, entrepreneurship, and legal and business expertise (HKU partners – – 2017).

Canada's fintech ecosystems combine concentration and wide coverage. It has many local fintech companies providing innovative products and services located all over the countries with Vancouver and British Columbia as two centers of leading companies. Most of their services are about mobile banking, payments, lending, investments, and wealth management. Government plays an active role by not only controlling but also considering the application of modern technologies into their operation. Canada also has central areas of nationwide fintech services, for example Vancouver-based Central 1 Credit Union. (FinTech in Canada – – 2016)

Some studies demonstrate that fintech ecosystems have important contribution to current financial markets. Fintech ecosystems provide environment for talented human resources and related businesses including data analytics, mobile banking and asset management. Fintech in developed financial markets such as the US and Europe is considered a force boosting technological innovation, improving quality of financial markets and systems, and raise customer satisfaction in general. For fintech ecosystems to grow, it starts with agreement between governments and financial institutions. Governmental role is extremely important in which fintech ecosystems have not become clear (Diemers et al. 2015). A fintech ecosystem can be a legacy system of traditional banking. Traditional firms would like to exploit fintech ecosystems to fill gaps in their own customer services (Riemer et al. 2017).

There has been news of current state of Vietnamese fintech ecosystem. Fintech in Vietnam is compared to a sprout of the finance tree. Due to its newness, building a well-structured ecosystem is in progress. Components of that ecosystem are found available but they are working instinctively and lack connection with each other. The operating model still limited to partnership between fintech companies and banks with mainly basic payment services together with a comprehensive legal framework are other major concerns of the authority (Pham 2017). In the relationship with fintech companies, financial specialists suggest that banks should study carefully products and services of fintech companies, then take issues of protecting customer data, brand and intellectual property into special consideration in order to minimize legal risk (Tung 2017). Even though such news has been collected from governmental representatives or experts, few reviews of fintech ecosystem in Vietnam has been made with the approach of scientific research.

1.2 Research purpose and research questions

This paper reviews current status of the fintech ecosystem in Vietnam through the lens of critical actors of a fintech ecosystem and in comparison with Singapore. It is to find out which actors are for setting up an ecosystem now and maintaining a healthy ecosys-

tem in the future. The intention in doing so is to assess the role of each actor and reflect the relationship among them. The final aim is to understand the emergence of fintech ecosystem in Vietnam, from which to suggest some ways to develop the ecosystem.

Vietnam is chosen to be studied due to its newness and potentiality. Financial needs of residents have not been met. Commercial banks, which are mainly responsible for financial services in Vietnam, are approachable mainly in urban areas (Wang 2016). Even in places where banks are available, customers are not completely satisfied with their services. Individual customers are not satisfied with their online payment experience (Rowan 2017, Pham 2018). Corporates, especially of micro, small and medium size, have difficulty in reaching traditional sources of fund, for example from banks, for their operations (Pham and Nguyen 2017, To 2018). Banks themselves are under pressure to refresh in order to adapt to dramatic changes in financial industry (Wang 2016, Dennis and Nguyen 2018, Hong 2018). Under the influence of the Fourth Industrial Revolution in all sectors and the primitive fintech in Vietnam, an ecosystem is necessary for sustainable growth and a study on Vietnam's fintech ecosystem is essential for preparation for that growth.

Studying how the fintech ecosystem is emerging in Vietnam, this research provides a structural viewpoint on fintech in Vietnam. While searching about fintech in Vietnam mostly finds pieces of news of funding to some fintech projects or advertisements of some fintech products, this thesis updates status of all related parties of the fintech ecosystem. Not only that, an analysis of each actor of the ecosystem (demand, talent, solutions, capital and policy) in relationship with each other and in comparison with the same actor of the other developed ecosystem (Singapore) is made. By doing this, each actor knows its standing and possibility to reach maturity. This research suggests that demand for fintech services in Vietnam is realistic, but talent, solutions, capital and policy has not been developed enough to facilitate fintech's growth. They are correlated, so absence of one actor makes other incomplete. To illustrate, weak talent limits the efficiency of solutions, which prevents investors.

Comparing each actor to that of Singapore, each actor can find recommendation for its future: talent focusing on fintech training in line with current and future demand to achieve practical solutions, by which winning trust of investors and encourage their investment. Outstanding from the comparison between Vietnam and Singapore is the role of policy in supporting the other factors. Policy nurtures talent, strengthen solutions and encourages capital by giving financial aids, collaborate with other countries, or providing incentives that promote the level of taking risk. These are positive recommendations that Vietnam's government can learn from Singapore.

This research is also useful for reference of building a fintech ecosystem outside Vietnam. With all actors at early stage, Vietnam can be taken as a typical example for other developing countries. Looking at Vietnam in relation to Singapore, other ecosystems

may acknowledge their current position by identifying what have and have not accomplished in the progress towards the complete ecosystem.

The main research problem is: How is the fintech ecosystem in Vietnam emerging? To be able to answer the main research problem, three sub-questions are to be explored:

- What are actors of a fintech ecosystem?

Finding solutions to develop a fintech ecosystem starts from knowing the constitution of that ecosystem. Those actors will be compared with the reality of Vietnam to see which is available and which is missing. What can be done to nurture the available and build the missing will be in scope.

- What is role of each actor?

Analysis of the role of each actor provides a base to study in what way the ecosystem should be developed. Each actor contributes differently to the ecosystem, based on which approach to develop the ecosystem will be suggested. A reflection into Vietnam's market will be made to assess influence of their roles in building and sustainably maintaining Vietnam's fintech ecosystem.

- How do those actors connect to each other?

An ecosystem means unity of all actors belonging to that ecosystem. On the basis of knowing their roles, the analysis of their correlation provides a direct answer to resolve the issue of how fintech ecosystem in Vietnam emerges.

1.3 Motivation of the study

Vietnam is an emerging fast-growing market. Businesses and customers in Vietnam quickly update international trends including fintech. Though the number of fintech startups is growing and the government issues some policies to encourage the development of fintech, Fintech in Vietnam is still in its infancy. All kinds of telecommunications channels in Vietnam mention fintech very regularly but voice of specialists giving full research of current situation and future orientation has not been made. Therefore, this study is conducted, utilizing standards frameworks to build one analysis suitable for Vietnam's market. This topic also comes from personal interest of the author because she has heard and read about fintech many times on mass media but found no structural analysis of it as an ecosystem.

A few fintech projects have received investment for their expansion. Mass media keeps reminding the influence of fintech on both macroeconomic level and daily life. Demand for more convenient financial services is increasing. Vietnam can be seen a promising land for fintech. However, fintech is not a simple unit, so promoting its development requires participant of all related parties. In other words, studying fintech in long term should be done in form of an ecosystem. Vietnam's government has a special-

ised department on fintech-related issues and acknowledges the importance of an ecosystem for the growth of fintech, but little research about it has been found. It is understandable in the context of a developing economy with many difficulties in almost all industries. That is why a research into fintech as an ecosystem is necessary in Vietnam.

Findings of this research is useful for fintech companies to review customers' demand, based on which to justify their products provided to the market and staff trainings for more effective solutions. Due to limits in traditional funds from banks, fintech companies can learn from their colleagues in Singapore to actively seek for other sources of fund besides self-improving competence to build reputation to attract more investment. Additionally, the comparison between Vietnam and Singapore made in this thesis emphasizes the role of the actor policy in supporting the others. This information is a reminder for Vietnam's government to take sensible action to support fintech talent, solutions and capital to meet fintech demand, preparing for the formation of a full fintech ecosystem.

This research also contributes to the study of fintech ecosystem in developing regions by taking Vietnam as an example. The author of this thesis hopes to start a discussion about what emerging fintech ecosystems can learn from full-grown ones and learn from each other to gain more achievements for their own countries and contribute to the global fintech ecosystem.

1.4 Outline of the study

First, this thesis gives definition of fintech because it is an acronym. Following the definition is summary of fintech development progress. After that, some key achievements of fintech in three levels (world, Asia and country Vietnam) are reviewed. The introduction of fintech is followed by the introduction of fintech ecosystem, in three levels same as done to review fintech. Research purpose and motivation of the study are stated.

The next chapter discusses theoretical frameworks of business ecosystem, innovation ecosystem and fintech ecosystem. Fintech is to serve business activities and seen as disruption in financial industry. Looking into business ecosystem and innovation ecosystem helps select frameworks of fintech ecosystem that satisfy both business and innovation's scope. Two frameworks of fintech ecosystem are introduced. The theory by Nicoletti (2017) is selected as it covers the other in an extensively detailed way. The framework of Adner and Kapoor (2016) is utilized to give recommendations on development approach of Vietnam's fintech ecosystem.

Chapter three states the research design of this thesis. The approach to conduct this research, method of collecting and analyzing data is included in this part. Evaluation of this study is discussed in the end of chapter three.

Chapter four shows analysis result based on the frameworks chosen in chapter two: analyzing Vietnam's fintech ecosystem by analyzing each actor of the ecosystem and comparing to that of Singapore. Chapter five concludes main points from the analysis. The last chapter summarizes the whole thesis.

2 LITERATURE REVIEW

2.1 Business ecosystem

According to Moore (1996), a business ecosystem is comprised of all types of individuals, organizations, entities and regulations relating to the operating activities of businesses (see figure 5). In each ecosystem does exist a leader whose responsibility is to allow other actors to progress towards final targets of the whole ecosystem. Moore (1996) emphasizes the correlation among the actors and their mutual goals to bring benefits to their ecosystem.

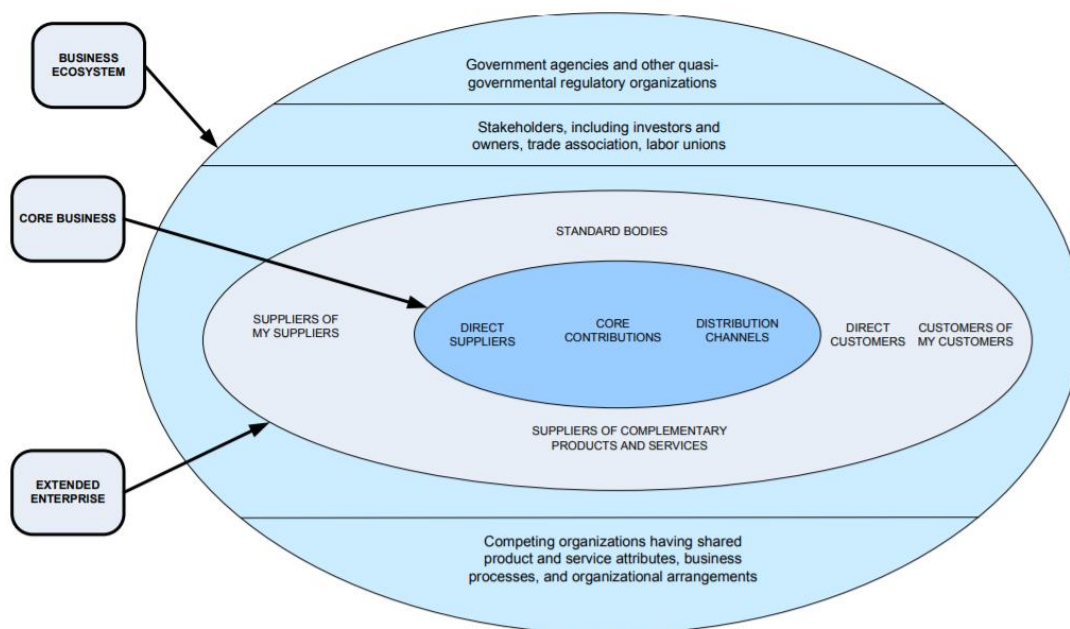


Figure 5 Business ecosystem model (Moore 1996)

The article “Predators and prey: a new ecology of competition” in 1993 by Moore shows the model of business ecosystem with five components which are actors, relations of actors, performance, dynamics, and strategies and behavior of actors. As for actors, Moore (1993) divides them into seven groups. They are customers, markets, products, processes, organizations, stakeholders and government (or society). He also mentions four criteria to assess how successful a business ecosystem is. First is the value it delivers, usually satisfying a niche. Second is critical mass or robustness. Next is productivity shown in continuous performance improvement. Last is co-evolution or the joint learning and optimization effects.

A business ecosystem goes through four stages: Birth – Expansion – Leadership – Self-renewal. The birth stage is time to build the ecosystem core with a convergence of key contributions, distribution channels and suppliers. The expansion stage is marked by the increase in scale and scope with partners, e.g. larger base of customers and suppliers, and by standardization in key market segments. Like its name, the leadership stage highlights “leadership” with Red Queen effect which requires businesses to maintain good relationship between suppliers and customers and strong bargaining power to those suppliers and customers. The last stage self-renewal guarantees a sustainable ecosystem as it generates new ideas which keeps the evolution process running. (Moore 1993)

Basically, a business ecosystem is an arrangement of niches of complementary contributions. Those niches improve each other while trying to offer low cost and high performance components. At the same time, those niches compete with each other to lead upcoming trends. Ultimately, how long a business ecosystem lasts depends on its customers. Hardly can customers’ comments go straight to related departments in a company. Within an ecosystem, the relationship of actors can do that to directly connect producers and customers. (Moore 2006)

Iansiti and Levien (2002) describe an ecosystem as not simply grouping all members. More than that, it helps each member perform its responsibility better than when a member is on its own. Robustness is the first index to determine whether the ecosystem is good or not. A robust ecosystem will nurture various types of business, serve the need of a diversity of market segments, and well-control major disruptive innovations. In a strong ecosystem, only a small number of members which are not qualified will be excluded. All members have equal developing chances. Impacts from the outside have little influence on a healthy business ecosystem. Not only are the factors not negatively affected by the outside but internal amendments – even are happening or in the future – are also in scope to prevent unexpected results at highest level. Another sign of a good business ecosystem is its ability to self-update continuously in order to adapt to surrounding environment. These changes are usually based on previous customers’ feedback, so they are more likely to occur in small degree from time to time.

Iansiti and Levien (2002) mention productivity as the second index to notice a good business ecosystem. Productivity index is broken into three categories: total factor productivity (showing how much the actors contribute to the final result of the ecosystem), productivity improvement (showing how much the actors progress to bring more values at lower cost), and innovation delivery (showing how much the ecosystem create and promote innovations to each actors). Besides robustness and productivity, niche creation is the third signal. A healthy business ecosystem has to serve different demands of different objects.

Corresponding to those three index, Iansiti and Levien (2002) propose three strategies: keystone, dominator and niche. Keystone strategies aim to create strong foundation for further development by provision of services and tools to encourage more niches, control relationship among the actors and increase productivity. In contrast with keystones, dominator strategies aim at removing all competitors within the reach to lead the niche, then explore new niches. This threatens the diversity and competition in an ecosystem which results in little innovation and more unsatisfactory customers in long term. Different from two mentioned-above strategies, niche strategies are the key to make diversity for a business ecosystem because companies following niche strategies target new products, new markets – making innovation is in their genes. This type of strategies closely connects with keystone strategies with which niche players are well-equipped with necessary instruments to stay focused.

Peltoniemi and Vuori (2008) conclude that diversity is the ground of a business ecosystem. It is an active system with members of all scale and correlating with each other to serve mutual goals. Discussing diversity, Peltoniemi, Vuori, and Laihonon (2005) note that a business ecosystem will have to make changes when a group of different important actors show their weaknesses. The more diverse a business ecosystem is the more weaknesses appear which reduces of the whole system.

Adner (2017) defines an ecosystem as “the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize”. “Alignment structure” refers to unity of all components of an ecosystem with each one having different position and performing its own function. Consistent and satisfying activity is standard of an effective ecosystem. “Multilateral” refers to the relationship of all actors in an ecosystem in which each one has connection to all the others and their connectivity cannot be broken into bilateral interactions. “Set of partners” mentions a system of actors in general towards the mutual goal no matter how different one is from the others. “For a focal value proposition to materialize” is to emphasize the purpose of an ecosystem focusing on value proposition which sets the boundary of the system and on materialization which requires a particular level of coordination among the actors.

Adner (2017) also illustrates four parts of an ecosystem, including (1) activities for the value proposition to materialize, (2) actors doing those activities, (3) positions showing the flow of activities, and (4) links showing transfers across actors.

2.2 Innovation ecosystem

In an innovation ecosystem, a business can achieve results which it cannot have by itself thanks to platform leadership, keystone strategies, open innovation, value networks, and hyperlinked organizations. Innovation ecosystems bring both opportunities and threats

to all the actors. The success of each actor is not completely based on itself but on its relation with other actors under consideration of time, resource arrangement and risk management. The third element, risk management, decides the existence of a business in an innovation ecosystem. It is classified into three kinds: initiative risks, interdependence risks and integration risks. Initiative risks are evaluated by product utility, customer satisfaction, competition, supply chain and project team. Interdependence risks are measured through due diligence process involving all related parties to ensure fulfillment of their obligations. Estimation of integration risks can be understood as cost-benefit calculation for each intermediate partner along the supply chain. (Adner 2006)

Adner and Kapoor (2010) states that innovation poses enormous difficulties to all the businesses are following it. Every organization has its own problems. Challenges from other members of the ecosystem such as business partners, authorities, end-users also require careful attention. Whether those challenges are opportunities or threats to a business is decided by where they occur. While technology leaders enjoy the benefits of innovating new components for their processes, they are more likely to fail if they introduce innovations using complements. This is because component challenges give leaders more space to learn to improve themselves and build stronger barriers so that competitors find it hard to copy. Unlike component challenges, complement challenges act in the opposite direction. If the ecosystem poses little challenges, the leaders are at an advantage. When component challenges are more than complement ones, the leaders gain more competitive advantages. In contrast, the leaders may soon lose their position to followers.

In the vertical integration strategy to manage challenges of an innovation ecosystem, Adner and Kapoor (2010) advise companies to acknowledge two types of uncertainty in the relationship with suppliers of components. First is uncertainty relating to technological issues from suppliers' side. Firms need to be aware the possibility and time that suppliers will address their own problems. Second is behavioral uncertainty, which shows the probability that suppliers will reconsider previous contract to gain more privilege. Technology uncertainty can be reduced but behavioral uncertainty is out of firms' full control. Therefore, good management of technology uncertainty helps a healthy ecosystem.

Adner and Kapoor (2016) have a study on technological evolution taking account of ecosystem influence on both the old technologies and the innovations. To survive, the innovations have to be strong enough to win the battle with available technologies. Old technologies have their own advantage. At the time they reach mature stage do they gain particular improvements and have favorable impacts on other actors and the whole ecosystem, which new comers do not have. Only when the innovations can switch their potential to concrete uses can they set a place and grow in their new ecosystem. However, not all businesses follow the innovations when they emerge. Some incumbents may

continue to utilize old technologies till the end of their maturity to maximize their values.

