THE DETERMINANTS OF FINTECH EMERGENCE: A CROSS COUNTRY STUDY

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ABSTRACT

THE DETERMINANTS OF FINTECH EMERGENCE: A CROSS COUNTRY STUDY

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The emergence of Financial Technology (Fintech) entrepreneurship differs across countries over the years. This thesis explores the determinants of Fintech entrepreneurship that emerged in the last decade. To illustrate the effects of possible determinants three historically connected model in Entrepreneurship theory is used.

The first model relates the level of Fintech entrepreneurship to economic development level where the relationship found to be positive. The second model argues that a regime switching effect occurs due to technological development. Consequently, the widespread usage of mobile phone has created a demand increase

in alternative financial services products and hence motivates the talented individuals to establish Fintech startups. The third model is inspired from Verheul et al's Eclectic Theory of Entrepreneurship (2002) which explains determinants of Entrepreneurship by combining different disciplinary approaches based on a supply and demand framework. Analogously, the supply and demand factors used in the eclectic model proposed in this thesis compiled from qualitative academic researches and practitioner reports about Fintech.

This thesis shows that while Fintech entrepreneurship positively influenced by high economic development level, mobile phone subscription, available traditional financial services, and government interventions such as availability of Venture Capital, supportive STEM education, and business friendly environment, it negatively affected by the affordable traditional financial services in developed countries.

In conclusion, along with its parallel findings to existing qualitative studies on Fintech, this thesis is contributing to the entrepreneurship literature by providing evidence that the main principles of entrepreneurship theory are applicable to this particular field.

Keywords: Financial Technology (Fintech) Entrepreneurship, Startup, Financial Institutions

ÖZ

FİNTECH GİRİŞİMCİLİĞİNİN GELİŞMESİNE ETKİ EDEN FAKTÖRLER: ÇAPRAZ ÜLKE ÇALIŞMASI

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Finansal Teknoloji (Fintech) girişimciliği ülkeler arasında yıllar boyunca farklılık göstermektedir. Bu tez, son on yılda ortaya çıkan Fintech girişimciliğinin belirleyicilerini araştırmaktadır. Bu çerçevede, olası belirleyicilerin etkilerini göstermek için, girişimcilik teorisinde tarihsel olarak bağlantılı üç modelden yararlanılmıştır.

İlk model, Fintech girişimcilik düzeyinin ekonomik gelişim ile ilgili olduğunu savunur. Ampirik çalışmada iki değişken arasındaki pozitif ilişki gözlenmiştir. İkinci model, teknolojik gelişmenin rejim değiştirici etkiler ortaya çıkartarak girişimciliğe

müsade edeceğini savunmaktadır. Bu çalışma, cep telefonu kullanımının yaygınlığındaki artışın Fintech girişilerince sağlanan alternatif finansal hizmetlere olan talebi artırarak Fintech girişimciliğini motive ettiğini göstermektedir. Üçüncü model, Verheul ve arkadaşlarının (2002) arz ve talep çerçevesinde farklı disiplinlerin yaklaşımlarını birleştirdiği girişimciliğin belirleyiciğini açıklayan Eklektik Girişimcilik Teorisinden esinlenmiştir. Bu çerçevede bu tezde önerilen eklektik modelde kullanılan arz ve talep faktörleri Fintech ile ilgili niteleyici akademik araştırmalar ve uygulama raporlarından derlenmiştir.

Bu tez, Fintech girişimciliği üzerinde yüksek ekonomik gelişim düzeyi, cep telefonu aboneliği yaygınlığı, mevcut geleneksel finansal hizmetlerin varlığı, girişim sermayesinin varlığı, destekleyici STEM eğitimi, ve işletme dostu ortamlar gibi devlet müdahalelerinin olumlu etkisini gösterirken gelişmiş marketlerde geleneksel hizmetlerin erişilebilirliğinden olumsuz etkilendiğini göstermektedir.

Sonuç olarak, Fintech girişimciliğindeki mevcut nitel araştırma sonuçlarına paralel olan bulguları ile birlikte bu tez girişimcilik teorisinin temel prensiplerinin bu alana uygulanabilir olduğunu göstererek literatüre katkı sağlayacaktır.

Anahtar Kelimeler: Finansal (Fintech) Teknoloji Girişimciliği, Girişimcilik, Finansal Enstitüler

To My Loving Family

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CHAPTER 1

1. INTRODUCTION

Who could believe that entrepreneurs can change the financial sector by applying technology in a new business model? In 2014 World Economic Forum, 50 senior financial services leaders asked about the future of financial services and Fintech startup intrusion into financial services. The respondents all agreed that regulation complexity of the financial industry would refrain these Fintech startups out of industry. In other words, these leaders thought that Fintech companies have no chance to survive in financial services industry against traditional banks.

Same group interviewed once again in 2015 World Economic Forum and they admitted that the business model of these small entrepreneurship and the product offerings of these Fintechs are very different, and incumbents admitted that these new entrants survived successfully and shaved incumbent's profits. Hence, incumbents started to see the intruders as a threat.

Third time in row, when the same group of business leaders were interviewed on the same topic in 2016, the incumbent companies started to see Fintech companies as an opportunity to fix financial industry rather than a threat. Hence, the incumbents started to establish partnerships with Fintech companies (McWaters, 2016).

Currently, more than 13 incumbents are actively investing in Fintech startups. Other than incumbents' interest, Fintech startups are seriously attracting investors all over the world. Last year, the global Fintech investments are grown by $27.4Billion with an 18% year-on-year increase (Consultancy UK, 2018). Moreover, according to KPMG Venture Pulse Report 2018, Venture Capital funds are seeking to invest more in Fintech startups that are specialized in Artificial Intelligence and Blockchain

applications in finance, hence this is a positive sign that the Venture Capital interest will continue in Fintech entrepreneurships.

The interest in Fintech field is not limited to incumbents and investors, big technology companies ("BigTech") and telecommunication companies saw the opportunity and by supporting intrapreneurial efforts, they became an important player in Fintech market (for example Alibaba in China, Mpesa in Africa). Thus, many different players appeared in Fintech market in a blink of eye. Currently, the market is consisted of entrepreneurs, incumbents, venture capitalists, thought leaders, big technology companies, and telecommunication companies.

Appearently, Fintech is becoming a buzzword for the last couple of years. The word is listed as one of Google's most searched terms per google analytics since 2012, and has already in placed in the Oxford dictionary which is defined as "computer programs and other technology used to support or enable banking and financial services"(Schueffel, 2016). In addition to these popular facts, the initial interest to explain the determinants of Fintech phenomenon is started by consulting companies (Ernst & Young, 2016, 2017; KPMG, 2018; Scally, 2017). Ernst & Young's Adoption Index, which conducted a survey in 20 markets over 22,000 digitally active individuals in every two-year period, showed that one third of respondents are using at least two Fintech services. In addition to this type of survey-based studies, the pragmatic evidences such as increasing level of venture capital investment amount reached to USD 27.4 Billion in 2017 (CB Insight, 2018) also proves the importance of this phenomenon. In a similar manner, how entrepreneurship itself has attracted many academician's attention for a long time, Fintech phenomenon has also attracted them for the last decade (Gomber, Kauffman, Parker, & Weber, 2018a, 2018b; Gomber, Koch, & Siering, 2017; Haddad & Hornuf, 2018; I. Lee & Shin, 2018; Schueffel, 2016). Several journals (such as Journal of Management Information Systems) prepared special topic issues, several business schools open specific courses on Fintech (for instance Colombia University) and almost all finance conferences are holding a special session on Fintech.