Adner and Kapoor (2016) combine opportunity for extension of old technologies and challenge to emerge new technologies into below framework and suggest strategy for each quadrant (see figure 6). Quadrant 1, characteristic of low opportunity to prolong old technologies but high chance for new technologies to arrive, is ideal time to make disruptions. Quadrant 2, typical of high probability that old technologies will extend and challenge for new technologies is still at low level, is suitable for incumbents with strong current technologies. Quadrant 3, characterized by low likelihood for old and big challenge for new ones, is safe to develop complementary assets for both types of technology. Quadrant 4, known as high opportunity for both extension and emergence, brings advantage to both businesses trying to improve their old technologies and businesses exploring new technologies.

		Ecosystem Extension Opportunity (Old Technology)	
		Low	High
Ecosystem Emergence Challenge (New Technology)	Low	<u>Quadrant 1</u> Baseline pace of substitution	<u>Quadrant 2</u> Intermediate pace of substitution
	High	<u>Quadrant 3</u> Intermediate pace of substitution	<u>Quadrant 4</u> Slowest pace of substitution

Figure 6 Technology replacement framework (Adner and Kapoor 2016)

That framework is visualized with consideration of time via S-curves. From figure 7 can be seen Q1 as when new technologies technically prevail over old technologies and start to become popular; Q2 as the conversion point when both new technologies and old technologies are in good condition: new ones meet little challenge and old ones are at their highest peak; Q3 as a contrast with Q2; Q4 as similar to Q1 in terms of realized performance.

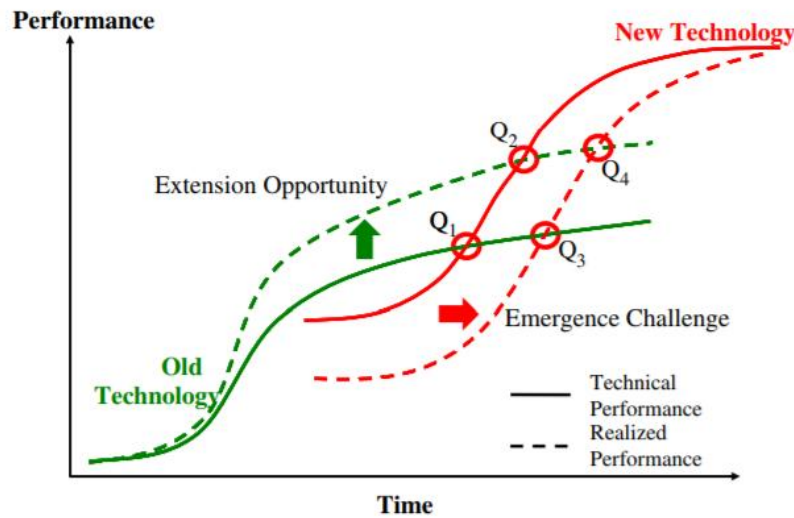


Figure 7 Competition of old technologies and new technologies (Adner and Kapoor 2016)

2.3 Fintech ecosystem

According to Nicoletti (2017), a fintech ecosystem includes five primary actors: demand (of customers, financial institutions, companies and governments), talent (which is dependent on training background of related parties), solutions (which vary with firms and sources of funds), capital (which is mainly accumulated from angel investors, venture capitalists, and initial public offering investors), and policy (which refers to the role of the government). At the core of the fintech ecosystem are fintech companies. However, a fintech ecosystem would never be complete without other members. This is shown in figure 8.

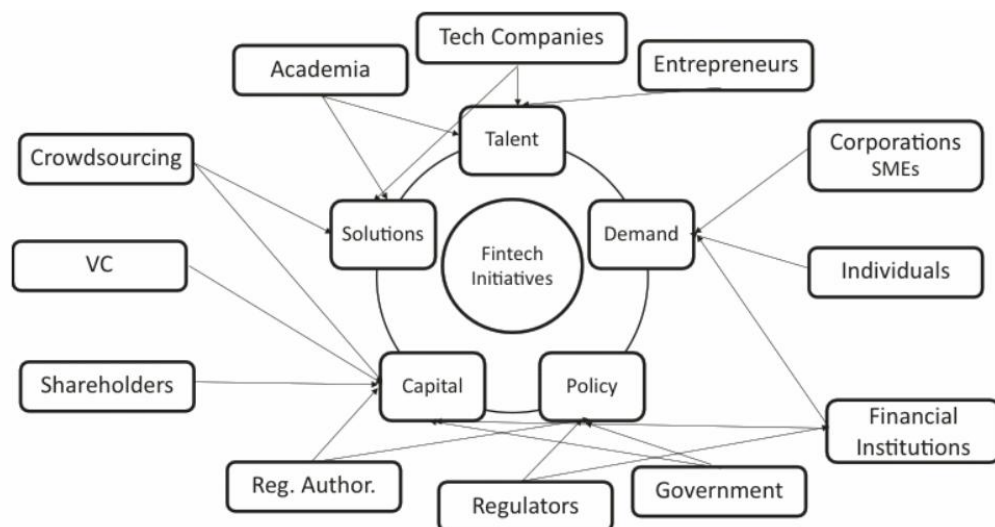


Figure 8 The fintech ecosystem 1 (Nicoletti 2017)

As a continuation of the model LASIC which Lee and Teo proposed in 2015, the model CLASSIC by Nicoletti (2017) put two more elements and amend the “A” to make the final model which stands for: Customer centricity, Low margin, Agility, Scalable, Security management, Innovative and Compliance easy. This is a model to describe success of an actor in a fintech ecosystem.

Customer centricity aims at deep customer satisfaction from material to invisible need. A business operating by doing this is able to distinguish itself from other competitors, which contributes to its sustainable development. Low margin means that profitability should be estimated in long term because it takes time and cost to persuade customers to trust and spend on such innovative services and products as fintech. Agility means quick adaptation to find and take advantage of ideal opportunities. Agility assists low margin and ensures the ability to become scalable. A startup staying at the same place is promised to end soon. It needs to involve scalability as one of its characteristics to absorb benefits from other members of the ecosystem and give back merits to others. Security management is to defend tangible and intangible properties of companies, especially information. Being innovative determines the future of not only fintech businesses but also the whole fintech ecosystem. Easy compliance fosters innovation as it helps all actors of the ecosystem save time and cost for innovative activities.

The fintech ecosystem by Lee and Shin (2018) includes five actors: fintech startups, technology developers, government, customers and traditional financial institutions (figure 9). Fintech startups are the soul of the fintech ecosystem. They are able to discover more market segments and equip customers with more customization. Technology developers are in charge of designing technological tools such as cloud computing, artificial intelligence, big data and social media. They act as the right hand of fintech startups as they decide how much cost can be saved, how much personalization for customers will be served and how much internal development startups can achieve. The tools they create largely contribute to businesses' income and that income will go back to fund them for further technology enhancement. Governments control macroeconomic environment based on their visions.

Many countries are putting traditional financial institutions under strict regulation and giving more generous administration to startups including fintech startups. That is the reason for rapid growth of fintech startups these days. Fintech startups are motivation for traditional financial institutions to renew themselves in the race to lead technological innovations. From seeing startups as competitors, incumbents started to collaborate with them through partnership, outsourcing, venture capital, accelerating programs, mergers and acquisitions, and setting up fintech department within the organizations.

Customers are the source of income of fintech businesses. People born between the early 1980s and early 2000s, who are familiar to mobile devices and high-tech services, will be key customers.

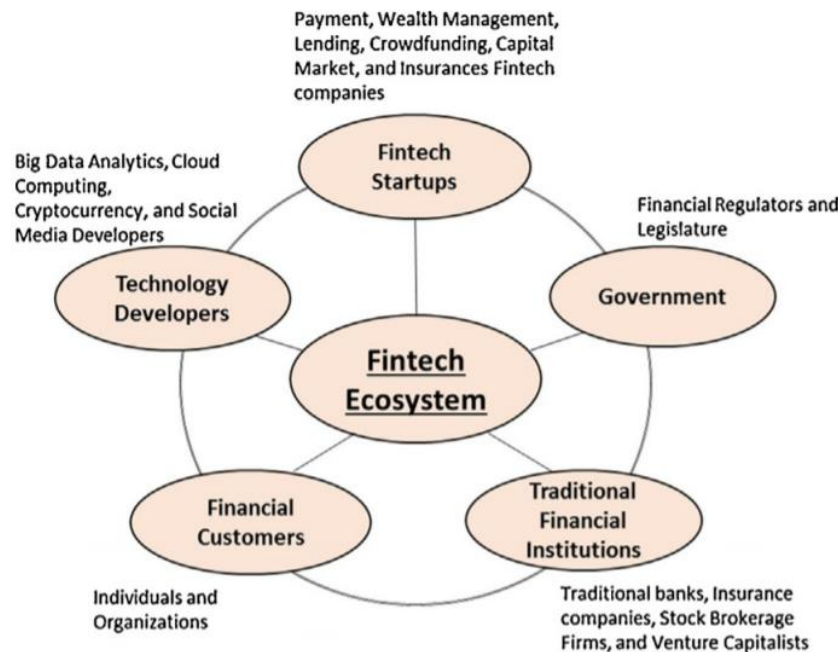


Figure 9 The fintech ecosystem 2 (Lee and Shin 2018)

To conclude this chapter, first the frameworks of business ecosystem are reviewed. In Moore's frameworks are found stages of a business ecosystem and the role of niches. Iansiti and Levien (2012) states qualities of a good ecosystem and different strategies to enhance those qualities. Peltoniemi's frameworks emphasize diversity of a business ecosystem. Adner has a framework in 2017 giving four characteristics of an ecosystem. Fintech is seen as disruption in financial industry, so frameworks of innovation ecosystem are reviewed. In this part is discussed works of Adner and found the importance of connection among actors, difficulties and relationship between old and new technologies of an ecosystem. Finally, two frameworks of the structure of fintech ecosystem are introduced. Nicoletti (2017)'s framework states five groups of actors, each group showing specific actors and correlation among groups, is chosen as the main ingredient for analysis. Adner and Kapoor (2016)'s framework is added to show movement of an innovation ecosystem, from which suggests an approach to develop from traditional finance to fintech. On table 1 the reviewed theoretical frameworks are summarized.

Segment	Author	Content
Business ecosystem	Moore (1993)	4 stages of a business ecosystem
	Moore (1996)	Definition of business ecosystem and correlation among the actors
	Moore (2006)	Role of niches

	Iansiti and Levien (2002)	Quality of a good ecosystem: robustness, productivity and niche creation, and 3 corresponding strategies: keystone, dominator and niche
	Peltoniemi, Vuori, and Laihonon (2005)	The more diversity, the less effectiveness
	Peltoniemi and Vuori (2008)	Diversity is the ground of a business ecosystem
	Adner (2017)	Definition and four parts of an ecosystem, including activities, actors, positions, and links
Innovation ecosystem	Adner (2006)	Relation of actors under consideration of time, resource arrangement and risk management
	Adner and Kapoor (2010)	Innovation poses enormous difficulties to all the businesses are following it
	Adner and Kapoor (2016)	4 quadrants of extending old technologies and emerging new technologies
Fintech ecosystem	Nicoletti (2017)	CLASSIC model describing success of an actor in a fintech ecosystem
	Lee and Shin (2018)	The ecosystem with five actors: startups, tech developers, government, customers and traditional financial institutions

Table 1 Theoretical frameworks

3 RESEARCH DESIGN

3.1 Research approach

Sachdeva (2009) explains that research design is a plan, a guide, or a procedure showing design of a research project. It shows how main sections are arranged to respond to research questions. It explores strategy of gathering and examining data. A qualified design avoids bias to the highest degree and builds trustworthiness to the maximum. Research design has direct connection with the origin of research issue and the ultimate research goal. Specifically, quality of a research design is decided by (1) method for acquiring data, (2) competence of researcher(s), (3) research goal, (4) origin of research problem and (5) available resource to complete the research.

Bechhofer and Paterson (2000) state 2 criteria to make a judgement about how good a research design is, which is based on the way the author make comparisons and control his or her reasoning. Good comparisons show well-built theoretical framework. Good control leads to conclusions being drawn confidently from used data.

Kothari (2004) mentions three types of research design categorized by features of the research – whether the research is exploratory, descriptive and diagnostic, hypothesis-testing. An exploratory research will make some discoveries about new viewpoints or principles, so an adaptive design to different angles of the research problem is well-suited. In descriptive and diagnostic research, researchers have to exactly express what to be measured in the research with well-organized plan that leaves little space for flexibility. Compared with exploratory research, researchers of descriptive and diagnostic method take samples randomly to guarantee as much objectivity as possible. As for hypothesis-testing design, the description stays in its name – researchers formulate hypotheses and examine the interaction among variables. In most cases, such design is in the form of experiments.

A research undertaken by qualitative or quantitative method depends on research purpose. In qualitative research, text is the main ingredient. Text comes from individual viewpoints of those taking part in interviews or conversations, or related practices and knowledge in daily life in forms of photographs, recordings, or memos. Four fundamental designs in qualitative research are cross-sectional studies, longitudinal studies, comparative studies and case studies. Some cases are chosen and compared with each other in the same condition in cross-sectional study. Longitudinal studies put cases under comparison in multiple conditions by contrast, with the intention of discovering changes. In cases studies, whether a chosen case is an individual, an organization or a phenomenon is determined by the research question. Comparative studies are more concerned with background of comparisons. (Flick 2008)

Quantitative studies are characterized by numbers. Starting from words, data is made into numbers, then how much text or numbers appear in the report on the result is subject to the purpose of data usage (Blaikie 2003). Balnaves and Caputi (2001) affirmed the key role of observations in quantitative research to serve the prime goal studying the relationship among variables.

Qualitative research serves better the purpose of understanding the root of problems or building theories. Quantitative research is more suitable to report the fact, give forecast based on available data or testing theories. (Sachdeva 2009)

Since objective of this study is to study a fintech ecosystem applicable to Vietnam, an approach to describe the situation and build a framework is more suitable than approach targeted for the use of measurement or theory test. That is the reason for qualitative approach to be chosen. As discussed in chapter one, studying the emergence of Vietnam's fintech ecosystem involves determination of main actors of the ecosystem, their contribution and relationship. To perform those tasks, qualitative approach is more suitable. Furthermore, theoretical frameworks which are reviewed and applied work better for qualitative research as they mostly describe and analyze the structure and relationship, rather than measuring any specific criteria.

Case studies are chosen from articles which contain "confronting theory with the empirical world". Four methods of theorising from case studies are: inductive theory-building, natural experiment, interpretive sense making and contextualised explanation. Inductive theory building tests variables against constructs to conclude their relation. This is the most popular method but it is considered a weak type of causality. Natural experiment is typical of high degree of internal validity due to its strict implementation. Interpretive sense making focuses on specific understanding rather than generalisable explanations. Contextualised explanation overcomes the trade-off between explanation and contextualization in the other three methods by emphasis on both criteria. This method is suggested to bring more benefit than the others; however, a diversity of methods is encouraged. (Welch *et al.* 2011)

A case study is selected because this study examines the emergence of fintech ecosystem in Vietnam and a look into the role of each actor in the ecosystem is necessary to understand the phenomenon. The ecosystem in Vietnam is incomplete with each actor not fully available, so the contribution of each actor and relationship with each other is hard to be reflected. A case study of Singapore acts a role model of a complete ecosystem for incomplete ones to learn from. This falls into the most popular method inductive theory building. Despite being considered a weak type of causality, the main purpose of applying the case study of Singapore in this study is not much to explain any causal relationships, but to take it as a suggestion for growth tendency of Vietnam's fintech ecosystem. Case study as the strategy of this study completes the task of "confronting theory with the empirical world".

3.2 Data collection

Data are obtained from primary or secondary source. Primary data is original but researchers have to tackle issues in choosing samples, avoiding bias, allocating resources, and taking appropriate measurements. Secondary sources are from other individuals or organizations that save researchers from being on their own to have information they need. Secondary data requires less time and cost than primary data and is more reliable in some cases when it is sponsored by government or big corporations. However, researchers cannot control origins of secondary data and must accept that little secondary data perfectly fits their research purposes. (Sachdeva 2009).

Among methods of collecting primary data, observation is the most popular to analyze behavior. This method allows highest subjectivity (if it is done in the right way), topicality, and effort-saving (as it does not require direct participation from interviewees). Nevertheless, this method is costly while does not yield much data and has latent factors that observers are not able to notice. Other common source of primary data is interview, which demands interviewers to be well-trained, sincere, and preventive measures to be ready for all troubles while interviewing. With large number of questions, it is convenient to use questionnaires. Similar to questionnaires, gathering information using schedules is useful with vast quantity of inquiries. The distinction is the role of research coordinator who can make questions easier to understand for interviewees and can identify who are giving responses, so this method is more expensive and risk of bias is much dependent on those coordinators. (Kothari 2004)

Kothari (2004) defines three qualities of secondary data that is secure enough to be used: reliable (based on the people collecting data, source, method, time and precision), suitable (based on context of the research and data origin), and adequate (based on the research goal). One of the most widely-used methods to get secondary data is through case study. It is a thorough analysis of a few samples which have been carefully chosen on assumptions about homogeneity, origin, and completeness. Even though this method does not exclude researchers' individual viewpoint, unrealistic assumptions, and is limited within the designated case, it permits a deep study of the research problem and strongly supports formulation of questionnaires or schedules.

To ensure objectivity and generalization, data in this study is collected through secondary sources. With five groups of actors, each group contains a number of members and they are all complicated, the usage of primary data is beyond the capacity of the author. Take the actor talent for example. This actor is about the talent at academic place, technological institutions, financial institutions and talent of fintech entrepreneurs. If this study is based on primary data, the act of collecting data from all those places faces challenges from time constraint, from limited access by privacy policy at such places and so on. These challenges are expected to multiply by five times for five

actors in the fintech ecosystem. Secondary sources are suitable to collect data for all actors without that hard effort and ensure accuracy.

The case study of Singapore is applied in line with analysis of each actor. That is to say, all actors in the five groups are analyzed within the context of Vietnam first. Details of similar standards in the context of Singapore are then consolidated to make direct comparison with Vietnam. In the analysis of each actor can be find two separate parts: situation in Vietnam followed by situation in Singapore.

Singapore is chosen as the case study because of its prosperity. Singapore is not far from Vietnam. Both countries are in Southeast Asian region. However, the development of Singapore in all sectors is much higher than that of Vietnam. Fintech is not an exception. Not only does Singapore have an advanced fintech ecosystem but it is seen one of the world's top fintech hub. With some social similarities and impressive achievements, Singapore is a good example for Vietnam to learn from.

3.3 Data analysis

Analysis of qualitative research can be performed by using one or a combination of those methods: classification (and give features names to measure them or symbolize them in a new framework), induction (to construct hypotheses from testing elements), content analysis (to explain statistics on the ground of investigated features), qualitative comparative analysis (to establish a set of data from case studies), event analysis (to spot events with their description), discourse analysis (to find out interaction among elements), grounded theory (to draw comparisons), hermeneutic interpretation (to understand what something means), phenomenological approaches (to emphasize significance of a phenomenon), and narrative analysis (to analyze the design of elements in their narrative form). (Byrne 2016)

Silverman (2009) remarked six points that need paying attention to while doing analysis of a qualitative research. First, in the analysis is clear what resources are in use and how they are allocated. Second, data should be collected during a period long enough to understand how the research problem came to current situation. Third is the context that data is applied to analyze the problem. Fourth, comparison with connecting data is essential as comparative method is the basic analysis method. The fifth suggestion is to consider general implications that can arise from the research problem. The final point reminds writers to study connections among theories used in the analysis.

In this research, a framework of fintech ecosystem in Vietnam is formed based on literature on business ecosystem, innovation ecosystem and fintech ecosystem. It is to observe fintech ecosystem in Vietnam from a commercial view because fintech is invented to support trading. Fintech itself is a breakthrough in financial services, so it

needs to be looked from the point of innovation. Current literatures include some designs of a fintech ecosystem. This brings a direct base to form a new specific framework with reference to contemporary basis.

The data analysis starts from the framework of Nicoletti (2017). This framework states five groups of actors in a fintech ecosystem: demand, talent, solutions, capital and policy. Based on those five groups, the analysis is structured into five parts. Each part goes into reflecting current position of each actor in Vietnam by data consolidated from reports and websites of established agencies. The comparison with the same actor in Singapore is done right after the analysis of Vietnam's context. This combination on the one hand checks the existence of an actor in reality against Nicoletti (2017)'s framework, on the other hand suggests potential approach for that actor to grow when achievements of Singapore are treated like the future of Vietnam's fintech ecosystem. As fintech is quite new in Vietnam and the ecosystem here is not complete, data is not available for all actors. Actors without accessible data are checked with similar ones in Singapore to see whether they should exist according to Nicoletti (2017) and how they can grow from zero, learning from their existence in Singapore's ecosystem. Completion of this analysis gives answers to three sub-questions about elements of the ecosystem, their role and their relationship in the ecosystem. Based on that, the emergence of fintech ecosystem in Vietnam is described.

3.4 Evaluation

Quality of qualitative research is summarized in three words: traceable, reliable and complete. Classical approaches suggest quality of case study research be decided by validity (construct, internal and external) and reliability. Interpretivist views decide the trustworthiness of case study research by credibility, transferability, dependability and confirmability. Ethnographic perspectives decide a convincing research based on its authenticity, plausibility and criticality. (Farquhar 2012)

Traceable means sources of data can be traced back easily and analysis tools in use must be well-known. Reliable means all records have to be sincerely reflected. Complete means all records should be reserved following proper instructions (Farquhar 2012). Sources of data used in this thesis are all recorded right after the data is used and are consolidated in references part in accordance with guidance of the organization to which this thesis is submitted.

Construct validity is about the degree that the research makes clear what it claims to make clear. The first strategy to ensure construct validity is usage of various data sources to reduce bias. The second strategy is gathering strong evidence to lead persuasive arguments from the research question to conclusion (Farquhar 2012). Data in this

study is collected from a variety of established organizations and not limited to any authors.

Internal validity is shown at data collection and data analysis stages. The way data is analyzed decides whether the findings are based on critical investigation or not (Farquhar 2012). Data is collected from secondary sources. With broad scope of this topic, secondary data helps remove defects of primary data such as samples that are not representative, bias, time and money consuming. The analysis is based on qualitative case study approach. This is appropriate for a study not targeting at measurement or giving quantitative forecasts. Case study helps reflect theories in reality.

External validity confirms theories not only within the study but elsewhere. There are some criticisms about external validity of case study research. One of them affirms external validity can be made from single-case study research (Farquhar 2012). Case study in this study is of single type, so the external validity is accepted. The validity of this study is not limited within itself and expanded to studies of fintech ecosystem in developing areas.

Reliability is about the consistency and stability of evidence used in the study. It shows the possibility of similar findings if the study is repeated (Farquhar 2012). Evidence for fintech in Vietnam and Singapore shows agreement in basic preparation for the completion of a fintech ecosystem. If this study is repeated, same results of what Vietnam's fintech ecosystem is lacking will be found and same lessons from Singapore will be drawn.

Credibility is gained through appropriate research methods and reasonable explanation of research design (Farquhar 2012). This study is done with qualitative approach as the research problem is more to description than measurement. Case study is applied for the phenomenon to be more clearly investigated as case study helps with "confronting theory with the empirical world". Data is obtained from secondary sources to ensure objectivity of the topic.

Transferability refers to whether the conclusion of case study research can be transferred to other contexts (Farquhar 2012). This study is about the emergence of fintech ecosystem in Vietnam. With all the actors at early stage, Vietnam's fintech ecosystem at this moment can represent the ecosystems in developing regions in general.

Dependability is demonstrated through research design on a strategic level, data addressing what was done and evaluation of the effectiveness of handling inquiries (Farquhar 2012). This research starts from a framework, checks the components of that subject in reality (Vietnam) and in comparison with a role model (Singapore). By doing this, three sub-questions about the structure of the subject, role and connections of components of the subject are solved.

Confirmability is ensured once individual opinions of the author or theoretical tendencies do not overly affect the research (Farquhar 2012). In this study is there no

place for personal ideas. Data is collected from government offices or established news agency and is analyzed independently of theories.

Authenticity can be achieved by specifying daily life in detailed cases, showing understanding in data collection and analysis, and describing how the author handled the case including how much time spent, the role and how much close to the case (Farquhar 2012). The case study Singapore are collected to match what is stated to analyze Vietnam's context. Details are determined by the author according to accessibility of data sources and not based on any available studies. From references can be tracked about eight months spent on gathering and working with the data of Vietnam and Singapore.

Plausibility aims at the question whether the research makes sense to readers when they read it. Plausibility can be attained by: using forms and devices that match readers' experience; drafting the readers where they are invited; using language that promotes readers' experience; providing background to controversies in the literature to minimize the probability that readers ignore statements that are beyond their experience level (Farquhar 2012). In this research are all terminology or abbreviation made clear to ensure readers of different backgrounds are able to comprehend the argument.

Criticality is whether the research encourages readers to review their current understanding. This is demonstrated in findings, discussion, form and style of the research (Farquhar 2012). Findings of this study are not limited to the context of Vietnam. The comparison between Vietnam and Singapore encourages readers to relate to countries with similar conditions as Vietnam and Singapore.

Basically, this study meets the standards of qualitative research: traceable, reliable and complete. Considering classical approaches, interpretivist views or ethnographic perspectives on quality of case study research, this study satisfies basic principles.

4 DATA ANALYSIS

In this chapter, the model of fintech ecosystem in Vietnam developed from Nicoletti (2017)'s framework is proposed first (figure 10). This model is then clarified with information stating facts in Vietnam in order to assess the application of the model in reality. Following is reflection from a developed ecosystem to realize the standing of Vietnamese fintech ecosystem in the world market, and to offer recommendations for how an ecosystem should be formed based on a successful model.

The analysis is conducted by answering three sub-questions that are:

- What are actors of a fintech ecosystem?
- What is role of each actor?
- How do those actors connect to each other?

By this way can moderately take six key notes of Silverman (2009) into consideration. First, a model is used as the center and secondary data is collected to make clear each actor of the model. Second, data to prove the progress is illustrated in a period of time. Third, data always goes with its context. Fourth, comparisons are widely made, between current and the past, between countries in general and between Vietnam and a role model in detail. Fifth, implications from this study are mentioned after the analysis is completed. Finally, theory of Adner and Kapoor (2016) is combined with one piece in the model of Nicoletti (2017), which creates connections among reviewed theories.

The role model mentioned in the fourth point is Singapore. Considering physical geography, Singapore is in the same Southeast Asia area as Vietnam. Take Ho Chi Minh City as the midpoint, the flight time to Hanoi capital is equivalent to the time to Singapore. Singapore has a land area of about 710 square kilometers, while Vietnam is about 310 thousand square kilometers. As of 2016, population density in Singapore was 7909 people per square kilometer, nearly 26 times higher than Vietnam (World Bank Open Data 2016).

Considering economic perspective, there is a huge gap between Vietnam and Singapore. Singapore is one the most developed economies. Gross domestic product (GDP) per capita in 2017 was estimated at 90500 USD, which was ranked at number 7 (*The World Factbook - Singapore*, 2018). Vietnam is a developing country with GDP per capita 6900 USD in 2017, which gives Vietnam rank 158 (*The World Factbook - Vietnam* 2018).

In the field of fintech, unlike Vietnam taking initial steps in building an ecosystem, Singapore is appreciated as number 4 in world fintech centers list. The government strongly supports fintech, resulting in the fastest growth rate of fintech companies in Asia. Fintech activities in Singapore are not limited within the country. Fintech companies in Singapore have joined hands with fintech companies in other strong ecosystems

through an agreement between their government and government bodies of Australia and the UK. (Smith 2016)

Singapore is a Southeast Asian nation – same as Vietnam. However, fintech in Singapore is at world level. Therefore, Singapore is chosen as the role model of a developed fintech ecosystem.

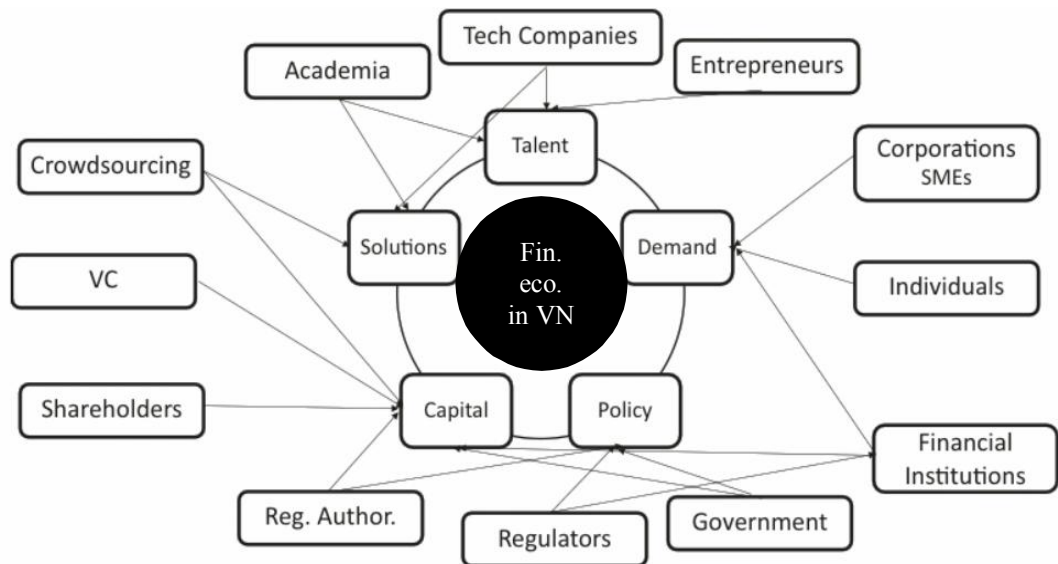


Figure 10 Initial model of Fintech ecosystem in Vietnam

4.1 Demand

Customers various from individuals to businesses and financial institutions are the ones that a fintech ecosystem serves (Nicoletti 2017).

4.1.1 *Individuals*

In Vietnam: The needs of individual customers in Vietnam create plenty of opportunity for fintech ecosystem. According to statistics of PwC and VCCI (Vietnam Chamber of Commerce and Industry) shown in the guide to doing business in Vietnam published in 2017, the number of 92 million of people gives Vietnam the position of the 14th most populous country in the world. Among them, 60% are still working and the median age is 30, which is appreciated both large human resource and active consumer market for many industries.

Irrespective of being one of the most densely-populated nations, Vietnamese residential population is not distributed equally nationwide. The density is highest along the coast, in the Gulf of Tonkin and the Red River Valley in the North, and in the Mekong

Delta in the South. Data in 2015 shows top 3 cities of greatest number of inhabitants including Ho Chi Minh City (7.298 million), the capital Hanoi (3.629 million) and Can Tho (1.175 million). (The World Factbook - Vietnam, 2018)

In the report published in February 2018, Business Sweden identifies three outstanding characteristics of Vietnam's consumer market. First, the market in Vietnam is not mature when no more than 1% of deals are done through modern trading. This is partly attributed to the considerable power of traditional trade which sets standards of acceptable ways of doing business. However, Vietnam's consumer market is booming. In the Southeast Asian region, Vietnam is ranked the second largest consumer market.

Second, consumption behavior is changing due to rising living standard. The quantity of middle-class and wealthy people is rocketing by 88% from 2010 to 2020. Together with this, Vietnam is witnessing rapid level of urbanization. The number of urban residents is expected to grow by 35% in 2020 compared to in 2010. The gap between urban and rural exists, but it is gradually narrowed. The spending is more on non-food products, i.e. clothing, medical services. Products of local brands are of greater interest from the consumers.

Third, like the discrepancy in the allocation of inhabitants across the country, there are differences in buying behaviors between cities and countryside, and from areas to areas. People living in countryside make buying decisions from reference to others' opinions while urban consumers are influenced more by information on social media. Consumers in the South are more open to new products and services than those from the North.

With young population, Vietnamese consumers quickly adapt to new technology. Nearly 54 million internet users are recorded by 2017 and this number is expected to rise to 60 million by 2021 (Hynes 2018). The number of mobile users is growing quickly according to Nielsen Vietnam Smartphone Insights Report 2017. 95% of people living in key cities owned mobile phones, and 84% of mobile phones were smartphones. These percentages were not much different from those of smaller cities. Even in rural areas, 89% of people had mobile phones, of which 68% were smartphones. Compared to some countries in the Southeast Asia, 31 million consumers conducting transactions via digital channels make Vietnam the second most significant base of digital consumers (see figure 11) (Hoppe, Lamy and Cannarsi 2016).

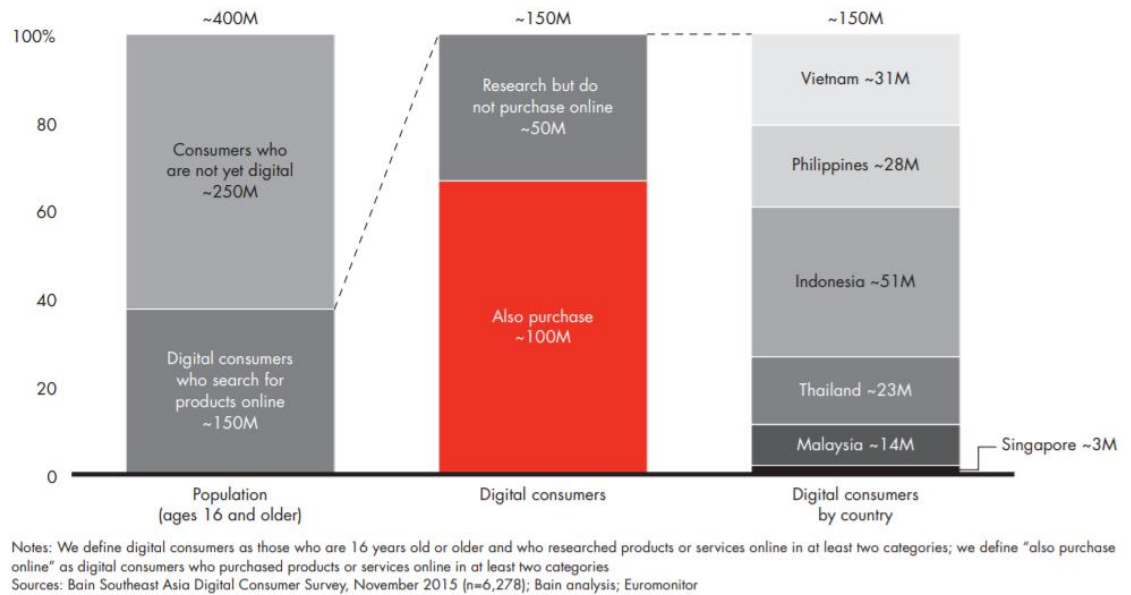
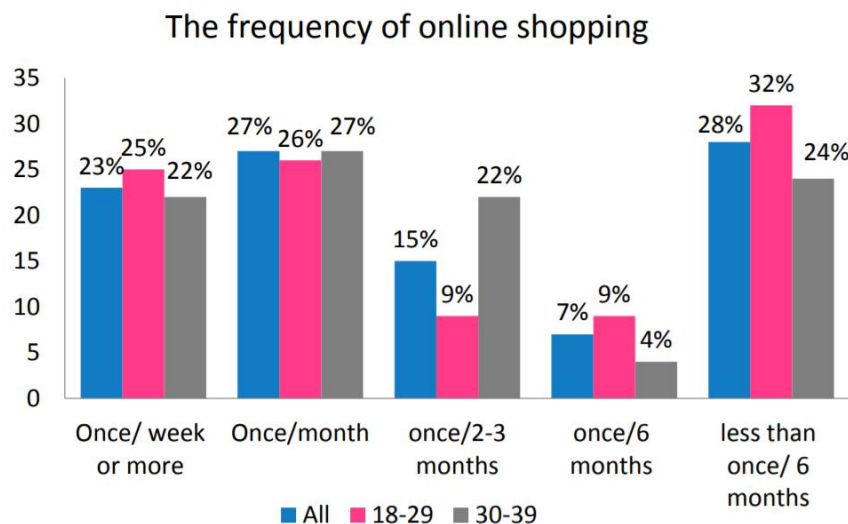


Figure 11 Digital consumers in Southeast Asia (Hoppe, Lamy and Cannarsi 2016)

Ecomobi, a publisher centric platform aiming to be the leader of media and data service provider in Southeast Asia and emerging regions, conducted a research on Vietnam's digital market in 2017, showing considerable potential of e-commerce. In 2016, the e-commerce market valued 1.8 billion USD. In 2017, the value approximated to increase by about 22%. In average, each consumer has spent around 61 USD through e-commerce channels. In line with the order of largest cities ranked by population density, a majority of digital transactions have been made by Ho Chi Minh City's residents, accounting for 38%, followed by Ha Noi capital with 17%. The research also shows that office workers are those shopping online the most. Roughly half of the people aged 18 to 39 who are familiar with online purchases buy something online at least once a month (see figure 12).