Fintech entrepreneurship which can be seen as a special form of entrepreneurship, has been changing the scheme of the financial industry dramatically (World Economic Forum, 2016). Hence, it is worth to examine the determinants of the

emergence of these brave entrepreneurs. In psychology, in order to something defined as important, it has a life changing effect. Does Fintech change our lives? Alternatively, is it really that much known by ordinary people?

This study will examine the Fintech entrepreneurship under general entrepreneurship theory. To serve this purpose an eclectic model proposed based on earlier studies in entrepreneurship literature. Aggregate conditions such as technological development, economic development level, trust levels of customers in traditional banking, and regulatory and governmental interventions influencing opportunities, resources, skills, and preferences to become entrepreneur in a country used to explain Fintech phenomenon. Previous studies explaining Fintech startup formation across countries are explained as the outcome of supply and demand conditions for this particular entrepreneurship (Haddad & Hornuf, 2018), the drivers of financial innovation (Schindler, 2017), or the outcome of entrepreneurship ecosystem (Deloitte, 2017b; Ernst & Young, 2016; Gordon, Deighton, Ullrich, & Marcu, 2013). In this study, we will provide an empirical analysis based on simplified version of Verheul et al's (2002) Eclectic Entrepreneurship Model to measure the rate of Fintech entrepreneurship across groups (Verheul et al., 2002). The model presented by Verheul et al. (2002) is a comprehensive one as the determinants of entrepreneurship addressed under a framework that incorporated different disciplinary approaches on a supply and demand framework.

In this thesis, the determinants and their effects on Fintech entrepreneurship emergence is tested under three models that are widely used in entrepreneurship theory. In the first model, the level of economic development selected as the main determinant to explain Fintech Entrepreneurship density. In line with empirical results Carree et al. (2002) and Acs et al. (2008) on entrepreneurship, a u-shaped relationship between Fintech Entrepreneurship density and economic development level is expected. The u-shaped relationship explained by the economic development stage of the countries. For instance, the economies at factor-driven stage and at innovation-driven stage have significantly higher entrepreneurial levels than economies at efficiency-driven stage. For a factor-driven staged country, the necessity entrepreneurship is emerged, as individuals cannot find job to live. Moreover, for innovation-driven staged countries, the opportunity entrepreneurship

arises, as the talented individuals prefers to work for themselves instead of being an employee. On the other hand, in efficiency-driven economies, being an employee in a big company is safer than being an entrepreneur. Hence, talented individuals prefer to become a paid employee instead of being self-employed. Innovation driven countries which are represented by high economic development level harness more high-tech entrepreneurship which basically converts scientific knowledge into business opportunity (Van Roy & Nepelski, 2017). Analogously, a direct application of Information Computer Technology (ICT) methods into knowledge-intensive financial services industry by Financial Technology Startups seen as an example of opportunity entrepreneurship. Naturally, in line with the findings of empirical studies in entrepreneurship theory, economic development level thought to be an important explanatory factor in Fintech entrepreneurship.

A second model used to show another important factor namely technological development that have regime switching effect on financial services industry. This regime switching effect leads to a decrease in importance of scale economies. Hence this will create room for entrepreneurs (Audretsch & Thurik, 2001). In the last century, inventions and innovations has had changed human history drastically. In the second half of 19th century, technological development created a regime switching effect. This enabled the startups such as Siemens, Bayer, Opel, AT&T, GE, GM, and Boeing to become an important player in the business environment. The diffusion of the technology that these companies used took approximately half century. Similarly, technological advancements especially mobile internet technology played a crucial role in emergence of Fintech startups in Financial Services Industry (Alt & Puschmann, 2016; Arner, Barberis, & Buckley, 2015; Boot, 2017; Lewan, 2018a; Puschmann, 2017). Hence, technological development especially mobile technology has become a natural candidate to explain Fintech emergence.

Still, neither economic development level nor regime switching effect of technological advancements can clearly explain Fintech entrepreneurship emergence. In classical entrepreneurship theory, economic and non-economic, such as technology, demography, culture, institutions, believed to be the influencing factors

in entrepreneurship level. In a similar logic, in this thesis, an eclectic model proposed to explain emergence of this game changer natured entrepreneurs.

Therefore, this thesis aims to investigate further the several determinants of emergence in Fintech entrepreneurship. Following the demonstration of the research questions and the significance of the study in Chapter 1, a short literature review provided in Chapter 2. Following this background, the theoretical background of the study, the proposed model along with corresponding hypothesis provided in Chapter 3. In Chapter 4, the data and methodology to analyze the data presented. Accordingly, the results reviewed in Chapter 5. Finally, in Chapter 6 the conclusions derived from the findings of study discussed along with implications on the several counterparties of Fintech**.**

1.1 Research Question

Financial services industry has been going through a dramatic change for the last decade (Alt & Puschmann, 2012; Malone, Yates, & Benjamin, 1987; Tallon, 2010). All around the world, the industry is witnessing entrance of small sized startup companies for the first time in its history(Ernst & Young, 2016). The future effect of these new entrants are ambiguous but the disintegration effect that they created is obvious(Basel Committee on Banking Supervision, 2018). The purpose of this study is to investigate the major determinants of Fintech startup emergence across the globe. Therefore, this thesis focuses on the following research questions:

What are the factors that affect the emergence of Fintech entrepreneurship density and how these factors are affecting it?

1- How does government interventions,

   a. motivate venture capital accessibility which will support Fintech entrepreneurship supply?
   b. Specificaly effecting Fintech Entrepreneurship supply, help to decrease information gap?
   c. reduce talent gap to support Fintech entrepreneurship supply, in other words increase skilled labor force in the country via education?

d. create business friendly environment to improve Fintech entrepreneurship demand?

2- How does technological developments effect Fintech entrepreneurship demand?

3- How does economic development level effect Fintech entrepreneurship demand?

4- How does decreasing trust in traditional banking players effect Fintech entrepreneurship demand?

5- Does Fintech startups be a competitor against traditional banks or does Fintech will be complimentary service to traditional banks.

1.2 Significance of the Study

The present study is significant in three main aspects. First, this study addresses a phenomenon that financial services industry has been encountering for a very short time. Moreover, this study establishes a link between practitioner reports and academic studies. Although, it attracts a huge attention, the academic studies are still scarce. The initial studies conducted by practitioners and based on surveys and interviews with industry experts. A similar trajectory which seen in the academic studies follow practitioner reports with a lag and are mostly qualitative.

Second, the present study points out that Fintech Entrepreneurship is nothing but a new type of Entrepreneurship. Hence, it perfectly inherits the features of existing entrepreneurship models.

Third, to best of my knowledge, no previous study thus far has provided an empirical evidence on the determinants of Fintech entrepreneurship with this much detail. Therefore, this study contributes to the development of the Entrepreneurship literature, by specifically addressing Fintech entrepreneurship and its determinants.

2. LITERATURE REVIEW

In literature, from different perspective many researchers investigated the determinants of Fintech entrepreneurship. Naturally, before academicians, mostly practitioners such as consulting companies, incumbent companies, and regulators have been trying to understand the determinants of Fintech phenomenon. Initial studies explaining Fintech startup formation across countries based on three strands. The first one is based on the outcome of supply and demand conditions (Haddad & Hornuf, 2018), second one is based on drivers of financial innovation (Schindler, 2017), and the third one is based on entrepreneurship ecosystem (Deloitte, 2017a; Diemers et al., 2015; Ernst & Young, 2016; Gordon et al., 2013; Lee & Shin, 2018).