However, the frequency of online payment does not correspond to that of online shopping. 85% of people shopping online choose cash-on-delivery payment method because they want to directly check whether the quality of the products they have picked is of their expectation. From consumers' view, it is the matter of trust. From authority' view, it reflects the reality of weak consumer protection, and ineffective intellectual property protection that makes fake products widespread. (Rowan 2017)



Base: Consumers, Age: 18-39, n=500, location: HCM- HN

Figure 12 Online shopping frequency in Hanoi and Ho Chi Minh city (Vietnam digital landscape 2017)

As for merchants, 82% of them accept payment by cash and confirm inconvenience due to high operation costs. The most popular non-cash payment is bank transfer, which is applied by 88% of sellers. The figure 67% of sellers accepting payment in credit cards is not big enough to save Vietnam from the position of the country with the least number of merchants going with credit card payment, compared with Indonesia, Thailand, Singapore, Malaysia and Philippines. This figure is nonetheless high in comparison to activity of credit card holders in online purchase: only 15% of card holders are involved in online shopping. (Pham 2018)

Above data shows a gap between satisfied need and dissatisfied need that arises from the advancement of technology and e-commerce, which demonstrates the potential to fill dissatisfied need. The large and young population well equipped with internet and mobile devices is a friendly environment for the development of fintech. The unpopularity of non-cash services may cause trouble to fintech, but makes Vietnam fertile soil for fintech in the long run, because both the world and local government is aiming at non-cash and current services are like a drop in the bucket.

In Singapore: Data as of July 2017 published on The World Factbook website shows that Singapore has the population of nearly 6 million people, the 113th populous country in the world. This number is much smaller than Vietnam's population but the density is much higher due to Singapore's small acreage. With its high development, urbanization eliminates all trace of rural areas in Singapore. As an overview, the whole Singapore is like a big city, which allows Singapore to be exempt from uneven population distribution between urban and rural areas as in Vietnam.

With around 3.7 million out of 6 million residents at work, Singapore's labor force accounts for 62%, not much difference from Vietnam. The median age of Singapore citizens is 5 years older than Vietnam citizens. The Ministry of Manpower Singapore has identified this age as signal of aging population.

Unlike Vietnam's developing market, the market in Singapore is rated successful and stable, even in comparison with other highly-developed countries (The World Factbook - Singapore 2018). Singapore's strong economy brings its people high living standard. They enjoy consuming foreign products of high quality and are highly mindful of brands. They are open to new products but it is not easy to make them change their mind once they have got attached to specific brands. Before making a buying decision, they consider three elements: price, quality and service (Singapore: Reaching the consumer 2018). These characteristics are similar to those of Vietnamese residents in urban areas and in the South.

Statistics in the beginning of 2018 on Singapore Business Review show 4.8 million Singaporeans are able to get access to the Internet, taking up more than 80% of the population. Nearly all of them use the Internet on a daily basis for the duration of seven hours on average. The number of mobile devices is higher than that of residents, 8.6 million mobile connections, implying 1.5 mobile devices per head.

According to The Statistics Portal, Singapore's e-commerce market value was estimated at 2.19 billion USD in 2016. E-commerce in this country has strongly served both local and international transactions. Singapore's residents go shopping online more than any other countries in the Southeast Asia, especially people aged between 25 and 44. Their infrastructure for online payment is also at number one position in Southeast Asian area. Credit cards are the most popular method of payment no matter where the shopping is done. For overseas shopping, PayPal is another favorite method in addition to credit cards. Cash on delivery is not preferred in e-commerce transactions (Singapore - eCommerce 2017). This is sensible in such a cashless economy as Singapore. No merchants can maintain their businesses without acceptance of payment via credit cards. Even the second popular method bank transfer has long distance to catch up with credit cards, with offer from nearly 40% of sellers (Mato 2018). Table 2 summarizes basic differences in individual demand between Vietnam and Singapore.

	Singapore	Vietnam
Population	6 million (113 th)	92 million (14 th)
Population density	Densest in central areas	Dense along the coast, densest in big cities, sparse in remote or rural areas
Urbanization	Completed	In rapid progress
Labor force	62%	60%

Median age	34.6 years	30 years
Consumer market	Highly developed	Immature
Internet users	4.8 million (more than 80%)	54 million (nearly 60%)
Mobile users	150%	89% - 95%
E-commerce market value	2.19 billion USD	1.8 billion USD

Table 2 Comparison in individual demand between Singapore and Vietnam

Despite wide gap in level of development, there are some similarities between Singapore and Vietnam, such as population density, labor force of total population and median age. The value of e-commerce market is noteworthy when Singapore's market is 1.2 times bigger than Vietnam's market, considering that GDP per capita of Singapore is 13 times higher than that of Vietnam. Therefore, current individual need in Vietnam is considerably potential for the future of fintech; however, basic conditions such as urbanization and the quantity of internet users and mobile users need improving.

4.1.2 *Businesses*

In Vietnam: The publication "Doing business in Vietnam" by Ernst & Young lists 4 types of businesses permitted in Vietnam by the Law on Enterprise (see table 3).

Types of business	Description
Limited liability company	comprising one-member company and more-than-one-member company; in case of participation of foreign investors can be divided into 100% Foreign Owned Enterprise and foreign-invested joint-venture enterprise; the involvement of foreign investors is categorized into Build Operate Transfer (BOT), Build Transfer Operate (BTO), Build Transfer (BT) and Build Operate (BO); foreign companies may establish branches or representative offices to operate in Vietnam
Joint stock company or shareholding company	at least three shareholders and no maximum number of shareholders

Partnerships	at least two members
Private enterprises	owned by one individual liable for all activities within his or her assets

Table 3 Types of business in Vietnam (Doing Business in Vietnam 2013)

Micro, small and medium enterprises (MSMEs) are the right hand of Vietnam's economy, accounting for 97% of all kinds of businesses, employing 77% of the national workforce and contributing to 41% of GDP (Can 2017).

MSMEs in Vietnam have had excellent performance, even when being drawn a parallel with those from more modern territories. A survey undertaken by CPA Australia, covering growth rate of small businesses in Vietnam, Indonesia, Malaysia, China, Hong Kong, Singapore, New Zealand and Australia, promoted Vietnam the second rank. Companies with enormous growth were reported in activities relating to innovation, e-commerce and social media. The survey also discloses substantial proportion of people doing online business. 86% of respondents confirmed they were making money via online platforms. The vast majority of business owners in Vietnam had expectation of their growth much higher than the average result of the survey (see figure 13). (Vietnam's small businesses – – 2017)

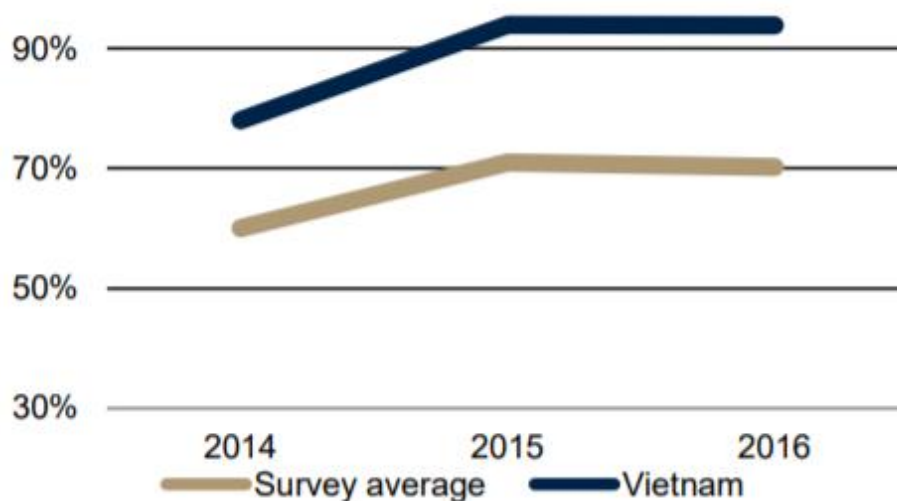


Figure 13 Growth expectation of small businesses in Vietnam (Vietnam's small businesses – – 2017)

To facilitate full development of MSMEs, low-cost and accessible sources of fund are necessities. Nevertheless, not many MSMEs in developing nations find it easy to fund themselves. MSMEs in Asia face much more challenges in accessing funds than large companies due to their creditworthiness to financial institutions (Beck *et al.* 2014).

Figure 14 shows access to finance or credit is one of the top obstacles that SMEs in many countries are facing.

	All countries	Malaysia	Thailand	Philippines	Indonesia	Viet Nam
Incentives						
Tax rates	31.9	31.1	54.8	42.9	14.3	16.5
Tax administration	26.7	24.0	49.6	34.2	13.3	12.4
Customs and trade regulations	20.0	20.1	41.0	18.0	12.5	8.7
Business licensing and permits	16.7	16.4	25.4	22.1	16.5	2.8
Political instability/ economic uncertainty	34.7	28.8	84.0	28.9	29.5	2.3
Supply side						
Transport	23.8	11.3	33.6	26.5	23.2	24.2
Electricity	29.6	17.9	42.4	30.6	30.2	26.7
Telecommunication	10.4	9.3	24.5	7.6	6.6	3.8
Access to finance/credit	34.6	22.1	44.3	28.5	38.6	39.4
Inadequately-educated labor force	28.0	24.1	60.2	16.8	15.4	23.7
Labor regulations	17.4	17.2	35.2	15.5	11.3	8.0
Access to land	16.0	11.1	11.7	9.6	19.2	28.3
Other						
Crime, theft and disorder	24.5	25.3	53.7	16.5	21.4	5.8
Corruption	30.1	20.6	59.7	37.4	23.4	9.5
Practices of competitors in informal sector	38.6	20.7	55.9	44.5	36.6	35.3

Figure 14 Perceived major or severe obstacles to conducting business, SME firms in percentage (Wignaraja 2013)

Vietnam is not an exception. Access to finance or credit is the biggest challenge of SMEs in Vietnam with agreement of nearly 40% of SMEs (figure 14). Limited access to finance is the first downside of MSMEs that Dr. Can Van Luc highlighted when discussing SMEs development in Vietnam at the Conference on APEC's post 2020 agenda in Singapore in 2017. Poor financial accessibility is explained that the credit that MSMEs have received in reality is lower than the amount they should be given, usually because of complicated information, high risk and insufficient collateral. This is especially true for new companies or those operating in sensitive fields. The average gap in 2011 was 42 thousand USD for each company. Finding it hard to approach sources of external financing, the majority of SMEs (80%) have sought for internal sources. Exter-

nal sources from non-bank lenders are prioritized due to simpler procedures and openness to various industries (Pham and Nguyen 2017).

Some surveys done to find out specific disadvantages of small business owners in the effort of financing their business. 55% of respondents have had difficulties in following complicated loan procedures. Half of small and medium business owners could not satisfy collateral requirements of banks given high value of collateral and restrictive types of collateral. 80% of respondents said that current rate of interest and loan conditions were not suitable (To 2018).

In Singapore: Enterprises formed by individuals in Singapore belong to one of three types: limited company, sole proprietorship and partnership (figure 15). In the limited category are there private limited, public limited and public limited by guarantee. Private limited companies, which permit up to 50 shareholders, are the most popular business type in Singapore. A public limited company must be listed on the stock exchanges and allows more than 50 shareholders. Public companies limited by guarantee are usually non-profit organizations. As for sole proprietorship, its rights and obligations are associated with its owner. In partnership, the number of partners is limited between 2 and 20. General partnership requires all partners to accept responsibilities for all debts. Limited partnership restricts its partners based on agreement. In limited liability partnership, partners' actions decide their responsibilities. (Company Incorporation Singapore – – 2018)

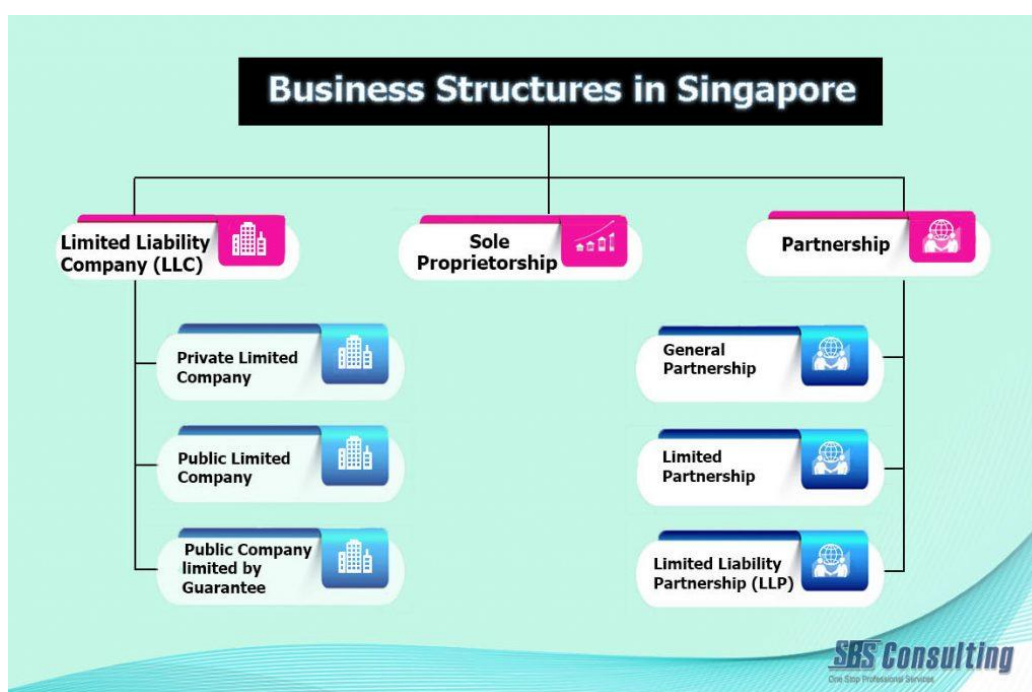


Figure 15 Business structure for individual owners in Singapore (Company Incorporation Singapore – – 2018)

Foreign companies operate in Singapore in the form of subsidiary companies, branch offices or representative offices. A subsidiary is a limited company and is allowed to be completely owned by foreigners. A branch is not treated as a local company. Its liability is based on its parent company. A representative office is a good option for a firm to test new markets. This is a short-term plan of its parent company, so the government of Singapore does not approve its business activities. (Company Incorporation Singapore – – 2018)

Singapore is the world second easiest place for businesses after New Zealand. Among 10 criteria to measure the overall level of ease, enforcing contracts is best graded with the second position. Insolvency resolve, credit obtaining and trading with abroad partners are three criteria that are ranked much lower than the final second position, but still above the average of Southeast Asian region (Ease of Doing – – 2018). Fast-growing industries are seeing high level of application of smart technologies. Financial services are not exception with increasing implementation of fintech (Business Opportunities in Singapore 2018).

SMEs are the power of Singapore's economy. Almost all companies in Singapore are SMEs. 65% of the labor force is working in SMEs. They contribute to nearly half of the national GDP. Due to their small size, the more disadvantages the economy poses, the more fragile SMEs are. In fact, the number of SMEs going bankrupt is going up. Although operating in a developed country with top priority given by the government, SMEs in Singapore have not taken the initiative in improving efficiency (Quarterly Global Outlook 1Q2017 2017).

Financing is of top concerns of SMEs. By 2017, 35% of SMEs had trouble relating to finance. This is a huge leap because it is nearly triple that of two years before. Collection from customer presents acute problem for SMEs in Singapore, with confirmation from more than 80% while only 14% facing this problem the previous year (see figure 16). This much detains the growth of SMEs as their cash flow gets stuck at their customers. Following is high-interest credit from banks. About one third of SMEs face this challenge, which decreases from almost one half in 2016. (Manpower concerns – – 2017)

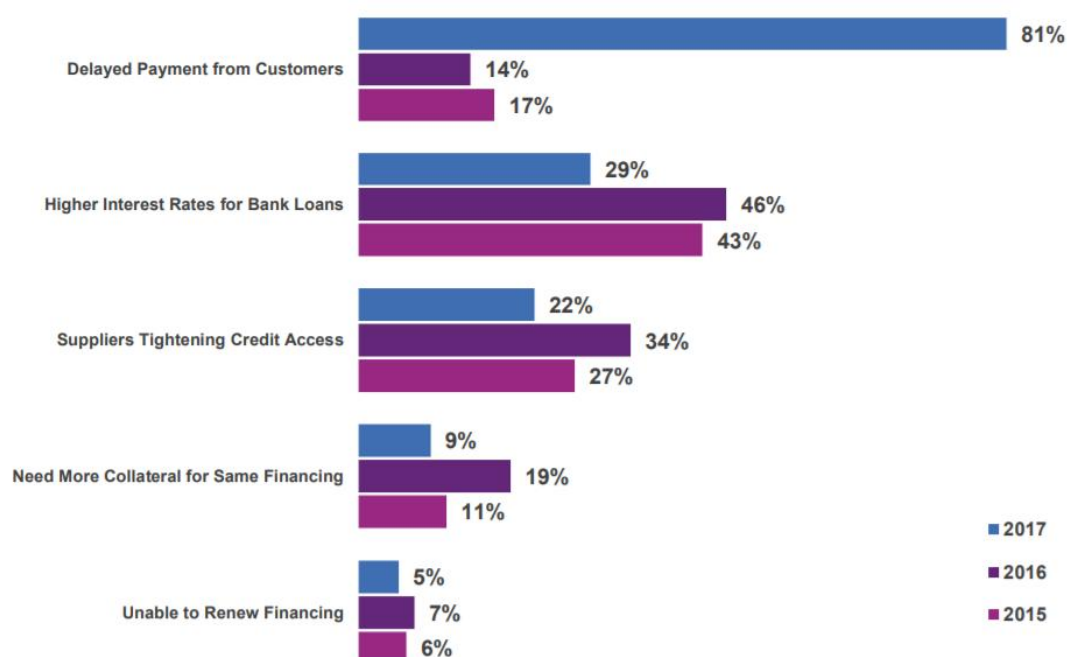


Figure 16 Specific financial difficulties of SMEs (Manpower concerns – – 2017)

	Singapore	Vietnam
Business classification	Locally-owned: limited liability company, sole proprietorship and partnership Foreign-owned: subsidiary, branch and representative office	Limited liability company (locally-owned and foreign-owned) Joint stock company Partnership Private company
Role of SMEs	99% of enterprises 65% workforce 48% of GDP	97% of enterprises 77% of workforce 41% of GDP
Top SMEs' financial concerns	Late customer payment High-interest bank loan	Low-cost and accessible credit

Table 4 Comparison in business demand between Singapore and Vietnam

Table 4 summarizes main points of business in Singapore and Vietnam. Basically, Singapore and Vietnam share the classification of business in fair common. The contribution of SMEs in both countries is enormous. Notwithstanding the leader in technology and business environment, Singapore's SMEs find difficulties in accessing bank credit. As for late customer payment, the most preferred method of payment cash on delivery in Vietnam places similar disadvantage to SMEs as it interrupts cash flow. However, SMEs in Singapore express their concerns in line with the advanced level of

Singapore, which is much higher than the development of Vietnam, so lessons from Singapore well worth learning.

4.1.3 *Financial institutions*

In Vietnam: Financial institutions in Vietnam fall into four categories: credit institutions, institutions on stock market, insurance companies and other institutions (Nguyen and Huynh 2011).

According to Law on credit institutions 2010, credit institutions include banks, non-bank credit institutions, microfinance institutions and people's credit funds. Banks refer to commercial banks, policy banks and cooperative banks. Non-bank institutions are finance companies, financial leasing companies and other non-bank credit institutions. Microfinance institutions serve low-income individuals and micro enterprises. People's credit funds are voluntarily formed by legal individuals and households to assist business development and life.

As asset value of banking is equivalent to about 183 percent of GDP and accounts for 92 percent of assets of all financial institutions, Vietnamese financial system is usually seen the same as banking. As a result of the dominance of banks, non-banking institutions remain a minority part (Vietnam - Financial sector assessment 2014).

90% of retail banking services are provided by local banks. Retail services, already the core business of almost all banks operating in Vietnam, now continues to be the focus with some amendments in strategies. Besides extending services to other than urban areas, banks have started upgrading mobile banking, internet banking and applications to improve retail customer experience. Social media, mobile, analytics, and cloud technology is forecast to be the future of retail banking. (Wang 2016)

In the Industrial Revolution 4.0 is stressed the role of automation. Banks have well acknowledged this and are active in integrating advanced technology. They do it by themselves or collaborate with other fintech companies to have the technologies they need. The more technologies they apply, the more important it is to be aware of risks in careful management (Dennis and Nguyen 2018). This means bringing updated technologies into current operations is a must for banks to satisfy their customers and achieve higher growth, only when standard risk management procedures are available.

Witnessing dramatic changes in financial markets, banks acknowledge the need to modify their current operation, products and services. Banks are strengthening the relationship with fintech companies, aiming at utilization of modern technologies developed by fintech companies without heavy investment in order to gain higher customer satisfaction. (Hong 2018)

In Singapore: The report assessing Singapore's financial system issued in 2013 by Monetary and Capital Markets Department of International Monetary Fund confirms that Singapore is among world's top financial centers thanks to its well-structured infrastructures in combination with strict laws and regulations. After some reforms of the financial system lately, banks are still the most common type of financial institution in Singapore (see figure 17).

Banks here witness local banks overwhelmed by foreign ones concerning quantity. Among 122 banks in Singapore by mid-2013, only five were born in Singapore. Except for one subsidiary of a foreign bank, the remaining were branches of foreign names. Although there are a few local banks, the three biggest local banks' asset account for 30% of the national banking industry, which closely doubles Singapore's GDP at that time. The second common type financial institution is insurance companies. They contribute 8% of assets and 48% of GDP, which is much smaller than banks.

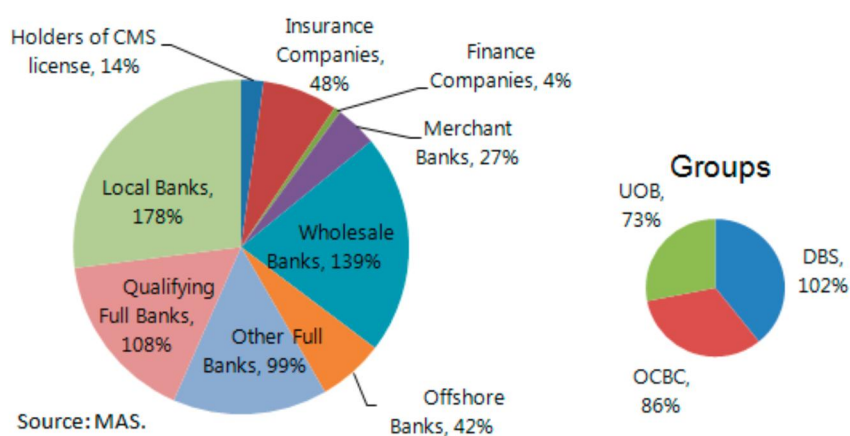


Figure 17 Singapore's financial system structure and 3 biggest domestic banks (Singapore: Financial System – – 2013)

Both local and foreign banks have been trying to expand their activities. Their amount of available credit has increased and they have also been active in promoting lending. The report notes 40% of lending from the three biggest banks is for real estate.

In the bloom of fintech, banks in Singapore have been coming under pressure to catch up with disruptions that fintech has created. In optimistic outlook on the future of banks, fintech opens up plenty of opportunity for banks to raise revenue and cut cost, which can be done by themselves or outsourcing a part of their operation to fintech companies. As for costs, the application of fintech in daily operation by automation or artificial intelligence can help Singapore's banks cut nearly 15% of costs. Relating to revenue, fintech can help address the problem of attracting more customers through mobile services or digital platforms. Banks with successful technology are much more likely to deliver good performance. (Financial Stability Review 2017)

Financial institutions in Singapore do not differ from those in Vietnam to the exclusion of scale. Banks are the dominator in both systems and are either integrating fintech to internal organizations or cooperating with fintech companies. From this can be concluded that main priority of banks in both Singapore and Vietnam are fintech, or else they will be easily defeated.

4.2 Talent

Talent refers to ability of academic places, technology and financial institutions, and people who are running their businesses that closely link to fintech (Nicoletti 2017).

4.2.1 *Academic performance*

In Vietnam: Vietnam's education system is divided into three major levels: primary education starting at age 6 (Grades 1-5), lower secondary (Grades 6-9), and upper-secondary (Grades 10-12). Other optional programs are pre-primary education (for ages 3-5), secondary vocational training, post-secondary training. (Dang and Glewwe 2017)

Result of PISA 2015 shows some highlights about student performance in Vietnam. In science, 15-year-olds in Vietnam score 525 points compared to the average score of 493 points of students from OECD countries. In mathematics, 15-year-olds in Vietnam score 495 points compared to 490 points on average of OECD students. In reading, 15-year-olds in Vietnam score 487 points compared to an average of 493 points in OECD countries.

Impressive achievements seen from academic scores do not go with high skill level at work, especially in jobs or positions requiring professionalism. The demand for well-educated workers and higher education graduates has remained huge (Skilling up Vietnam – – 2013). Vietnamese workers appear incompetent at soft skills, foreign language skills, teamwork skills, information technology skills and creativity (Preparing high quality – – 2018). Labor productivity in Vietnam has become better in the past few years, but it is still much lower than the average level of East Asian region. Vietnam's labor productivity is even ranked at the bottom in East Asia, with most of important sectors being recorded with low productivity (Vietnam's labour productivity – – 2018).

In Singapore: Singapore's education system is divided into 3 stages: primary, secondary and post-secondary. Primary education lasts 6 years, followed by 4 to 5 years at secondary schools after passing primary school leaving examination. Time for education after secondary stage varies from 1 to 6 years depending on personal decision and ability. (Education system, 2018)

Not only having strong economic performance, Singapore also has one of the top education systems in the world. Take PISA result for reference of the ability of students in Singapore. In science, 15-year-olds in Singapore score 556 points compared to the average score of 493 points of students from OECD countries. In mathematics, 15-year-olds in Singapore score 564 points compared to 490 points on average of OECD students. In reading, 15-year-olds in Singapore score 535 points compared to an average of 493 points in OECD countries. (Singapore Student – – 2015)

2017 marked the year of highest growth in labor productivity in Singapore from 2010. While the real value created per actual working hour slightly rose by 1.8% in 2016, the pace of growth in 2017 increased significantly to 2.5 times higher than the level of one year before. Human resource working in finance industry is of major contribution to that growth. Lifelong learning and training to provide staff with essential skills for their job is considered a key to raising labor productivity. (Labour productivity – – 2018)

While academic talent does not ensure working efficiency in Vietnam, the situation looks ideal in Singapore: both education quality and labor productivity is on top appears on world top lists. What makes the difference is Singapore focuses on practical learning in long-term vision. In the context of fast-changing technologies, learning in close connection with reality and with long-term vision is vital to adapt and control technologies. However, good academic performance of students in Vietnam is good foundation, then modifications in the current academic program can help catch up with modern technologies.

4.2.2 *Technology institutions*

In Vietnam: Talent of technology institutions in fintech ecosystem in Vietnam has been little mentioned. In the early stage of fintech ecosystem, fintech companies, their relationship with banks reactions of the government are topics that have been exploited the most. Technology institutions in Vietnam are more about academics activities, but academic performance in Vietnam does not closely connect with reality as explained above, so it is reasonable that technology institutions play a blur role in the ecosystem.

In Singapore: The role of technology institutions in Singapore's fintech ecosystem is remarked not only in domestic activities but also in expanding to abroad. Within Singapore, Distributed Ledger Technology has been piloted in payment-related sectors such as payments between banks, settling securities and claiming insurance. On international scale, the Monetary Authority of Singapore (MAS) has recently collaborated with the Media Laboratory of Massachusetts Institute of Technology. The participation of the Media Lab in Singapore's fintech ecosystem is expected to contribute to cultivate

fintech talents in Singapore. They are working with Singapore's researchers and specialists on new fintech projects. This collaboration also promotes the importance of cryptocurrencies and blockchain technology. These two types of digital currencies are seen the breakthrough made by fintech in global financial system. (Yu 2017)

The current status of technology institutions in fintech ecosystem as illustrated above establishes a close connection between technology institutions and academic talent. It is where testing of new models is conducted before being commercialized. Talent of experts of those institutions knows how to launch best version to the market, by which unnecessary losses are minimized. From the aim of learning attached with reality, it is reasonable that technology institutions in Singapore stay active in fintech revolution both in their own country and internationally through practical projects. This adds to explain the gap between Singapore and Vietnam although both have comparably good academic talent.

4.2.3 *Financial institutions – banks*

In Vietnam: Significant contribution to national economy, broad customer base, and extensive branch network which is a great merit in the context of cash economy in Vietnam, are qualities that banks are confident about in fintech era. Deputy CEO of Vietnam Technological and Commercial Joint stock Bank, the largest private sector bank in Vietnam (Daga 2018), regards fintech as added values to current products and services, particularly in payment services, money transfer and electronic banking (Duy 2016).

Banks from big to modest size are changing towards replacing traditional services with fintech. The Joint Stock Commercial Bank for Foreign Trade of Vietnam has some services automated or less manual to speed up customers' transactions and strengthen security at the same time. The Saigon – Hanoi Bank has utilized fintech more for internal control with the usage of big data and artificial intelligence. Viet A Bank is using artificial intelligence in newly-launched services Smart Branch and ChatBot to shorten time needed to serve customers. Foreign banks cannot stand out of the game. For customers preferring non-cash payment, Shinhan Bank has been investing heavily in digital banking. For customers accustomed to using cash, Shinhan Bank allows them to withdraw cash without their ATM cards by a mobile application called Samsung Pay (Vietnamese banks – 2018). Tien Phong Bank, which is only 10 years old, has appeared active in fintech wave. It has an automatic machine called LiveBank acting as an online teller allows customers to use TPBank's regular services 24/7. Bank for Investment and Development of Vietnam, the biggest listed bank in Vietnam based on

assets, reported the number of online customers in 2016 was 7 times higher than 3 years before (An 2017). Banks generally are trying to catch up with new technologies.

In Singapore: In 2015, MAS unveiled a 5-year plan worth 225 million Singapore dollar for creating new innovation centers and funding more projects to enhance banking technology. Banks' staff has been offered great assistance from the state-agency Institute for Infocomm Research. Researchers of the institute help banks work towards projects that they are struggling with due to lack of professional specialization. (Vasagar and Weinland 2016)

Banks in Singapore are well aware of their strategies and taking good advantage of their financial resource. Take DBS, Singapore's biggest bank, for instance. The leader of DBS is focusing more on fintech services. He confirmed going on as a tech company. 3.5 million USD was spent in 4 years starting from 2012 on developing technology and marketing new services to customers. Moving more to fintech helped reduce their costs and increase their profit by about 14 per cent (Chanjaroen and Koh 2018). In 2016, DBS was recognized as the world best digital bank by the financial magazine Euromoney while being rated one of the worst in 2009. The key of this achievement stands in their ability to digitalize their operations and to facilitate innovation all over the organization. Digibank, their newly-introduced service in India, runs without any physical branches. They plan to apply artificial intelligence to replace workload of most traditional staff positions (Bloomberg 2016). Singapore's banks in general have been keeping good pace with the progress of fintech with modern technologies such as mobile banking, cloud computing and social media interaction (What happens – – 2018).

Looking at what Singapore have done up to now, Vietnam is at the starting line. Banks in Vietnam began to notice the influence of fintech with a few banks paying attention to fintech infrastructure. To reach Singapore's current position, representing by most of the banks updated with prevalent technologies and well-equipped for the future, local banks in Vietnam have to accelerate their technological improvement. Despite many things to do, the advance of foreign banks and growth of some local banks as a result of applying new technology to catch the wave of fintech signals the right direction.

4.2.4 *Entrepreneurs*

In Vietnam: Talents of fintech and fintech-related entrepreneurs have not been discussed in separation from entrepreneurs in general.

Normally, Vietnamese entrepreneurs are hard-working. They spend most of their time working but still enjoy hangouts. Most founders have technical background, usual-

ly in the role of software development engineers. Nearly of all of them are young, so lacking experience and network is unavoidable. (Quek 2017)

Successful entrepreneurs are 28.8 years old in average. Nearly 80% used to be employed by others or fail twice at least. 45% have a period of studying or working overseas before starting their own businesses. The average time for a startup to succeed is 5.7 years. 100% localize abroad business models. Criteria for deciding a successful startup are: from 10-million-USD valuation, or from 2-million-USD revenue, or from 100 employees, or passing second seed funding, or having sold their startups at good price. Based on these criteria, only 3% of startups are successful. (Nhi 2017)

Preliminary statistics shows that the vast majority of fintech companies in Vietnam have been founded and run by Vietnamese people, which infers that Vietnam owns a potential talent pool to nurture fintech. One outstanding drawback to them at the moment is their young age and small size that causes concern for who are interested in becoming their partners, especially big institutions (Van 2018). If this situation is not improved, their talent may not be cultivated at right level. This is not only a waste but also damage to the ecosystem as fintech companies, one of the main players, cannot grow.

In Singapore: Fintech talents receive tailor-made attention. Financial staff of traditional institutions has been continuously updated with relevant knowledge. A center specialized in fintech is in progress to be completed. Not only training local staff, Singapore also plans to make its environment more attractive to foreign talents as it appreciates international interaction to grow its ecosystem (Lau and Yew Tek 2017).

There are organizations specializing in training of starting up in fintech, such as the non-profit organization SFA (Singapore Fintech Association). Singapore have hosted fintech-related events of various size, especially Singapore Fintech Festival in 2017, which was seen the world's biggest events for all actors of a fintech ecosystem (Sarbach 2017). Such events are to attract and exchange talents all over the world and are vital in the context that Singapore is of top tech-leading countries and in want of more talents. Like other countries in the progress of developing fintech, Singapore demands coders, software developers and data engineers regularly. Not only that, Singapore needs high-quality human resource in supporting fields including customer experience and security. As fintech is the combination of finance and technology, necessary skills cover those two fields (Kashyap 2017).

Top 10 fintech companies of the most impressive growth rate in Singapore in 2017 as consolidated by Fintechnews Singapore call the name of Alpha Fintech (world's first platform accommodating payment, risk and commerce altogether), Fastacash (payment with digital content), GrabPay (payment via mobile devices), M-DAQ (payment in stock market), MatchMove Pay (mobile wallet), Mesitis (wealth management platform), Numoni (micro-payments), Otonomos (world's first corporate compliance platform),

QUOINE (payment empowered by blockchain technology) and TradeHero (game-like mobile application turning virtual trading into real money).

Top 10 fintech companies in Vietnam in 2017 are 1Pay (payment via mobile devices), Timo (Vietnam's first digital bank), MoMo (payment and transfer via mobile devices), Cash2VN (money transfer platform using Bitcoin), LoanVi (personal loan platform), OnOnPay (mobile wallet), Payoo (e-wallet), Money Lover (finance monitoring mobile application), BankGo (Vietnam's largest interest rate comparison site) and FundStart (crowdfunding platform) (Scott-Briggs 2017).

Comparing those two lists of top ten, it can be seen that fintech entrepreneurs in Singapore are sensitive to innovation. Though payment services are popular in both countries, the noticeable gap between them is that Vietnam's fintech entrepreneurs launch more services to replace cash transactions while Singapore's entrepreneurs specify their services in smaller markets, stock exchange for example, or add more value to common non-cash transactions such as an omni-platform or digital content included. It is easy to understand at this moment considering the background of each country. While non-cash payment is usual and the technology level reaches high standard in Singapore, Vietnamese residents have just started to acknowledge non-cash methods of payment and the technology competence is not as high.

While fintech talents in Vietnam have not been separated from talents of other industries, Singapore has had customized trainings for fintech talents, and acknowledged what kinds of talents in need. Therefore, the level of fintech talents largely depends on the vision and support of other organizations. Besides, the specific vision of Singapore's fintech entrepreneurs differentiates them for their mates in Vietnam. Following the trend of payment services but Singapore's entrepreneurs know how to make difference and stay updated with modern technologies.

4.3 Solutions

Solutions are mainly adopted by technological companies and academic resources. Crowdsourcing is also a potential answer (Nicoletti 2017).

4.3.1 *Fintech companies*

In Vietnam: Currently, a majority of fintech companies in Vietnam provide payment services. Principal mobile payment providers can be listed 1Pay, MoMo, Payoo, Vimo, Moca, VNPAY, and OnOnPay (see figure 18). (Fintech in Emerging ASEAN, 2017)



Figure 18 Fintech companies in Vietnam (Fintech in Emerging ASEAN 2017)

The report “ASEAN Fintech Census 2018” by Ernst & Young shows the proportion of payment providers in Vietnam is substantially higher than other neighbor countries, accounting for nearly half of fintech services. Malaysia, Thailand, Indonesia and Philippines have similar density of payment service providers to each other, fluctuating between 27 per cent and 33 per cent. Singapore, whose fintech ecosystem is the most developed, does not have as many payment fintech companies as others. Compared to Vietnam, Singapore’s density is only nearly a half.