Among these studies, in Gordon et al. (2013) which is a qualitative study highlighted the digitalization trend in banking industry. The data collected through expert views and interviews with 50-retail bank's executives in this study. The researchers identified four factors, namely the regional banking capabilities, the domestic customer demands, the external market dynamics, and the regulation level of the market, which triggers the digitalization trend in banking sector across the different countries. Based on these four factors they assigned a digital banking readiness index to each country and categorized countries into three markets: Sprinter, Siesta, and Marathon. With this categorization, the markets classified based on the readiness for an external player such as Fintech startups or telecommunication companies. Their analysis primarily based on the bank's point of view and how they will act in each market type. For instance, in sprinter markets such as the United Kingdom, the United States, and Canada financial services customer were ready to use digital banking solutions however; the incumbents were not able to answer this request. Hence, from their point of view, this gap was filled by non-bank companies namely Fintechs (Gordon et al., 2013).

On the other hand, from an academic point of view, Haddad and Hornuf (2016, 2018) probe the economic and technological factors effective in Fintech startup

formation in the supply and demand context. In their study, well-developed economies with readily available venture capital funds found to be a collateral factor in Fintech startup formation. In addition to these factors, level of internet connectivity, high level of mobile phone subscription along with the size of available labor force and lack of access to loans are found to be effective factors on the Fintech development in a market (Haddad & Hornuf, 2016, 2018).

As a third strands of methods, the Ecosystem approach followed by consulting company studies (Deloitte, 2017a; Diemers et al., 2015; Ernst & Young, 2016; Gordon et al., 2013). Diemers et al. (2015) claims that heavy utilization of technological innovations in finance is the main trigger of Fintech ecosystems. Hence, with the help of technologically superior applications created a more efficient financial market and increased customer satisfaction in the US and Europe. In the study, Fintech ecosystem is composed of three major players, namely Entrepreneurs, Governments, and Financial Institutions. In their case study, they demonstrated necessary steps to establish a successful Fintech ecosystem in Gulf Cooperation Council (GCC) countries. Given the current situation of GCC countries, they concluded that governments are the major player to nurture Fintech start-ups in this specific market (Diemers et al., 2015).

Following Diemers et al.'s footsteps, Fintech ecosystem contributors, Lee & Shin (2018) studied Fintech business models and investment types. Lee and Shin (2018) enlarged Diemers et al. (2015)'s Fintech ecosystem model by adding financial customers and technology developers. Moreover, in their study the usage of real options for Fintech investment valuation is demonstrated to reflect the incumbent's point of view on the subject (Lee & Shin, 2018).

In 2016, one of the best-in-class leader consulting company Ernst & Young (EY) conducted a special study to compare seven Fintech ecosystems. The study based on the identification of four fundamental attributes that directly affect the future success of the ecosystem. Their study based on over 65 external stakeholder interviews and more than 30 internal EY interviews. Availability of talent, capital, demand, and friendly policy environment are the key nurturing environment attributes for a Fintech ecosystem. Hence, the study exemplified that with the availability of these

four attributes make the United Kingdom market flourish in Fintech. (Ernst & Young, 2016).

Delloitte conducted another ecosystem framework study in 2017; they selected 44 Fintech hubs and interviewed executives of these hubs. In Delloitte's study, existence of government support, availability of innovation culture, customer readiness, talent availability, existence of foreign start-ups, regulatory support selected as the main attributes to nurture a successful Fintech ecosystem. Other than these attributes, the study assigns a synthetic index calculated by summation of Global Innovation Index, Doing Business Index, and Financial Center Index to compare these 44 Fintech hubs. The study highlighted the hub features in terms of technologies, innovation areas, and challenges specific to each hub. Moreover, study exemplifies the top Fintech companies in each hub, big investors, and success stories (Deloitte, 2017a).

From a different perspective, Schindler (2017) explained the Fintech development in financial innovation framework based on supply and demand factors in an abstract manner. The paper answered two major questions: "Why Fintech is happening right now?" and "Why Fintech is getting more attention than traditional innovation normally does?" While answering these two questions, Schindler (2017) tried to explain the origins and the growth of Fintech and its potential effect on financial stability. Schindler highlighted that even though the underlying technology of Fintech innovations are not new, but these technological developments have been recently applied to financial services. Moreover, in his study Schindler emphasized that the expected depth of Fintech innovation is greater than any financial innovation occurred before. Hence, it will have a greater potential to change the financial services industry drastically (Schindler, 2017).

Even though the existing Fintech literature is limited, it would be appropriate to study utilize the entrepreneurship literature to explain Fintech determinants. The determinants of entrepreneurship explained by several different factors in literature. As a starting point to compare the level of entrepreneurship, studies used several different measures. Some of the most popular studies define the level of start-up activity based on three measures. These are: the rate of new entrepreneurs (the percentage of adults transitioning into entrepreneurship at a given point in time), Opportunity Share of New Entrepreneurs (The percentage of new entrepreneurs

driven primarily by “opportunity” vs. “necessity), and Startup Density (The number of new employer businesses normalized by population or labor force) (Morelix, Reedy, & Russell, 2016). In this study, Startup Density used as the measure for the level of Fintech entrepreneurship.

This study hypothesis that the Fintech start-up density has been changing over the regions and years and aim to vocalize the determinants of this change under entrepreneurship theory. Similarly, a significant difference among level of entrepreneurship across countries or regions are shown by several studies (Acs, Szerb, & Autio, 2017; Stel et al., 2003). For instance, in these studies the variance in entrepreneurship level is attributed to several different factors such as levels of economic development, he divergence of demographic features of the countries, the dissimilarities in cultural and institutional characteristics as well as the unpredictable consequences of fast pace of technological innovation (Blanchflower, 2000; Verheul et al., 2002; Wennekers, 2006). Such a high number of different approaches to explain same topic is an indicator of multifaceted nature of the topic. For the first time in the literature, Verheul et al. (2002) proposed an eclectic model, which combines all ideas under one umbrella.

Prior to Verheul et al. (2002)’s eclectic model, scientists used different approaches to explain change of level of entrepreneurship across countries. One of the schools of thought argued that the economic development levels of the countries (per capita income levels used as proxy) are the main determinant of the level of entrepreneurship in a country. In relation to this, many empirical studies provided evidence of a significant relationship between the level of entrepreneurship and per capita income level (Acs, Audretsch, & Evans, 1994; Audretsch, 2007; Audretsch & Acs, 1994; Carree et al., 2002; Porter, Sachs, & Mcarthur, 2002; Stel et al., 2003; Verheul et al., 2002; Wennekers, 2006; Wennekers, Uhlaner, & Thurik, 2002). One of the most famous study (Carree et al., 2002) summarizes the arguments behind a u-shaped relationship between per capita income and the rate of self-employment i.e. entrepreneurship.

The second strand of school of thought investigated the effect of technological advancement, which called regime-switching effect, on the level of entrepreneurship. This effect attributed to a reduction in importance of economies of scale by the

technological advancement. Hence, it creates a room to small entrepreneurs that has an innovative advantage over established counterparts. In his seminal work "Theory of Economic Development", Schumpeter (1934) explained the effect of technological development and its usage by a framework. This framework has two major parts; Schumpeter Mark I and Schumpeter Mark II regime. In the first part, technological advancement is resulted in a **creative destruction** that allows the entrance of entrepreneurs using innovative methods to a mature industry dominated by incumbent players using obsolete technologies. After a while later, the new technology become the industry norm and **creative accumulation** starts. While creative destruction represents major characteristics of Schumpeter Mark I regime, creative accumulation represents the major characteristics of Schumpeter Mark II regime (Schumpeter, 1934).