Large quantity does not ensure good activity. Out of 25 payment fintech companies whose activities are approved by the State Bank of Vietnam, only 5 companies reporting positive net profit, a few confirming stable operation, and the remaining still having expenses higher than revenue. As for external competition, fintech companies in Vietnam are facing difficulties with foreign smuggling service providers right within home territory. Those smugglers take advantage of tourist attractions and use their own devices for paying stuff in Vietnam but money directly transferred to overseas organizations. (Thang 2017)

Two typical ways that fintech companies in Vietnam have been working are building big customer bases and adding additional services for current customers. Prioritizing attracting customers over focusing on profit is the strategy of fintech startups that make new products. Mobile payment application MoMo, Expense managing and budget planning application Money Lover are two typical examples for such a risky strategy due to huge capital for advertising until it generates profit. The opposite direction is usually taken by companies which have already had a specific amount of audience. They have continuously introduced new services in order to prevent their customers using services of other providers. Take Grab for example. Coming to Vietnam, Grab was purely a

transport mobile application. After a few years when Grab becomes the most popular transport app in Vietnam, GrabPay Credit has been added as an e-wallet for customers to pay for their usage of Grab's services. Having big source of customers does not make Grab neglect to take care of new services. Big money is being spent to make customers become familiar with new functions. (Tran 2018)

Competing with banks or launching completely new products is the decision of the minority 28% of fintech companies. The remaining 72% have been approaching customers through cooperation with banks (Phan 2018). Only a quarter of fintech companies are capable of direct competition against commercial banks because only a limited number of companies have big enough sources of finance to survive until they can prove the efficiency of their products to customers. As not many fintech companies are able to independently launch products, cooperation between them and big institutions allows smaller fintech companies to contribute to the whole ecosystem. Such cooperation is a win-win relationship for both involved parties.

Vietnamese banking system has been known as bulky and ineffective in applying state-of-the-art change to continually provide customers more satisfaction, but customer base is available and its efficiency in compliance and risk management has been proven to some extent. Therefore, weaknesses of fintech startups in customer, management and finance can be overcome and their strengths will be built up by utilizing available resources of the incumbents. On the other hand, if banks recognize where they act ineffectively and are willing to cooperate with fintech companies strong in their weaknesses, they can still perform active role in the fintech ecosystem. No single actor can work without support from others, so working together is mandatory.

In Singapore: Solutions that Singapore's fintech companies bring to the ecosystem vary from popular services such as payment, digital banking to emerging services such as insurtech (insurance technology) and regtech (regulatory technology). Figure 19 shows fintech companies in various sectors. Concerning quantity, services relating to wealth management are the dominant in the ecosystem, followed by payment services. (Singapore Fintech Map 2017)

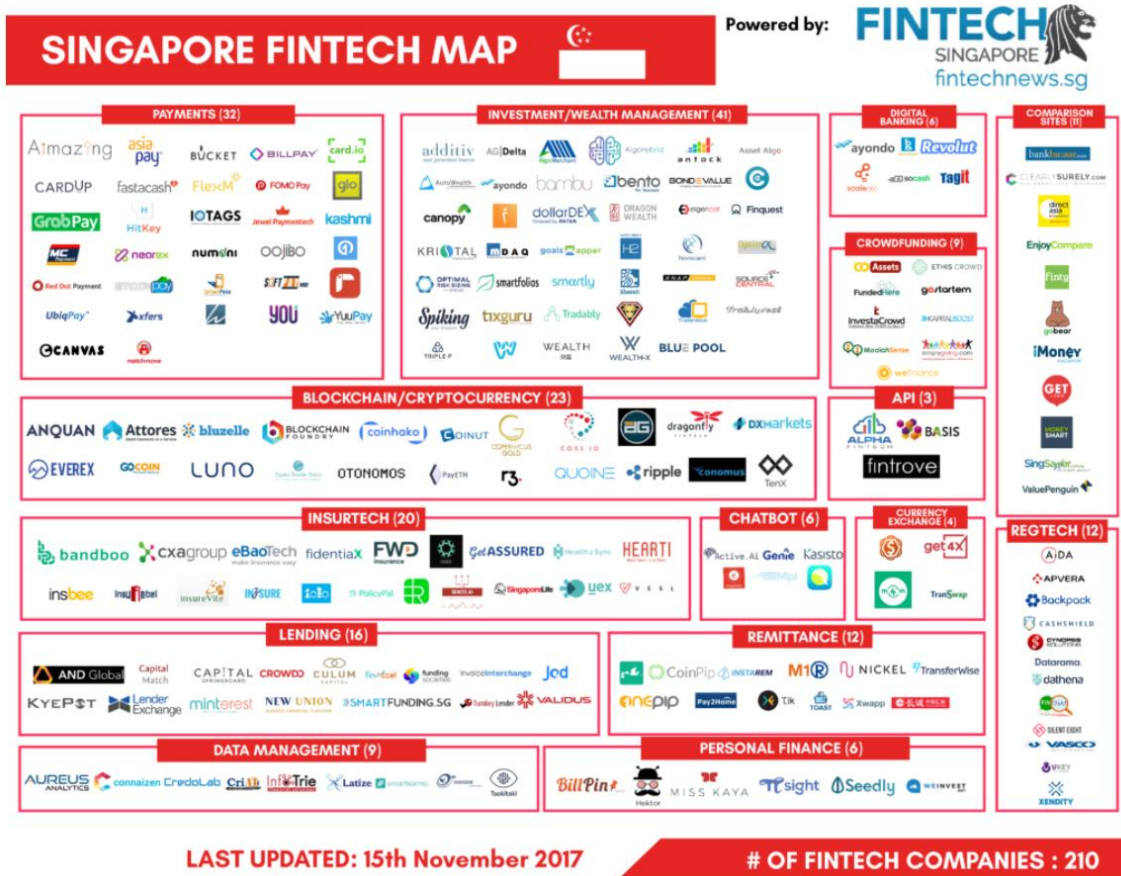


Figure 19 Fintech companies in Singapore (Mesropyen 2017)

Unlike fintech companies in Vietnam, fintech companies in Singapore serve a wide range of services, from normal ones such as platforms for online and mobile payment for individual customers, to services specialized for the need of businesses, for example, Fibonacci Global Payment Services with payroll and commission payments. Payment services are a popular player among Singapore's fintech companies but the field with highest number of players is wealth management. Though more fintech companies doing business in wealth management than other fields in Singapore, the number 41 out of 210 in total, equivalent to one fifth, is not as substantial as in Vietnam in which the ratio is one half.

Fintech has been thought to be of concern to current banking in Singapore like in other countries. Considering significant contribution of the financial institutions up to now, which accounts for more than 12% of Singapore's economy, the fear that fintech has caused is real and cannot be hidden. With technology widely applied in all aspects of life, fintech is seen the future of finance industry. Therefore, adaptation and lifelong learning is the ideal solution in the long run. (Tay 2018)

From this point can be concluded that a handshake between banks and fintech companies is plain to see besides their effort to renovate within their own organizations. Fintech companies find their way to collaborate with traditional banks usually through

joining events funded by those banks. For example, two fintech companies BlackSwan Technologies and Silent Eight signed contract to build artificial intelligence for OCBC Bank Singapore after participating in the accelerator program held by this bank called The Open Vault (Freer, 2017). Accelerator programs or innovation labs exist in most of the banks in Singapore at the present time (Singapore FinTech Festival – – 2017).

This is a clear signal showing determination of banks in the competition to take control of technology, keep up with new trends, and welcome cooperation from fintech companies. Such labs and programs are the place for them to foster innovation besides running their business as usual at the same time. By organizing accelerators, many fintech companies are gathered and banks can discover suitable partners. From the banks' side, this relationship brings them benefits which are much bigger than the threat they felt at the very beginning of fintech.

The key to effective collaboration between banks and fintech companies in Singapore is using application programming interfaces (APIs). APIs are like a bridge connecting different systems of the banks and the companies (Pennington 2017). In contrast with the concern about the threat of fintech companies at early stage that fintech companies would make profit of banks fall, the performance of three big banks in Singapore including UOB, OCBC and DBS in the last three months of 2017 shows a leap of 27%. All these three banks confirm serious investment in fintech which explains such good results (Singapore banks – – 2018).

Joining hands of banks and fintech companies is the common direction of Vietnam and Singapore in building their fintech ecosystem. As a fintech hub of the region and the world, not surprisingly Singapore has that relationship at an advanced level. Big financial corporations perform the role of a giant investing heavily in infrastructure and attracting small companies. Fintech companies focus on practising their profession; one of the convenient ways is joining with big ones. It is worth mentioning the role of APIs reconciling differences in system between big and small companies.

At this moment in Vietnam, the importance of cooperation with fintech companies has been acknowledged in theory but has not been implemented in practice much. This should definitely be encouraged considering the fact that not many fintech companies have enough resources to serve all the needs of the market. Building internal fintech labs and sponsoring more accelerator programs to attract fintech companies and find the best matches are effective ways that banks in Vietnam can learn from their colleagues in Singapore. By this way, fintech companies in Vietnam will be more confident to jump in more complicated fields and offer more products for better customer satisfaction.

4.3.2 *Academic resources*

In Vietnam: The contribution of academic institutions to fintech ecosystem in Vietnam is not big enough to be considered one of two major sources of solutions according to theory of Nicoletti (2017). Little scientific research has been found. Main activities are seminars by fintech companies to introduce their new products or contests organized by universities to test students' knowledge and give them chance to present new ideas.

In Singapore: Singapore's government clearly understands the gravity of fintech for the moment and in the long term. They strongly support pouring money into fintech projects whose concept practicality is proven. Such investments are not only to carry out projects, but also aim at training to have qualified human resources as preparation for the future. Data analytics, cyber security, and application development are forecast to have experts in short supply. Based on that forecast, two coding schools, Alpha Camp and Byte Academy, are set up to train necessary skills and knowledge of a fintech specialist. Learners are not required to have technology-related foundation. Completing courses in one of those schools, learners are ready for fintech jobs. Coding schools are not the only academic preparation. Five polytechnics has amended training program of students who would like to have their career in fintech sector. Skill sets of fintech jobs are clarified. More internships with financial organizations of various sizes, such as startups and fintech department of banks, are offered. There are also 100 mentors available to guide students in projects with companies. (Shetty 2017)

What Singapore has been doing to develop fintech system from academic perspective displays a huge gap compared to Vietnam. Curricula in universities of Vietnam have not caught up with current environment in all industries. When the whole world is in Industry 4.0, including Vietnam mentioning 4.0 in nearly all types of media, Vietnam's education system is still at 2.0 stage, which is no more than adding the Internet into the connection between teachers and students (Thanh 2017). This comes as no surprise that practical training programs giving students readiness to join fintech right after graduation has not existed. The role of universities in supporting students to apply theory in practice through internships or mentoring has not been active but has entirely depended on individual effort. Academic issues has not been solved in academic places, fintech expert shortage keeps being a pain with all people doing fintech jobs. The incompetence of human resource then constrains growth of the whole ecosystem.

It is now time for Vietnam's academic institutions to take prompt action to provide qualified experts for the development of fintech. It is feasible for Vietnam to do what Singapore is doing. Revision of current training program may take time. It can start with assisting students getting closer to internships in startups and fintech department of banks, or to professionals who are willing to guide potential students. By actively connecting with more external organizations, universities recognize practical skills and

knowledge to amend curricula, which helps raise quality of fintech personnel in long term.

4.3.3 Crowdsourcing

Howe (2006) defines crowdsourcing as the act of outsourcing a job to a group of unknown people through an open call. From the crowd can be found solutions to a collection of issues, such as ideation, strategic planning and raising money (Grewal-Carr and Bates 2016). There are various methods of crowdsourcing and no method is ranked the best in all circumstances. It depends on the problems that a business is facing to decide which types of crowdsourcing are useful. Figure 20 illustrates ten methods of crowdsourcing: crowd collaboration, crowd competition, crowd labour for micro, meso and macro task, crowd funding, crowd curation, user-generated content, crowd voting and crowd processing (Grewal-Carr and Bates 2016).

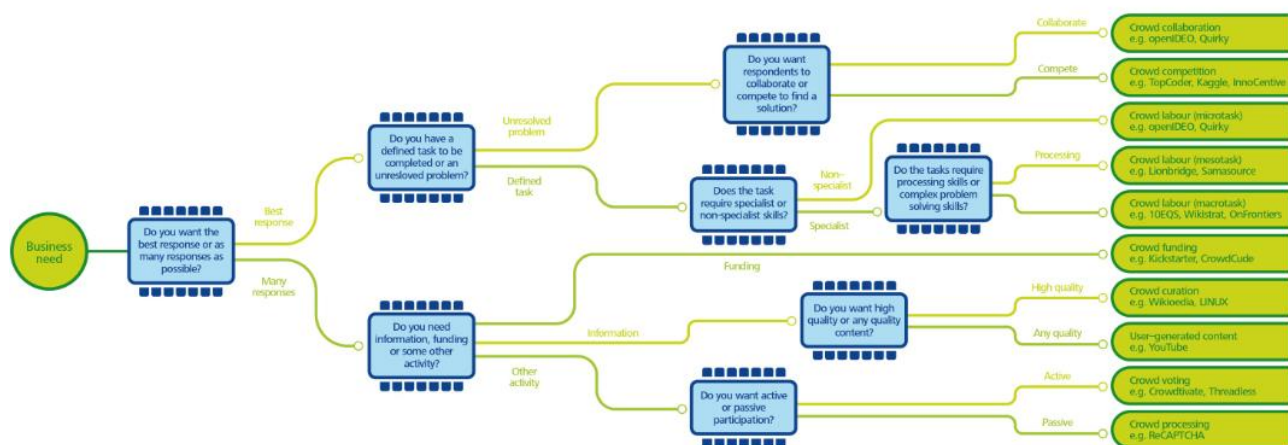


Figure 20 Crowdsourcing model (Grewal-Carr and Bates 2016)

Due to unknown identity, people involved in the crowdsourcing come from a variety of backgrounds. They can be experts or someone with basic skills related to the job. Deciding to crowdsource, entrepreneurs may not select exactly who share the job with them, but they know who are interested in their products; based on that they will have final products best fit for the need of targeted customers. In the age of 4.0, Internet is the vital platform for crowdsourcing.

In Vietnam: Referring to crowdsourcing in Vietnam, crowdfunding is the most common method and is usually misunderstood as another way to call crowdsourcing. The term crowdfunding itself has just become known in Vietnam for a few years. Currently its growth is still limited. In table 5 are four fintech crowdfunding platforms that are running in Vietnam. Challenges mainly come from the mindset of Vietnamese peo-

ple. From the viewpoint of who start the crowdfunding, most of them are afraid of seeking support from the public, given criticism in case of failure. From the crowd's side, they do not have enough trust to invest in strangers (Crowdfunding in Vietnam – – 2016).

Platform	Activities
Fundstart	Raise fund for artists and project leaders
Comicola	Connect artists, writers, and readers in the cartoon industry; Offer courses in applied comic art
Betado	Raise fund for startups in need
Firststep	Raise fund to implement ideas

Table 5 Fintech crowdfunding platforms in Vietnam (König 2016)

The above four platforms are fintech startups that aim at raising funds for startups in general. Data about crowdfunding of fintech companies in Vietnam has not been in public media. The amount of fund raised from the crowd for all cases in 2018 is expected to reach 8000 USD, increasing by 12.7% compared to the previous year (Crowdfunding 2018). With this growth, crowdfunding is a potential solution to develop fintech ecosystem.

In Singapore: In CEO of the largest bank bank in Singapore DBS's opinion, the market for crowdsourcing is now extremely small (Teng 2016). Top three biggest bank of Singapore, United Overseas Bank, has been playing a leading role of a fund provider to fintech startups. In partnership with a crowdfunding platform from Israel, United Overseas Bank has extended their influence to regional level (Vasagar and Weinland 2016). The crowdfunding game in Singapore is now witnessing participation from startups. Funding Societies is emerging as a leading platform serving SMEs in Singapore. After 30 months since opening, this platform succeeded in calling the first 100 million Singapore dollar, equivalent to 73 million USD, from 40000 investors. For the next 6 months, Funding Societies has reached the second 100 million Singapore dollar with the number of investors almost doubling. What this platform offers those who need crowdfunding capital is disbursement no more than one day for small and medium loans. This platform recently received 25 million USD in series B. This is one of the biggest deal in Southeast Asia for a crowdfunding platform (Alois 2018).

In both Vietnam and Singapore, crowdsourcing is nearly synonymous with crowdfunding and is identified as tiny. While crowdfunding in Vietnam is tiny with 4 platforms and 8000 USD, the tiny degree in Singapore is defined at nearly 150 million USD on one platform. From this can be seen demand of crowdfunding is real. The number 8000 USD of Vietnam's market is potential to reach much higher number.

4.4 Capital

Capital is generated from three flows: angel investors, venture capital and IPO (Nicoletti 2017). Fintech has attracted largest investment among all sectors (Nguyen 2017).

4.4.1 *Angel investors*

Angel investors are individuals putting money into new businesses. Not only finance, they contribute to daily operations. Their motive may come from desire to help other entrepreneurs. (Benjamin and Margulis 2000)

In Vietnam: Currently, angel investors are not interested in Vietnamese startups in general (Thong 2017a).

In Singapore: There are 709 angel investors now living in Singapore and 6170 foreign angels showing attention to startups in Singapore (Singapore Angel Investors 2018). Angel investors in fintech projects are acting more and more active with governmental support of tax incentives (Schwartz 2017). Joining accelerators is one of the best ways to find angel investors. Each accelerator has specific requirements to limit the number of startups. For example, Startupbootcamp FinTech is an annual event in Singapore which accepts 12 fintech startups maximum no matter where they are from (About Startupbootcamp – – 2018). Some recent deals from angel investors are soCash (supply chain of cash) with 600000 USD, Policypal (insurance mobile app) and Connaizen (marketing solutions based on data of banks) with undisclosed amount of investment (6 Recent – – 2017).

4.4.2 *Venture capital*

Venture capital is money raised from individuals and organizations to invest in newly-built companies. Because these companies are in their early stage, investments of venture capitalists have the characteristic of high risk high return. Venture capitalists also join managing the businesses they invest in by becoming members of the director board. (Sahlman 1990)

In Vietnam: Foreign venture capital is increasing investment in fintech companies in Vietnam. In November 2016, Champion Crest, a fund under Credit China Fintech Holding from Hong Kong, acquired 51% of Amigo Technologies Joint Stock Company (a personalized financial service provider)'s stock at 12.73 million USD (Fintech - tâm điểm – – 2017). Some top mobile payment providers are invested by foreign investors.

For example, NTT Data Corporation from Japan owns 64% of Payoo; True Money (a fintech company from Thailand) takes over 40% of 1Pay (Anh 2018).

Fintech startups in Vietnam are in sight of venture funds both inside and outside Vietnam. A fintech venture capital fund in Singapore, FinLab, has been excited at the prospect of fintech startups in Vietnam. Acknowledging dramatic growth of fintech in Vietnam but CEO of FinLab added the greatest weakness of Vietnam's fintech companies as marketing and finance to run marketing campaigns (Thong 2017b). One of the biggest investment fund in Vietnam VinaCapital has recently established a 100-million-USD venture fund VinaCapital Ventures with a focus on technology startups. The key aim of this venture capitalist is long enough relationship with startups to encourage their expansion. In the portfolio of VinaCapital Ventures, the biggest part is for fintech which account for 22% (Bui 2018).

In Singapore: In 2017, big venture capital funds together with well-established fintech companies invested 229.1 million USD in fintech startups. This is the highest number Singapore's fintech has reached (Pollari *et al.* 2018). Singapore's venture capital funds have the scope of investment not limited within Singapore but spreading all over Southeast Asia. Some outstanding names are: East Ventures with investment value ranging from 100 thousand to 500 thousand USD per deal, Temasek Holdings with 275 billion USD of asset under management (Finance: Venture capital - Singapore 2018). Singapore's government gives venture capital funds considerable privileges to raise their risk-taking level. However, not all fintech companies in Singapore are satisfied with source of fund from venture capital. 23% of the fintech companies think venture capital at the moment in Singapore is not enough (ASEAN Fintech Census 2018 2018).

Scale of venture capital funds is one more index that Singapore has much higher than Vietnam. Even in Singapore funding need of fintech startups has not been fully met. Nonetheless, in Vietnam are there signals of noticeable improvement. VinaCapital Ventures is the example of existence of well-established funds. Investments from foreign funds prove attraction and potentiality of Vietnam's market. Incentives that Singapore's venture capital funds receive from their government serve as a powerful lever for their development because they are better prepared to take risks. This point is well worth applying in Vietnam.

4.4.3 IPO

Initial public offering (IPO) is when a company going public for the first time. The main reason of going public is to attract a great source of capital to maximize firm value. This is the best scenerio of a successful IPO, or else that company may have to step

back at least one year because of time-consuming, expensive and uncertain process. (Brau and Fawcett 2006)

In Vietnam: No IPO of fintech companies in Vietnam has been found.

In Singapore: In the first quarter of Singapore, Singapore has the first fintech company listed on Catalist board of the Singapore Exchange. That company is Ayondo Ltd, a combination of two brokerage platforms for both personal and business clients founded in 2008. Its headquarters are in Germany, serving not only Singapore but international markets with a diversity of products from forex to cryptocurrencies. The private equity investor of Singapore Luminor Capital is has held the largest number of shares of Ayondo. The head of equity capital market for SMEs of Singapore Exchange are optimistic that the IPO of the foreign fintech company will promote new technologies and begin new trends in finance in general. (Mui 2018)

Since IPO is a demanding process and Vietnam is a new player in fintech, it is too early for a fintech company to go public. Even the first fintech IPO in Singapore is not from a local company. Participation of a foreign company, as one head of the Singapore Exchange stated, is motivation of current market. On this point, Vietnam can take it as an approach in distant future, as listing on stock market is determined by various socio-economic conditions.

4.5 Policy

Policy indicates particular plans and benefits agreed by the government and their efficiency to fintech ecosystem.

In Vietnam: Vice President of Ernst & Young Vietnam, Ms. Nguyen Thuy Duong, confirmed that protection from the government given to fintech companies that had grown to a specific level is necessary to help them grow stronger and reach overseas markets; in contrast, early protection provided to fintech startups would lose their strength (Man 2018).

The Steering Committee on Fintech established by Governor of the SBV did identify top priorities to develop fintech ecosystem, such as: innovative payment solutions, blockchain, peer-to-peer lending, open API (application programming interface) and e-ID/e-KYC (electronic identification / electronic know-your-customer) (Kien 2018). Director of the SBV's Payment Department, Mr. Pham Tien Dung, promised to amend Circular number 39 to boost fintech and introduce tighter regulation to fight money laundering (Thang 2018). From now on, in case new fintech activities that has not been regulated emerge, such activities will be piloted so that regulation is revised if appropriate (Dung 2017).

In Singapore: E-commerce in this country is growing very quickly, thanks to the government's effort trying to build Singapore to become a customer-centric innovation center. With that vision, the government has been actively supporting enterprises to improve their technological infrastructure. (Singapore - eCommerce 2017)

The financial organization belonging to Singapore's central bank MAS has taken the leading role in the prosperity of Singapore's fintech ecosystem. In 2017, they signed bilateral agreements with many countries, from neighbors Malaysia, Thailand, Philippines to further Asia Hong Kong, Japan, to Middle East Israel and Europe Poland, Denmark, France. They have joined a project applying blockchain, which is seen disruptive technology today. They organized fintech festivals where policy makers, established financial institutions and entrepreneurs talk about fintech from global vision. They pay special attention to artificial intelligence and data analytics, illustrated by a grant worth 27 million Singapore dollar for local researching institutions. Cultivating fintech talents is also in scope of work of MAS. They collaborated with local universities and financial institutions to organize TechSkills Accelerator, in which providing students with mentoring and update of new trends. (Fintech Singapore – – 2017)

Fintech companies are the center of plans to develop fintech of Singapore's government. The virtual platform FinTech Office, formed by MAS, Economic Development Board, Infocomm Media Development Authority and Enterprise Singapore in 2016, is where fintech companies looking for advice on financial and regulatory support. In the same year, MAS established FinTech Innovation Lab as a place for fintech companies to get together, and regulatory sandbox as an offer of reasonable legal requirements to encourage fintech companies to innovate (Tay 2018). Singapore's government has specific schemes to support fintech companies: Startup SG Founder supporting new entrepreneurs, Startup SG Talent supporting businesses entering local talent pool, Startup SG Accelerator and Startup SG Tech supporting promising startups, Startup SG Equity supporting startups aiming to go international, Capabilities Development Grant for SMEs in expansion, Financial Sector Technology and Innovation Proof of Concept Scheme aiding technology providers (Looi 2018).

Recommendations from Adner and Kapoor (2016):

Two subjects of the framework of Adner and Kapoor (2016) are old technology and new technology. In the context of this research, old technology is traditional financial services and new technology is fintech.

With reference to the four quadrants, Vietnam is now in Quadrant 1, in which traditional services do not effectively address growing needs as an inevitable result of growing technologies while fintech is being heavily financed and actively supported. As suggested that companies should focus on new technology as much as possible, fintech should be strongly promoted to grasp new growth opportunities and make beneficial changes to the whole economy. This is proven by the reality in Singapore. The govern-

ment puts fintech companies at the centre and provides a variety of grants for innovative ideas or technologies. Table 6 summarizes differences between Vietnam's and Singapore's fintech ecosystem.

		Vietnam's ecosystem	Singapore's ecosystem
De-mand	Individuals	Immature consumer market 60% Internet users 95% mobile users 1.8-billion-USD e-commerce market	Developed consumer market 80% Internet users 150% mobile users 2.19-billion-USD e-commerce market
	Businesses	SMEs: 97% of enterprises, 41% of GDP Top concerns: Low-cost and accessible credit	SMEs: 99% of enterprises, 48% of GDP Top concerns: late customer payment, high-interest bank loan
	Financial institutions	Mainly banks Banks strengthening the relationship with fintech companies	Mainly banks Banks integrating fintech to internal organizations or cooperating with fintech companies
Talent	Academic performance	PISA 2015 results: 525 points in science 495 points in maths 487 points in reading	PISA 2015 results: 556 points in science 564 points in maths 535 points in reading
	Technology institutions	Little mentioned	Contribute both in-country and internationally by cooperation with financial institutions and foreign technology institutions
	Financial institutions (banks)	Banks gradually replacing traditional services with fintech by automated services, mobile apps	MAS approving 225-million-USD plan in 5 years for new innovation centers and projects Banks focusing more on fintech by digitalized operations
	Entrepreneurs	Young, running small businesses	Fintech training center in progress

		Mainly payment solutions	International events attracting talents worldwide Various sectors: payment, stock exchange
Solutions	Fintech companies	Mainly payment services 28% competing with banks, 72% cooperating with banks	Mainly wealth management services Collaboration with banks via APIs
	Academic resources	Little mentioned	Fintech projects Coding schools Polytechnics focusing on fintech content Cooperation with businesses, mentors
	Crowdsourcing	Mainly crowdfunding 4 platforms 8000 USD raised	Mainly crowdfunding Funding Societies platform: 200 million Singapore dollar in 36 months
Capital	Angel investors	Little mentioned	709 resident investors, 6170 foreign investors interested in Singapore
	Venture capital	Attractive to both local and foreign funds	229.1 million USD into fintech companies (2017)
	IPO	Little mentioned	Ayondo on Catalist board of the Singapore Exchange
Policy		Top priorities identified	Bilateral agreements Fintech festivals Accelerators Supporting schemes 27-million-SGD grant to local researching institutions Virtual platform for financial and regulatory support Innovation Lab for fintech companies to get

		together
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Table 6 Vietnam’s and Singapore’s fintech ecosystem

5 CONCLUSION AND DISCUSSION

5.1 Main findings

The purpose of this study is to understand the how fintech ecosystem emerges in Vietnam, based on which to suggest some ways to develop the ecosystem. This research is done by answering three sub-questions. The first sub-question is finding out what actors forming a fintech ecosystem. The second is analyzing the contribution of each actor into the ecosystem. The third is discovering the connection among those actors.

According to Nicoletti (2017)'s framework, a fintech ecosystem comprises 5 actors: demand (of individual, corporates and financial institutions), talent (in academic places, technology and financial institutions, and entrepreneurs), solutions (by tech companies, academic institutions and crowdsourcing), capital (from angel investors, venture capital and IPO), and policy. In Vietnam's current conditions, some parts have not been complete and the others have just begun their journeys.

The demand of individuals, corporate and financial institutions for technology products and services in finance is realistic and increasing, especially under the influence of the industrial revolution 4.0. Current high growth rate of Vietnam's economy combined with young and energetic demographic makes Vietnam a highly potential market for fintech.

As for talent, the majority of Vietnamese people are well equipped with academic knowledge at school, however, their competence at work is not highly recommended. The role of talents from technology institutions is faint. In financial institutions has been recorded slight improvement. Fintech entrepreneurs have not made big enough breakthrough to be mentioned separately from entrepreneurs of other fields. All of them are described together as work hard, play hard and highly potential.

Among technological companies, academic resources and crowdsourcing, solutions are now mainly produced by tech companies. Their solutions are now predominantly concentrating on payment services and not diversified in general. Many fintech companies negative business performance. Cooperation with banks is the choice of most of fintech companies. Academic resources show little contribution to current fintech ecosystem. Crowdsourcing is an optional option as stated in Nicoletti (2017)'s framework. Of ten methods of crowdsourcing, crowdfunding is the most common but its role is like salt in the sea.

Capital from venture funds is the most common in comparison with angel investors and IPO. Not only funds based in Vietnam, fintech companies are attractive to foreign venture funds. Angel investors have not expressed interest in startups in Vietnam, in-

cluding fintech companies. IPO, a time-consuming and expensive process, is not suitable for fintech companies at this moment due to their immaturity.

Policy for fintech development in Vietnam is now in the stage that priorities are identified and general schemes are introduced. The importance of fintech is recognized by all leaders in the government, shown in their emphasis in finance meetings and the establishment of a specific unit taking care of fintech called The Steering Committee on Fintech. No stronger actions have been taken until now.

In Singapore, all five actors of a fintech ecosystem according to Nicoletti (2017) are fully available. Singapore has many aspects in individual, corporate and financial institution need that are similar to Vietnam. This is the only actor that two countries share many things in common. The four remaining show a huge gap in which Singapore is the leader.

Regarding talent, not only Singapore has good academic results at school but the work productivity is among world's most productive countries. Their technology and financial institutions have active participation in both local and international markets. From staff at traditional banks to entrepreneurs are well prepared with tailor-made knowledge to be ready to make innovation. Tech companies cooperate with banks to provide solutions for the ecosystem. Academic resources also join in solving problems of the ecosystem, by preparing knowledge and skills both for presence and future. Crowdsourcing, in the form of crowdfunding, is effective to the extent that can be seen as a main solution, not just as potential as in the theory of Nicoletti (2017). Capital is raised from angel investors, venture capital and IPO. Each source of capital is many times bigger and risk-taking than in Vietnam. Policy acts as the most powerful and supportive actor in the ecosystem. It gives strategic and financial support to all the other four actors and promotes the connection among them through MAS.

In Singapore's fintech ecosystem can be seen a close relationship from one actor to another. Starting from the demand, talent brings solutions. Capital plays the role of fuel for the job of talent. Policy shows direction of the government and orients the growth of each component of an actor by incentives given to them. A lack of any part of one actor limits the contribution into the ecosystem. Weak connection between any actors creates an incomplete ecosystem. Reflecting back to Vietnam, the fintech ecosystem is now particularly primitive. Five actors exist but some are not full. Talent has not been at their best in all four components including academic performance, technology institutions, financial institutions and entrepreneurs. That leads to not strong performance of academic resources and technological companies in bringing solutions. The option crowdsourcing is too tiny to produce any outstanding results. Investment from angels and IPO to raise capital is what Vietnam's fintech ecosystem has not achieved. The monitoring and supporting role of policy is unclear. Overcoming those shortcomings brings a full ecosystem for comprehensive development in the future.

5.2 Theoretical contribution

Three ways to contribute to theory development are: focusing on different elements rather than a single element of the theory to protect completeness and thoroughness of the study, organizing persuasive evidence and suggesting solutions or substitutes. (Whetten 1989)

This thesis contributes a theoretical framework for the study of fintech ecosystem in Vietnam. The main findings of this study propose a fintech ecosystem composed of five actors: demand, talent, solutions, capital and policy. Those actors correlate with each other, especially fintech companies as the heart of the ecosystem and the actor policy as stimulation of all the others.

By comparing the current situation in Vietnam with in Singapore, the initial framework is illustrated in two views, one from a new market that has not have a complete ecosystem and one with a developed ecosystem whose all actors are mature. The current fintech ecosystem in Singapore has full actors according to the framework by Nicoletti (2017). Individual demand, business demand and demand of financial institutions are all towards supporting the growth of fintech. Talent from academic places sets good foundation to acquire new skills and knowledge necessary for the development of fintech. Talent at technological institutions has been building on expertise through cooperation with foreign institutions. Talent at financial institutions is well-equipped with tailor-made knowledge and works closely with fintech companies. Fintech entrepreneurs serve a wide range of sectors. Solutions by fintech companies cover payment, insurtech, regtech and so on. Solutions by academic resources help forecast demand and bridge the gap between theory and reality. Crowdsourcing is mostly known as crowdfunding. 200 million Singapore dollar was raised by Funding Societies platform during 3 years. Angel investors include more than 700 residents and 6000 foreigners interested in Singapore. Together with venture capitalists, they are receiving incentives for their investment in fintech projects. The appearance of a fintech company on Singapore Exchange is valid. Policy of Singapore's government provides not only financial grants but also incentives, relationships and opportunities to all related parties.

This suggests an approach to build the fintech ecosystem in Vietnam. The framework of Nicoletti (2017) puts fintech companies at the center. The reality in Singapore proves the key role of fintech companies in the ecosystem. In Singapore's fintech ecosystem is also emphasized the influence of policy. Therefore, at this time, continuing to build talent to have more effective solution, and adopting policy in a practical and supportive way to attract more capital and encourage the other three factors is how to set foundation for fintech ecosystem in Vietnam. Figure 21 confirms the fintech ecosystem in Vietnam.

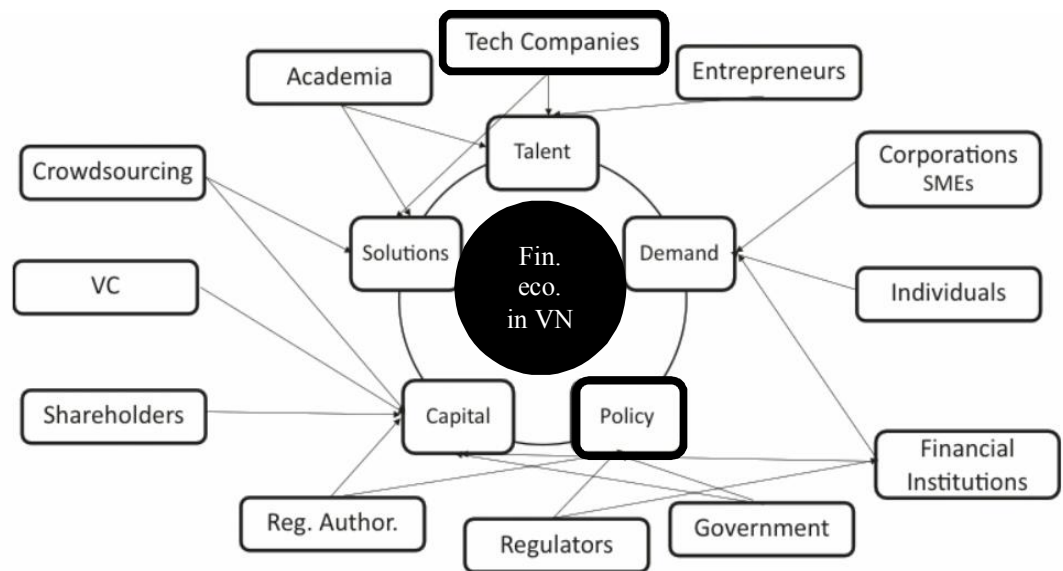


Figure 21 Fintech ecosystem in Vietnam

Figure 21 originates from the framework of Nicoletti (2017). This figure highlights the importance of fintech companies as stated by Nicoletti (2017) and proved in the reality of Singapore. By using the case study Singapore, the outstanding contribution of policy is confirmed, so it is stressed in the above figure.

There are seven factors to be considered in judging a theory paper. First is new value added to current theories. A completely new theory is not obligatory, but adjustments to current theories are expected. Second is change that the theory makes on the practice in the same area. Third is the existence of reasonable arguments. Fourth is completeness and thoroughness of the paper. Fifth is the logic of the idea presented in the paper. Next is whether the topic is contemporary and potential for further discussions. Last is the proportion of academic readers responsive to the topic. Topics of narrow interest are more likely to include papers bringing new values or changes to current theories. (Whetten 1989)

Besides agreeing with Nicoletti (2017) that fintech companies are the main motivation of the fintech ecosystem, this research adds the importance of policy in growing the ecosystem. Studying fintech as an ecosystem, this study goes into every actor. This stimulates the research of fintech in Vietnam as a group of connections. Only fintech companies or the government are required to do something will not improve fintech in general. The boundary of this study is not limited within Vietnam. Developing countries with similar conditions will find themselves in this study and are suggested some ways to develop their own ecosystem.

5.3 Managerial implications

This thesis offers Vietnam's market a framework of a fintech ecosystem. This framework states what actors are needed in a fintech ecosystem and their relationship. By analyzing reality of each actor and comparing them to similar real situations in Singapore, each one knows their current position and has reference to what should be done to grow in the future.