With Schumpeter's work, academicians were able to explain the new economic environment starting from the second half of 19th century. It can be easily understood the success of the new companies - such as Siemens, Bayer, Opel, AT&T, GE, GM, and Boeing - of that era which utilized the innovations such as vaccine, airplane, automobiles, telephone which has had changed human history drastically (Schumpeter Mark I). Just after the effect of creative destruction was on set, starting from the late 19th century, business ownership and management roles separated, this role separation created Managerial Revolution (Chandler, 1977) which helped the scale up the businesses by increasing productivity via R&D activities. During the Managerial Revolution period, the R&D activities of incumbent corporates determined the rate of innovation that prevented start-ups to enter matured industries (Schumpeter Mark II).

A similar pattern in acceleration in entrepreneurial activity in the economy appeared during third industrial revolution period (also known as information and communication technology – ICT- enhancement). This time, ICT has reduced the importance of scale economies in many industries which created room for innovative entrepreneurs (Audretsch & Thurik, 2001; Thurow, 2003). Empirical evidence support the existence of Schumpeterian regime switch in entrepreneurship (Audretsch & Thurik, 2001; Stel et al., 2003; Thurow, 2003; Wennekers, 2006).

On top of those two major determinants, many other economic, demographic, cultural, and institutional variables considered as the determinants of level of entrepreneurship. In the entrepreneurship literature, two of the most popular other economic factors, namely growth and unemployment rate, are used as determinant of level of entrepreneurship: Parallel to this, the relationship between economic growth and entrepreneurship level is modeled and analyzed by Reynolds et al (1994, 2002). In the same studies, the demand changes during the short-run business cycle fluctuations found to be effective in the entrepreneurship level (Reynolds et al., 2002; Reynolds, Storey, & Westhead, 1994). On the other hand, other empirical studies showed that unemployment is an effective supply factor for entrepreneurship level (Audretsch & Thurik, 2000; Verheul et al., 2002).

Moreover, among several demographic factors including population growth, age distribution found to be a significant determinant in entrepreneurship level. As an illustration, a growing population indicates an emergence of increase in consumer market for new services hence demand increase in product market attracts individuals to become entrepreneurs. Among the age groups, studies showed that the entrepreneurship attempts are seen mostly between the age of 25-34 (Armington & Acs, 2002; Delmar & Davidsson, 2000; Lee, Florida, & Acs, 2004; Verheul et al., 2002).In relation to demographic factors, the existence of high quality human capital is considered as an important determinants of entrepreneurship level in a country. For instance, Delmar & Davidson (2000) and Lee et al. (2004) presented that a better-educated population has a positive effect on new firm formation especially in service sector.

Furthermore, several national cultural factors such as national cultural traits (Bosma et al., 2012; Reynolds et al., 2001; Tiessen, 1997; Veciana, 1999; Verheul et al., 2002; Welter, 2012; Wennekers, 2006; Wennekers et al., 2002) and trust level of individuals (Welter, 2012) are used to explain the level of entrepreneurship. For instance, to illustrate the effect of cultural traits on entrepreneurship level, Reynolds et al (1999) used Hofstede's individualism index and in another study, Wennekers et al. (2001) used Hofstede's individualism and avoidance index as national trait indicators. On the other hand, Welter (2012) focused on trust to support development of entrepreneurship level in a country.

Lastly, researchers poked the institutional factors such as regulations and government interventions as a major differentiation factor (Bjørnskov & Foss, 2016; Kreft & Sobel, 2005; McMullen, Bagby, & Palich, 2017; Reynolds et al., 2002; Verheul et al., 2002; Wennekers, 2006; Wennekers et al., 2002). Among the studies in literature, Verheul et al. (2002), Reynolds et al. (2002), and Wennekers (2006) found that fiscal legislation (tax rates and tax breaks) and the social security system have influencing effect on entrepreneurs. Government interventions that changes the administrative requirements for starting a new business can crerate this effect. Other than these classic institutional factors, some articles focused on the impact of public policies related to economic freedom on the entrepreneurship development (Bjørnskov & Foss, 2016; Kreft & Sobel, 2005; McMullen et al., 2017).

After determinants of entrepreneurship linked to many different factors in the literature, researchers focused on cross-country studies and bring these factors to life in different cross-country setting. For instance, economic development (Dvouletý, 2017; Nicolae, Lupu, & Ion, 2017; Valdez & Richardson, 2013), institutional factors (Carbonara, Santarelli, & Tran, 2016; Dempster & Isaacs, 2017; Freytag & Thurik, 2006; Hall, Lacombe, & Pokharel, 2016; Kreft & Sobel, 2005; McMullen et al., 2017; Valdez & Richardson, 2013), availability of funds (Kreft & Sobel, 2005), education (Carbonara et al., 2016), culture, belief, and trust (Hoogendoorn, Rietveld, & VanStel, 2016), social and demographic factors (Grilo & Thurik, 2004), multi-determinant eclectic models (Calá, Arauzo-Carod, & Manjón-Antolín, 2015; Dvouletý, 2018; Nicolae et al., 2017; Roman, Bilan, & Ciumaș, 2018; Rusu & Roman, 2017) are studied in cross country setting. These cross-country studies are not only differentiated in factors, but also different in sample settings. For instance, while Grilo & Thurik (2004) applied their model on 15 European Union countries, Calá et al. (2015) focused on developing countries.

Entrepreneurship has been extensively studied in the literature since it is considered as one of the most important steps in economic development (Carree et al., 2002; Schumpeter, 1934). Especially the multiplier effect in the economy by generating employment opportunities through entrepreneurship found to be crucial. In recent years, governments and economists are focusing on supporting high technology entrepreneurship which is defined as a vehicle to convert scientific knowledge into

economic benefit (Van Roy & Nepelski, 2017) to gain higher benefits. Evidently, high technology entrepreneurship has been contributing world economic development extensively, for instance historically any kind of scientific break-through inventions (such as vaccines, automobiles, telephones, etc.) and innovations (such as Information and Communication Technology (ICT), segregation of business ownership and management roles, manufacturing process improvements) have an extensive effect in business life and world economic development. Analogously, implementation of ICT methods into financial services applications on the knowledge-intensive financial services industry by Fintech startups creates a game changer effect on the financial markets. For this reason, understanding the main determinants of this phenomenon is crucial. In accordance with this purpose, this study proposed an eclectic model specific to Fintech entrepreneurship based on Verheul et al's Eclectic Theory of Entrepreneurship (2002). Moreover, the proposed model tested under nine different hypotheses to seek empirical evidence on major determinants of the Fintech development across the world.

3. THEORETICAL FRAMEWORK AND HYPOTHESIS

In the first part Verheul et al.'s Eclectic Theory of Entrepreneurship (2002) will be visited briefly, the other thought schools – regime-switching effects due to technology and economic development levels of the countries will not be revisited as those models are covered under eclectic model in detail. Then the proposed eclectic model on Fintech entrepreneurship introduced along with hypothesis. The proposed eclectic model based on role of supply and demand distinctions. In order to explain this distinction in detail, two subsections dedicated to explain supply and demand factors.

3.1. Eclectic Theory on Entrepreneurship

Verheul et al.'s (2002) Eclectic theory formed a coherent and unified theory to gather necessary pieces of different disciplines to explain determinants of entrepreneurship. The model presented by Verheul et al. (2002) is a comprehensive model that incorporated different disciplinary approaches, level analysis, a distinction between supply and demand framework, and a distinction between the actual and equilibrium rates of entrepreneurship. Their study models determinants based on distinction between supply and demand as well as the role of government intervention through linking policies and the effects of these policies on supply and demand factors on entrepreneurship.

In their analysis, the demand side represents the opportunities created by the market demand for entrepreneurship that includes user or firm needs and desires for entrepreneurial goods and services in a certain market, the supply side represents opportunities to establish an entrepreneurship.

The major factors affected the rate of entrepreneurship can be listed as macro conditions such as changes in market structure and micro conditions such as entrepreneurial decisions made by individuals, i.e. preferences, or personality traits, values, attitudes or experiences, etc. In micro level, the occupational choice between

being an employee and self-employed is based on individual's choice and this decision making process is a combination of several factors including environmental conditions, individual's characteristics, ability, personality traits, demographic characteristics of individual and preferences. In macro level, this occupational choice is the main determinant of the entry and exit rate of entrepreneurship.

Verheul et al. (2002) defines actual and long-term equilibrium rate of entrepreneurship, and they explained how market conditions and government interventions are the main players to achieve equilibrium rate. They argued that to achieve equilibrium rate of entrepreneurship, government interventions are necessary. For instance, any de-regulation in entry policies, any alteration caused by a change of policy in the demographic structure of labor market for instance, immigration policy, child support to women, any supportive policies to alter individual's abilities or avail resources such as providing incubation centers, consulting and counseling services, direct or indirect financial support, general economic policies such as fiscal incentives, labor market regulations, bankruptcy legislations are directly effective on entrepreneurial supply. Moreover, even though it is a long shot influencer, government intervention is also affecting individual's preferences by altering education or using media power.

In sum, Verheul et al.'s (2002) eclectic theory of determinants of entrepreneurship explains the effect of supply, demand factors and government interventions on the level of entrepreneurship. (Audretsch et al., 2002; Verheul et al., 2002)

3.2. Factors Affecting Fintech Entrepreneurship

Entrepreneurship is described as one of the prime cause of economic development (Schumpeter, 1934), while high-tech entrepreneurship converts scientific knowledge into business opportunity (Van Roy & Nepelski, 2017). The application of ICT methods into knowledge-intensive financial services industry by Fintech startups have a game changer effect on the financial markets. For this reason, understanding the determinants of this phenomenon is important. Hence, in this thesis the determinants of Fintech entrepreneurship will be addressed based on the role of supply and demand distinctions. The determinants in Verheul et al.'s (2002) model filtered carefully based on the literature on Fintech entrepreneurship. The offered

framework in this study provides theoretical arguments accompanied with an empirical analysis on explanatory roles of demand and supply determinants on Fintech entrepreneurship.

It can be defined from labor market perspective, the supply side of the model represents factors affecting resources, abilities, and preferences that individuals willing to utilize to establish a Fintech startup. Moreover, from product market perspective; demand side of the model presents the factors create opportunities to become Fintech entrepreneur.

In the first perspective, the underlying causes of change in Fintech entrepreneur supply investigated and it has been argued that government interventions are the main influencer factor in Fintech supply. The details regarding to supply side factor can be found under section 3.2.1 Supply Conditions.

In the latter perspective, any changes in customer demand or any change in the structure of the industry expected to create room for potential entrepreneurs. Relevantly, technological development, economic development, and change in trust level of the consumers selected as the major influencers of Fintech entrepreneur demand. This perspective detailed in section 3.2.2 under Demand Conditions.

In the next two subsections, detailed analysis and relevant hypothesis provided for supply and demand side of the model.

3.2.1. Supply Conditions Affecting Fintech Entrepreneurship

Supply side of the model, which depicted in Figure 1, represents the factors affecting abilities, resources, and preferences available to establish a Fintech startup by individuals in a country. The Fintech entrepreneurial supply shows the number of entrepreneurs who can use the opportunities offered to them and establish a Fintech startup.

Three major types of interventions are investigated as government interventions under supply side of the model. The first one represents general macroeconomic policies (shown with arrow G1 in Figure 1) effective in supporting entrepreneurship, the second one represents policies to attract venture capital funds which enable startups to reach necessary funding and policies to establish regulatory sandboxes

which provide physical space and information to help startups to reach necessary resources to compete incumbents (shown with arrow G2 in Figure 1). The second one represents education policies which help to reduce talent gap in the industry (shown with arrow G3 in Figure 1). These three types of government interventions aim to motivate individuals by decreasing market imperfections.

The governments are aiming to reduce the finance and knowledge gap of individuals to increase Fintech entrepreneur should proactively support G2 type regulatory changes. To reduce knowledge gap of Fintech entrepreneurs, some governments (currently in over 20 countries) are establishing regulatory sandboxes. Regulatory sandboxes are providing a real-world test environment for new business models which are not currently regulated or supervised by regulatory institutions (BBVA, 2017; Financial Conduct Authority (FCA), 2015). The regulatory sandboxes established to harness Fintech companies to allow test their products and business models in a controlled environment. Hence, regulators are establishing these regulatory sandboxes to protect financial system and consumer rights while offering a direct provision of relevant 'business' information to Fintech entrepreneurs. In addition to regulatory sandboxes, to reduce finance gap, governments incorporate policies that will attract Venture Capital Funds to avail alternative financing tools. Hence, this kind of policy changes are directly aiming to attract more Fintech entrepreneurs by availing necessary physical and financial resources.

Furthermore, governments are intervening the markets by implementing focused education programs to affect the talent level of the population. The arrow G3 in Figure 1 represents this kind of intervention that affects both ability and preferences of individuals and available resources to establish a Fintech. For instance, increasing participation in tertiary education in STEM fields, availing entrepreneurial education along with special courses to increase skills necessary for Fintech can be listed as the common current policies around the world (Digital Finance Institute, 2016).

In relation with these governmental interventions, raising awareness of individuals on entrepreneurship by publishing success stories of previous entrepreneurs through media (Stel et al., 2003; Veciana, 1999, 2007) are also found to be an important contributor in supporting entrepreneurship in a country.

Any government intervention causes an alteration in banking regulations or banking deregulations, or any alterations in macroeconomic policies creating a more flexible business environment will be effective on supply of Fintech entrepreneurship. To elaborate this argument, any policies cause a regulatory arbitrage will create a market demand for Fintech startups, this relationship is illustrated with the arrow G1 in Figure 1. Moreover, any regulatory changes by effecting preferences of individuals (illustrated by the arrow G3 in Figure 1) or providing necessary factors to establish a startup (illustrated by the arrow G2 in Figure 1) incentivize the Fintech entrepreneurship supply (Verheul et al., 2002).

Next four subsections provide detailed information regarding these government interventions.

3.2.1.1. Existence of Business-Friendly Regulations

The first governmental intervention represented by G1 in Figure 1 aimed to affect the general business environment and create an arbitrage favoring the new business establishment in the country.

The intensity and quality of business related regulations may affect the decision making process of individuals to encourage to become an entrepreneur. Especially general macroeconomic policies directly related to income including taxation, influencing business earnings, social security arrangements, labor market legislation, and bankruptcy policy may severely influence the occupational choice of individuals. In other words, the countries that offer friendly business environments positively related to the emergence of entrepreneurial activities. In addition to general macroeconomic policies, government interventions directly effective the competitiveness of the specific market may help to create room for small companies (Verheul et al., 2002).

In relation to these economies, aims to promote any kind of entrepreneurship via adopting supporting regimes found to be attract entrepreneurship talent. Talented individuals are encouraged to establish startups when country has less cumbersome administrative requirements, less bureaucratic costs, and less tax compliance rules, easy hiring and firing policies. In addition to this favorable employment rules and bankruptcy laws found to have encouraging effects on any type of entrepreneurship

including Fintech (Armour & Cumming, 2008). Business friendly environments improved the accessibility of markets by lowering entry barriers for small business. In relation to this view, Haddad and Hornuf (2018) found empirical evidence that business friendly countries harness more Fintech startups. In addition to business friendly environment, more specifically the level of regulation in financial services companies may have a positive impact on the emergence of Fintech startups worldwide (Freij, 2018). In relation to this, open data policies such as PSD2 which became effective in January 2018 in Eurozone is expected to motivate competition (Derebail, Bhushan, Gamblin, & Van Oijen, 2016; Freij, 2018).