All parts mentioned as talent including academic places, technology and financial institutions, and fintech entrepreneurs are now given their achievements and problems. A strong connection between academic and technology institutions will form a good base of practical expertise knowledge. Banks and other financial institutions should have departments specialized in fintech, train staff fintech-related knowledge depending on their job, and consider organizing fintech events to attract qualified staff and suitable startups for partnership. Fintech entrepreneurs should be well aware of future trends and keep learning to upgrade and diversify products and services.

Both Vietnam and Singapore has a designated office for fintech, the Steering Committee on Fintech in Vietnam and MAS in Singapore. The Steering Committee should perform more vigorous action like what MAS has been doing. The Steering Committee can conduct short courses to generalize knowledge in fintech to interested people, sign agreements with other countries to promote collaboration among academic and technology institutions, and offer incentives to individuals and organizations with plan to invest in fintech activities.

Above suggestion on governmental role is also useful for developing countries with similar fintech ecosystems as Vietnam. A specialized office taking care of all fintech-related matters should be established for the government to promote fintech development in its country. Through policy, that office then should have specific actions to support each actor of the ecosystem, taking fintech companies as the center. The support can be financial aids for academic, technological and financial institutions to boost their research and innovation, international agreements and events to attract foreign partners, or incentives to fintech investors to raise their risk-taking level.

5.4 Limitations

The topic under discussion in this thesis is at high level. Studying the emergence of fintech ecosystem in Vietnam, this study goes into each actor of the ecosystem. There are five groups of actors identified and each group is divided into smaller parts. Therefore, it is challenging to mention all aspects of every actor in detail. Current analysis of

each other offers opportunities for separate studies on the influence of each actor on the development of fintech ecosystem.

Another limitation is lacking statistics when analyzing some actors, for example no records found about angel investors in fintech in Vietnam. This makes the analysis less thorough and hard to assess the potentiality of that actor compared to that in Singapore. However, this limitation can be removed over time when the fintech ecosystem in Vietnam reaches an acceptable level of development and more data is available.

In addition, a few frameworks of fintech ecosystem is applied in this study while there are some other frameworks on this matter. While reviewing theoretical frameworks to be applied in this study, three types are reviewed including business ecosystem, innovation ecosystem and fintech ecosystem. Though in the selected theory in fintech ecosystem can be found aspects of business ecosystem and innovation ecosystem, all aspects cannot be covered. Studies of Vietnam's fintech from broader perspectives of business ecosystem or innovation ecosystem can be developed.

Lastly, this thesis takes only Singapore as an example of a successful fintech ecosystem. Singapore has similarities in fintech demand of individual, businesses and financial institutions. This country locates in the same geographical region with Vietnam. Achievements that Singapore's fintech ecosystem has had are definitely a rich source of experience for Vietnam. However, Singapore is not the only advanced fintech ecosystem. Taking only Singapore as the role model may exclude best practice in other developed ecosystems. Further research taking case study of other countries is needed.

6 SUMMARY

In this thesis, the emergence of fintech ecosystem in Vietnam is analyzed by answering three sub-questions:

- What are actors of a fintech ecosystem?
- What is role of each actor?
- How do those actors connect to each other?

The research is done to find out the necessary ingredients of fintech ecosystem in Vietnam. By analyzing each actor with data from reality, the incomplete actor – capital is identified. In Vietnam now has not been recorded any fintech companies funded by angel investors or venture capital. Taking Singapore's fintech ecosystem as role model, though talent in Vietnam has similar academic result at school, the gap between that good academic performance and good results at work is huge. Due to weak base of talent, solutions brought to the ecosystem are not strong. While the actor policy greatly encourage the other actors in Singapore's fintech ecosystem, the support of policy in Vietnam is not that great. However, with existence of all basic actors of a fintech ecosystem, it is possible for Vietnam to have a complete fintech ecosystem in the future.

This topic is chosen because there has been little research on fintech in Vietnam as an ecosystem. Popular information about fintech is fragmented news of some new fintech companies or meetings, events. When Vietnam's market is more and more attractive to both local and foreign investors, a scientific research is necessary for all related parties to be aware of themselves and well-prepared for upcoming threats and opportunities.

This study adopts theory of Nicoletti (2017) and Adner and Kapoor (2016). From Nicoletti (2017), five actors of a fintech ecosystem are recognized. They are demand, talent, solutions, capital and policy. All individuals, businesses and financial institutions have demand for modern financial products and services, originating from prevalence of technology in nearly all aspects of life now. Good academic performance at school shown by PISA result is not enough to bring excellence to technology and financial institutions. Talent of technology places has little been mentioned. Some banks are incorporating fintech in their operations. Fintech entrepreneurs are generally potential but they need to be better equipped with expertise knowledge and more innovative. Solutions from academic resources are almost zero, from fintech companies not diverse, from crowdsourcing too tiny. The collaboration between fintech companies and banks is bringing advantages to both parties. Angel investors and IPO are now not a viable option for fintech companies in Vietnam. Venture capital is easier to reach. Both local and foreign venture funds are showing interest in Vietnam's fintech. Policy is still more in paper than in practice.

After discussing the role of each actor and their correlation, the discussion moved to recommendations drawn from the theory of Adner and Kapoor (2016). Based on their framework, Vietnam is now in the first stage, in which traditional financial services do not completely meet growing customer need while fintech started to be paid special attention to. A sensible approach is to devote huge effort to fintech. This is proven in reality of Singapore. Fintech companies are in the heart of their ecosystem and all the actors are working hard. Some lessons can be learned from Singapore are: focusing on fintech companies – this is also emphasized in Nicoletti (2017)’s framework, policy offering more incentives to investors in fintech companies and supporting to improve quality of talent and solutions.

Because the scope of this thesis is broad, an in-depth analysis of each actor in the ecosystem is not performed. Missing data in some parts brings difficulty in delivering a thorough analysis. Additionally, the selection of two out of many frameworks may raise the possibility of overlooking strengths of other frameworks. Taking only Singapore as a role model may count out good examples from other countries.

This thesis would like to start the structural discussion about fintech ecosystem in Vietnam to understand more its emergence in order to have more ways to develop it. The author hopes that the findings of this thesis are useful to understand how fintech ecosystem emerges in Vietnam, encourage more research on this phenomenon and catch more interest from international investors in Vietnam’s fintech.

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APPENDICES

Appendix 1 Four stages of a business ecosystem (Moore 1993)

The Evolutionary Stages of a Business Ecosystem		
	Cooperative Challenges	Competitive Challenges
Birth	Work with customers and suppliers to define the new value proposition around a seed innovation.	Protect your ideas from others who might be working toward defining similar offers. Tie up critical lead customers, key suppliers, and important channels.
Expansion	Bring the new offer to a large market by working with suppliers and partners to scale up supply and to achieve maximum market coverage.	Defeat alternative implementations of similar ideas. Ensure that your approach is the market standard in its class through dominating key market segments.
Leadership	Provide a compelling vision for the future that encourages suppliers and customers to work together to continue improving the complete offer.	Maintain strong bargaining power in relation to other players in the ecosystem, including key customers and valued suppliers.
Self-Renewal	Work with innovators to bring new ideas to the existing ecosystem.	Maintain high barriers to entry to prevent innovators from building alternative ecosystems. Maintain high customer switching costs in order to buy time to incorporate new ideas into your own products and services.

Stage 1 aims at finding out customer needs. Dominants of this stage are those who express the best customer value proposition.

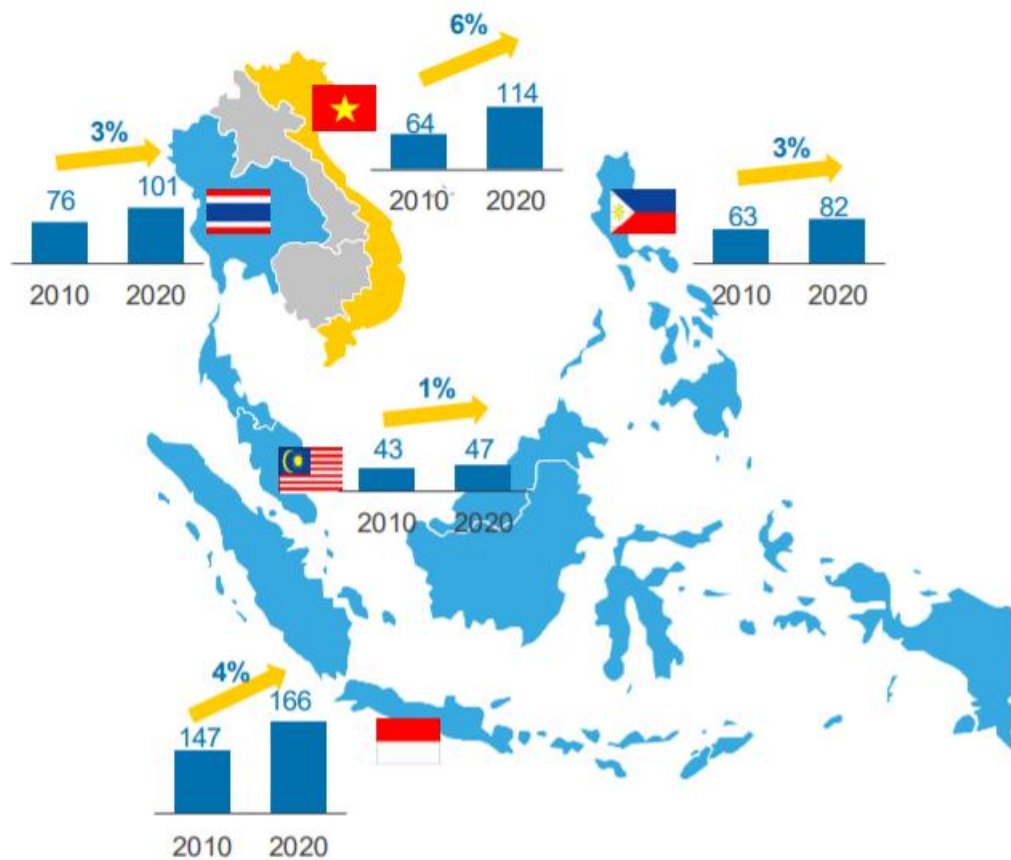
Stage 2 is when ecosystems are scaling up. Together with broader border is bitter rivalry. One ecosystem may achieve victory and the others become weaker but never disappear, creating a circulation.

Stage 3 is time for companies to build their own standards and relationships with customers and suppliers.

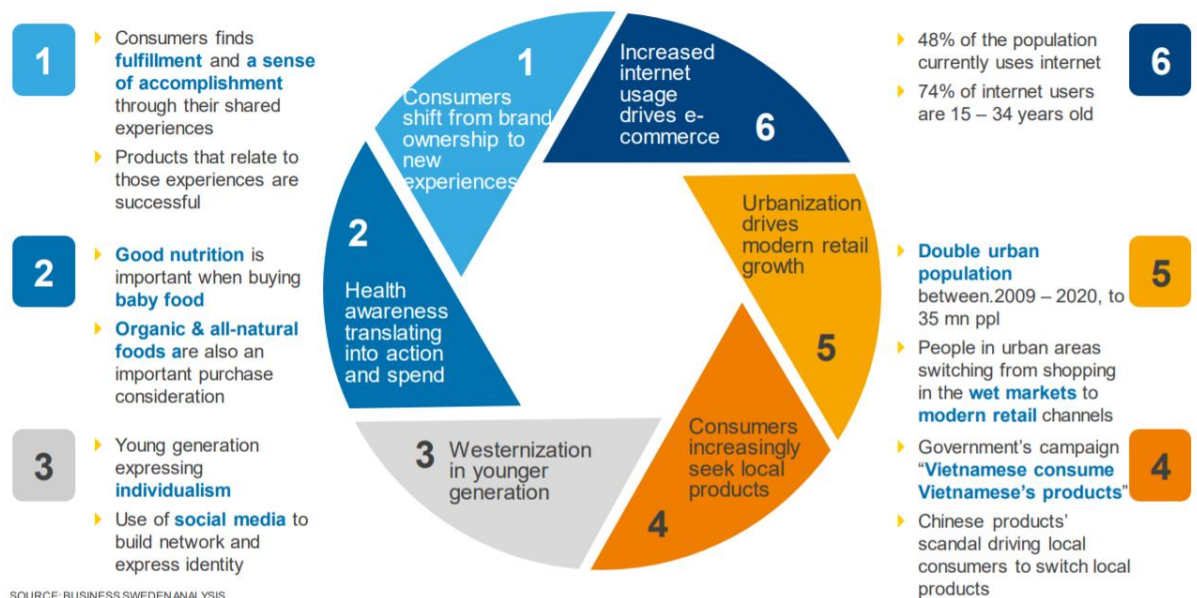
Stage 4 happens when companies come to maturity and are under threat from new ecosystems.

Appendix 2 Vietnam's consumer market (Capturing the – – 2018)

Fastest growth of consumer market in Vietnam, USD trillion

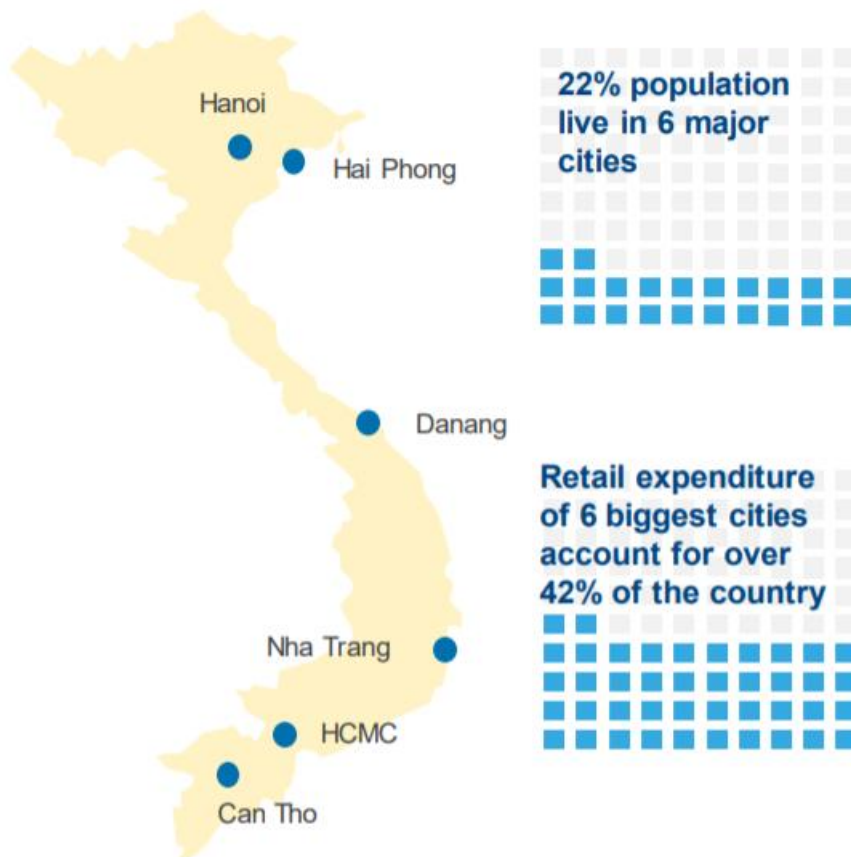


Changing consumption behaviour



Differences among regions

6 MAJOR CITIES IN VIETNAM



- ▶ Brand loyal
- ▶ Passionate about luxury brands

Hanoian**Purchasing
behaviour****HCMC**

- ▶ Open to new products
- ▶ Embrace change

Rural

- ▶ Rely on recommendations from retailers & commercials
- ▶ Less educated

Appendix 3 Enterprise crowd platforms (Grewal-Carr and Bates 2016)

<i>Crowdsourcing model</i>	<i>Good for</i>	<i>Not so good for</i>	<i>Examples</i>
<i>Crowd collaboration</i>	<ul style="list-style-type: none"> • Tasks requiring the aggregate 'wisdom of the crowd' • Generating outside ideas 	<ul style="list-style-type: none"> • Promoting individual capabilities or expertise • Predetermined outcomes 	<ul style="list-style-type: none"> • 99Designs • X Prize • Quirky
<i>Crowd competition</i>	<ul style="list-style-type: none"> • Creating actionable solutions • Developing prototypes • Building a sense of community • Generating outside ideas • 'Gamification' 	<ul style="list-style-type: none"> • Predetermined outcomes 	<ul style="list-style-type: none"> • TopCoder • Kaggle • InnoCentive • Applause
<i>Crowd labour (microtasks)</i>	<ul style="list-style-type: none"> • Well-defined, everyday tasks for individuals that require general skills only • On-site manual work, such as store restocking, furniture assembly and cleaning • Large crowds • When you don't want to hire permanent employees or contractors • Real-time market intelligence or data gathering 	<ul style="list-style-type: none"> • Poorly defined, unstructured or non-routine activities • Tasks requiring subjective judgement • Tasks requiring specialist or higher-level cognitive skills 	<ul style="list-style-type: none"> • TaskRabbit • Amazon's Mechanical Turk • Streetbees • Gigwalk • Samasource
<i>Crowd labour (mesotasks)</i>	<ul style="list-style-type: none"> • Well-defined tasks that require specialist processing skills • Routine but time-consuming activities, such as data entry • When you don't want to hire permanent employees or contractors 	<ul style="list-style-type: none"> • Poorly defined, unstructured or non-routine activities • Tasks requiring subjective judgement or specialist skills 	<ul style="list-style-type: none"> • Lionbridge • CrowdFlower
<i>Crowd labour (macrotasks)</i>	<ul style="list-style-type: none"> • Poorly defined or unstructured tasks or problems, such as strategy development, research or consulting • Tasks requiring subjective judgement or specialist skills • When you don't want to hire permanent employees or contractors 	<ul style="list-style-type: none"> • Routine tasks and activities 	<ul style="list-style-type: none"> • 10EQS • Wikistrat • OnFrontiers • Applause
<i>Crowdfunding</i>	<ul style="list-style-type: none"> • Fundraising • Start-ups • High transparency 	<ul style="list-style-type: none"> • Financing ongoing operations • Loosely structured initiatives • High short-term expectations 	<ul style="list-style-type: none"> • Kickstarter • CrowdCube
<i>Crowd curation</i>	<ul style="list-style-type: none"> • Building and sharing knowledge 	<ul style="list-style-type: none"> • Solving defined problems 	<ul style="list-style-type: none"> • Wikipedia • TripAdvisor
<i>User-generated content</i>	<ul style="list-style-type: none"> • Building large content repositories 	<ul style="list-style-type: none"> • Ensuring the best possible quality of content 	<ul style="list-style-type: none"> • YouTube • iStockphoto