Hence, this change expected to create an improvement in the accessibility of markets by lowering barriers to entry for small business. In addition to this, regulators overlooked the activities of non-financial companies in financial services industry. Hence, this may create an arbitrage effect that encourage Fintech startups to access the financial services industry. Several authors argued that the higher stringency level of regulation which intensify barriers to entry may deteriorate Fintech emergence and Fintech related entrepreneurial supply (Boot, 2017; Claessens et al., 2018; Cumming & Schwienbacher, 2018; Navaretti & Calzolari, 2017; Rau, 2017). For instance, in alternative fund transfer services sector, Boot (2017) argued that regulatory developments such as PSD2 in EU would elaborate competition by allowing payment information share among the competitors. In lending side of Fintech market, Rau (2017) found that the crowdfunding volume affected by regulatory strength. Moreover, Navaretti and Calzolari (2017) depicted that more regulated banking sector lowers investment in Fintechs. Furthermore, Cumming and Schwienbacher (2018) suggested that due to regulatory arbitrage the less stringent regulated markets attract more venture capital funds to support Fintech startups. Finally, Claessens et al. (2018) argued that higher stringent banking regulation has a negative impact on Fintech credit activity. Even though individual studies suggest different methods to evaluate stringency level of banking regulation, currently none of them has widely accepted criteria. In order to analyze existing effect of specific policies such as PSD2, more data is necessary. Since a specific measure for regulatory developments such as PSD2 cannot attributed at this point, hence in this study following general entrepreneurship theory found to be more logical.

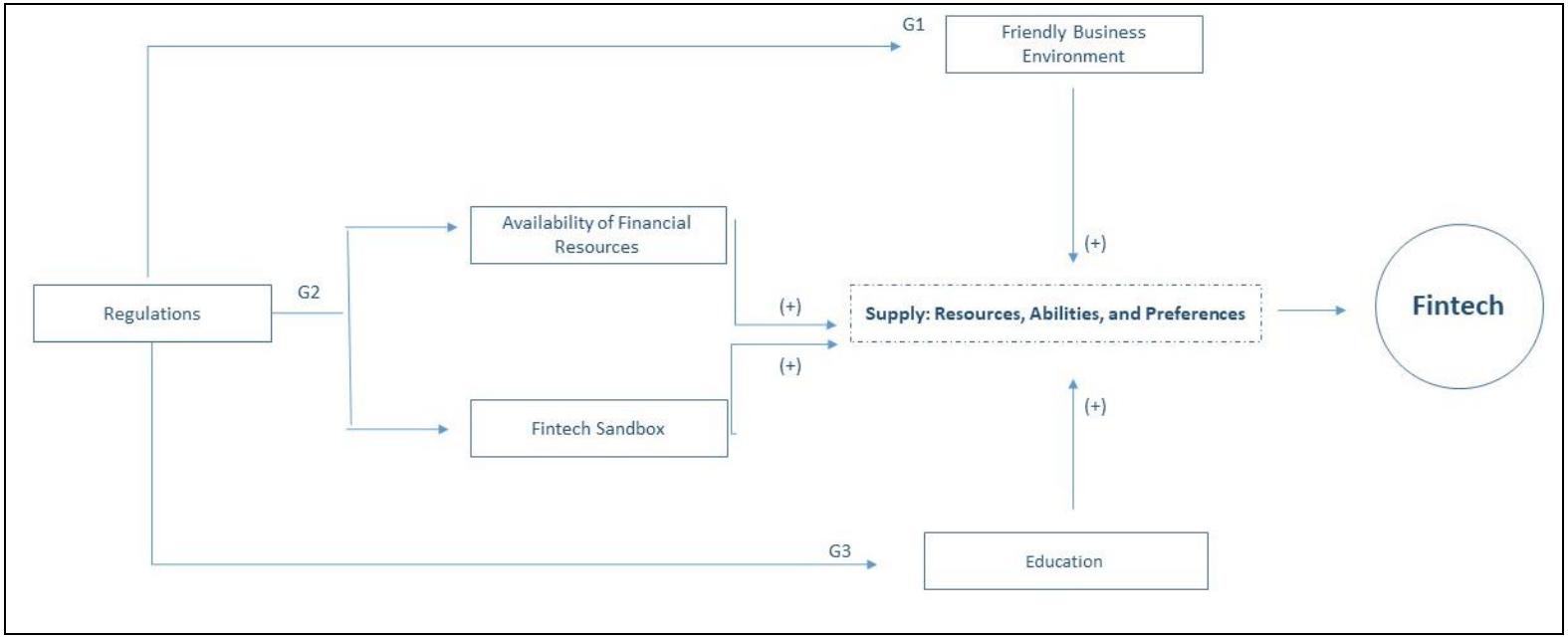

Figure 1 - Supply Conditions effecting Fintech Entrepreneurship

represents the factors affecting abilities, resources, and preferences available to establish a Fintech startup by individuals in a country. The Fintech entrepreneurial supply shows the number of entrepreneurs who can use the opportunities offered to them and establish a Fintech start-up. Government intervention effects general business conditions, availability of resources by reducing financial gap by attracting financial resources to the country, reducing knowledge and experience gap by establishing Regulatory Sandboxes, and reducing the talent gap by supporting STEM education within the country. In this model, three major types of interventions investigated. First type of intervention is effecting the general business environment in the country (shown with arrow G1), the second one is effecting the resources such as funding, physical space, and information via implementing policies to attract venture capital and establishing regulatory sandboxes (shown with arrow G2), and the second one is effecting resources like talent in labor force via education policies (shown with arrow G3).

In the light of earlier studies, this study proposed that this hypothesis:

> **Hypothesis 1: Countries/Regions that have business friendly environment expected to harness higher Fintech entrepreneurship density.**

3.2.1.2. Regulations Affecting the Availability of Financial Resources

The first one of the G2 force represented in Figure 1 aimed to reduce finance gap in the market. Ease of access to finance is found to be one of the most important problems for small and young entrepreneurs by both academic studies and practitioner reports (Block et al., 2018; Ernst & Young, 2013; G20 YEA Summit, 2010; Gaston, 1989; Giudici & Paleari, 2000; Gompers & Lerner, 1999; Misra, Memili, Welsh, & Sarkar, 2014).

To raise capital, the majority of start-up entrepreneurs rely on personal savings or financial support from family members or friends as a first resort. Generally speaking, personal and close network funds might not be sufficient to scale up a start-up or in some cases those funds are not even enough to establish the company (Gaston, 1989; Gompers & Lerner, 1999; Marchese, Potter, & Halabisky, 2014).

To raise seed money, to scale up their business, the startup companies has to seek funding from external resources. Mostly, the external resources represented by traditional sources such as banks. However, newly established companies are generally facing with difficulty to raise capital from banks due to insufficient internal cash flows, lack of collaterals, asymmetric information or agency problems (Beck & Demirguc-Kunt, 2006; Hall & Lerner, 2010). Another fund resource such as capital markets also closed to startups due to their small sizes and their high-risk nature. Therefore, given the existing situation, venture capital and private equities are the only available options as external financing for especially high-risk and high return projects of these startups.

Similar to other startups, Fintech startups have been facing similar barriers in raising capital from formal financial institutions (Haddad & Hornuf, 2018). According to World Fintech Report 2018 Fintech startups are heavily relying on Venture Capital funding which may create a potential funding problem for Fintech startups in the case of losing attractiveness in the future (Capgemini, Linkedin, & Efma, 2018). Luckily, venture capitalists and private equities have been highly interested in

Fintech investments since 2010 and so far there is no evidence of stall or slowdown in this trend (Claessens et al., 2018; Fenwick, McCahery, & Vermeulen, 2017; Lee & Shin, 2018; Pollari, 2016; Press, 2018).

An interesting point to note is the regional variation in venture capital investments in Fintech. Figure 2 clearly represents that the lion share of the venture capital investment in Fintech received by the US market, following the UK market, and finally Asia-Pacific Region. In the USA, the value of investment is spurted by 31% to USD 11.3 Billion, in the UK, the deal values reached USD 3.4 Billion, and in India the investment amount was USD 2.4Billion in 2017 (Consultancy UK, 2018).

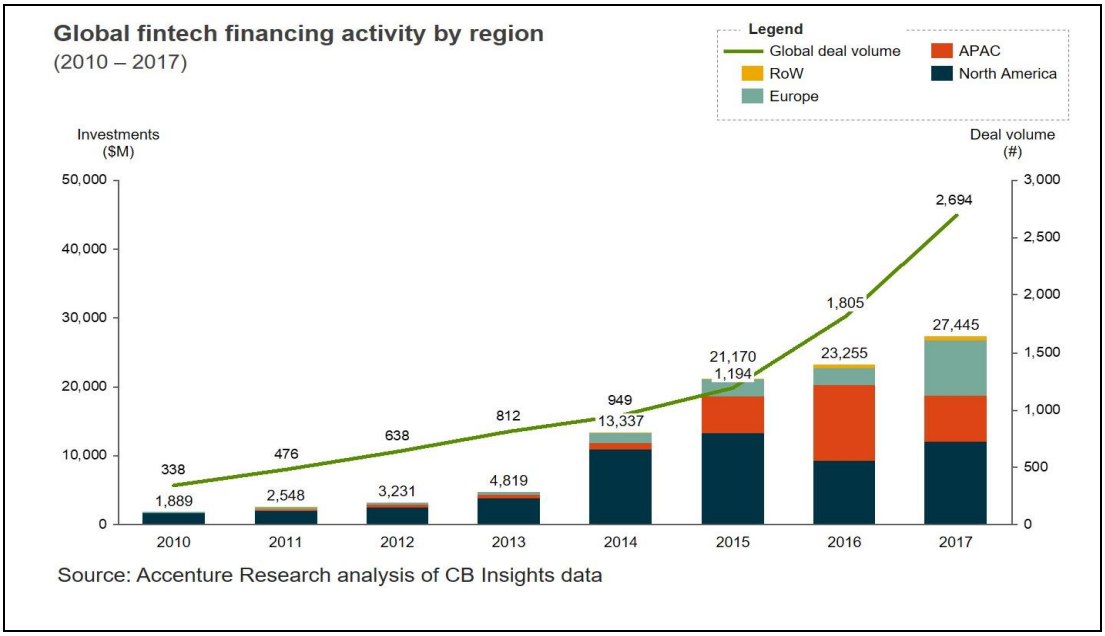

Figure 2 - Global Fintech Financing Activity by Region Around the World

Even though, the regional variation in venture capital investment in Fintech is explained differently by several authors (Claessens et al., 2018; Cumming & Schwienbacher, 2016; Fenwick et al., 2017; Haddad & Hornuf, 2018; Lee & Shin, 2018; Pollari, 2017; Press, 2018), they all agree that venture capital (VC) is an integral factor in establishing a Fintech entrepreneurship in a given country. Pollari (2017), Fenwick (2017), Claessens et al. (2018) and Cumming and Schwienbacher (2018) attributed this VC interest in Fintech as a consequence of specific regulations to attract venture capital investments or regulatory arbitrage created due to lack of regulations on Fintech companies.

Cumming & Schwienbacher (2016) argued that the amount of VC backed Fintech companies are proportionally move from developed countries to countries with weaker financial regulations. On the other hand, Pollari (2017) exemplified how Monetary Authority of Singapore (MAS) played a proactive role to attract venture capital funds to support Fintech emergence. Similarly, in Fenwick et al.'s (2017) paper, the authors showed that the governments proactively regulating Fintech market to attract more venture capital that primarily support the Fintech emergence in the country. Another supporting empirical evidence is provided by Haddad & Hornuf (2016-2018) regarding to a positive relationship between existence of Venture Capital and Fintech emergence in well-developed markets. Similarly, Lee & Shin (2018) and Bömer (2018) explained that governments created resource-rich locations attract more venture capital and hence Fintech startups in these locations can easily find necessary funding. In summary, based on the literature, attracting Venture Capital into a country has a positive impact on Fintech startup emergence.

Hence, based on the discussions in this section following hypothesis is formulated

Hypothesis 2: Countries/Regions that attract more venture capital funds expected to harness higher Fintech entrepreneurship density.

3.2.1.3. Regulations Affecting Fintech Sandbox

In this part of the paper, the second G2 force represented in Figure 1, which aims to reduce information gap in the market, will be examined. Since the Global Financial Crisis (GFC), the regulators seek to find out balance between innovation and regulation. Following GFC, to ensure financial stability, regulators imposed very harsh additional rules to incumbent companies; however, these new harsh regulations are not imposed to Fintech companies. The reason behind this imbalance between two players is that regulators have no idea how to deal with these small new players. Wıth its increasing number and importance of Fintech companies, regulators started to take specific actions towards these companies. To understand the business model, and nature of these companies and prevent any systemic risk, UK government pioneered regulatory sandbox idea in 2015 (Allen, 2019).

Besides UK's proactive action, the governments around the world responded Fintech emergence in three different ways. Some of them proactively interact with these startups, some of them chose to manage them by incorporating case-by-case

approvals, and some of them choose to do nothing but waiting them to flourish on their own. To elaborate this, some of the regulatory bodies choose to do nothing – in other words they impose no regulation on Fintechs, some of them ignored them and ban the activities of Fintech startups , some of them provide special approvals on a case-by-case basis through special charters, some of them provide structured experimentation units through regulatory sandboxes (Zetzsche et al., 2017). Those who chose to set a balance between innovation and control in a proactive way established regulatory sandboxes to support entry of new players in the financial services sector (Autio, 2017; Block et al., 2018; Bromberg, Godwin, & Ramsay, 2017; Dorfleitner & Hornuf, 2016; Fáykiss, et al., 2018; Fenwick et al., 2017; Zetzsche et al., 2017). In their study, Fenwick et al. (2017) compared year-on-year percent growth of first time venture capital backed Fintech companies in twelve countries, which have different type of governmental approach towards Fintech emergence; they found out that the countries with supportive governments have an increasing trend in Fintech emergence.

Historically, regulatory barriers seen as the major obstacle for new players to enter financial services industry. The existence of this barrier is a natural protector for incumbent companies from new entrants to this juicy profitable industry and it created a highly concentrated industry with giant companies. In order to support competition within financial services sector, in 2015, UK government pioneered regulatory sandbox idea to overcome the regulatory barrier obstacle and allow newly established small startups to compete against giant incumbent financial services companies (Allen, 2019). Regulatory sandboxes are controlled environments supervised by regulatory institutions for new businesses to test their products (BBVA, 2017). Following the UK's footsteps, regulatory sandbox idea is adapted by over 20 countries around the world. Even though, some authors raised concerns against establishing regulatory sandboxes (Allen, 2019; Chiu, 2017) - for instance, Chiu (2017) argued that by promoting regulatory sandboxes, the regulators are assuming innovation role instead of regulation role, regulatory sandboxes are popular for their expected benefits and they are believed to meet the nation's needs in an effective way (Binti, Khalid & Kunhibava, 2018; Bromberg et al., 2017; Fáykiss et al., 2018; Jenik & Lauer, 2017; Zetzsche et al., 2017).

When the benefits of establishing a regulatory sandbox is considered, five advantages can be listed. The first one will be the elimination of risk-associated complexity of financial innovation. In a sandbox setting, the financial innovation can be tested in a controlled environment setting where regulators can understand the processes and products thoroughly and take appropriate actions in time (Chiu, 2017). The second advantage will be the opportunity of open dialogue between regulatory and Fintech startups (Zetzsche et al., 2017). This opportunity allows both parties to understand clearly each other and communicate effectively the rules and regulations. The third advantage by establishing a regulatory sandbox, regulators can be more hand on , in other words they become more engaged and familiarize with these technological innovations which allow them to monitor closely the activities of Fintech startups (Bromberg et al., 2017). The fourth one is about the opportunity of improve financial accessibility and achievability through financial innovation (Jenik & Lauer, 2017). The last but not least advantage will be, the support in regulatory sandbox will be seen as a positive sign in terms of innovation and supports any digitalization efforts in a controlled manner within industry (Zetzsche et al., 2017). Based on the evidence provided by previous studies, it can be strongly argued that the regulatory sandbox is seen as a strong way of supporting Fintech emergence in the countries.

Hence, based on the discussions in this section following hypothesis is formulated.

Hypothesis 3: Countries/Regions with regulatory sandboxes expected to have higher Fintech entrepreneurship density.

3.2.1.4. Regulations Affecting Education

Availability of intellectual capital, in other words talent or skilled labor force, is one of the most important ingredients for establishing a Fintech start-up in a country. Three important types of talent are especially necessary to establish a Fintech start-up. These are: entrepreneur minded individuals, technical knowledge workers, and qualified financial services experts. Entrepreneurial minded individuals who have ability to developing a business from scratch by identifying an opportunity in the industry and taking necessary business risks. Technical talented individuals including Engineers, Software Developers, Computer Programmers, Mathematicians, and Statisticians who are building Fintech solutions. Financial services talented

individuals have a deep understanding in financial markets, business models, and regulations. Even early analysis on factors effecting Fintech emergence touched the importance of available labor force. For instance, Haddad & Hornuf (2018) showed that the size of the available labor market is closely associated with Fintech formations. Then in their paper, Bömer & Schwienbacher (2018) indicated that resource rich locations such as big financial centers, or technology hubs, provide necessary skilled labor force to these newly established companies.

Currently, based on market intelligence reports, level of entrepreneurial talent and financial services expertise talent are strong in Fintech industry however, there is a shortage in technical skilled individuals (Ernst & Young, 2016; PwC, 2017). According to PricewaterhouseCoopers (PwC) 21st CEO survey in financial industry, 76% of Banking and Capital Markets (BCM) CEOs expect that digital technologies will create a major disruption in the industry over the next five years. In order to successfully response to this major challenge, the financial services industry needs technological interoperable labor force (Tassey, 2000) who combines financial and digital skills. Apparently, attracting and retaining talent who have both financial skills and digital skills is the main challenge for Fintech companies (Digital Finance Institute, 2016; Flanagan, Modjtahedi, & Coe, 2017; Karkkainen et al., 2018; PwC, 2018). This challenge is not a surprise for increasing demand for technical talented personnel even faster than its supply. Apparently, financial services industry is competing with other information technology based industries as both of them is aiming to attract same type of talented individuals (Digital Finance Institute, 2016; Karkkainen et al., 2018; World Economic Forum, 2016). The government intervention to support to provide high quality Science, Technology, Engineering, and Mathematics (STEM) education especially in tertiary level, streamlining immigration processes to attract foreign talent, specific incubator program offerings, and specific college level programs directly related to Fintech can be listed as common solution offerings.

Industry partners believe that providing quality STEM education and offering expertise programs in Fintech are the two of the most effective solution to meet this technical talent gap in the Fintech industry (Digital Finance Institute, 2016). The solution reminds a parallel view of Hofstede's argument of changing mentality of the

society through education. According to Hofstede (1980), entrepreneurial abilities may stimulate by education. This may create a positive attitude towards career as an entrepreneurship that can interpreted as mental changing program while effectively closing the talent gap. Global Entrepreneurship Monitor Report (2001) indicated that the entrepreneurship levels might affected from tertiary education levels as tertiary education increases self-confidence, autonomy, and independence of individuals that opens the doors of alternative career choices for them. Tertiary education creates a high quality labor force who are better equipped to produce creative solutions to problems (Reynolds et al., 2001). Moreover, skilled labor force created by tertiary education has the ability to change labor market demands in the knowledge based economies (Enders, 2010). Establishing a business without necessary expertise put an entrepreneur into a chronic disadvantage position (Lee, Chang, & Lim, 2005). Especially in Fintech field, a certain level of knowledge is necessary for starting and maintaining the business. Currently, as an increasing trend government put special effort on establishing high quality STEM education at tertiary level will to reach desired level of skilled labor force to support Fintech emergence in their country.

Hence, in the light of the discussion above, below hypothesis has been proposed to support the claim

Hypothesis 4: Countries/Regions supporting high quality STEM education expected to have higher Fintech entrepreneurship density.

3.2.2. Demand Conditions Affecting Fintech Emergence

The demand side of the model, depicted in Figure 3 represents the opportunities for Fintech entrepreneurship. According to microeconomic theory, labor demand is a derived demand of product market. When there is an increase in demand for the firm's output, the firm demands more labor (Investipedia, 2018). With a similar analogy, Fintech entrepreneurial demand can be seen as a derived demand of Fintech products and services. When there is an increase in demand in Fintech products and services or any aberration causes a demand increase in these products or services in the market, then individuals who have capacity to become a Fintech entrepreneur are more eager to become self-employed rather than a paid employee.

In this regard, following subsections of this thesis introduces the factors causes an aberration in Fintech product or services demand and hence create a change in

Fintech entrepreneurial demand. Changes in regulation, technological development, economic development level of the country, alternative product availability and affordability, and trust level of customers in traditional financial services selected as the main factors.

3.2.2.1. Technological Development:

> **…Uber, the world's largest taxi company, owns no vehicles. Facebook, the world's most popular media owner, crates no content. Alibaba, the most valuable retailer, has no inventory. Airbnb, the world's largest accommodation provider, owns no real estate. Strategist Tom Goodwin (Goodwin, 2015)**

Similar to transportation, media, and accommodation industries, banking industry is also going through a structural change due to rapid changes in technological innovation. Technological innovations create two major impacts: first, it reduces the scale and scope economies that allows intruder startups to enter mature markets and second it changes customer expectations by providing tailor-made products and services.

First technological innovation creates a regime switching effect by reducing the importance of scale economies which leads to a structural change in industry (Audretsch & Thurik, 2001). Accommodation, media, retail, and music industries have experienced a similar change. Could it be possible that technological advancements change banking industry in a similar manner?

Technological advancements especially mobile internet technology played a crucial role in emergence of Fintech startups in Financial Services Industry (Boot, 2017; Lewan, 2018a). Even with their tiny existence, Fintechs changed structure and consumption of financial services (World Economic Forum, 2017). Instead of believing this change happened magically overnight, it believed that Fintech is an inevitable result of technological progress and inefficient banking business model. Over the years, technology created an evolutionary effect on banking services. By utilizing technological advancements incumbent banks were able to flourish for a long time.

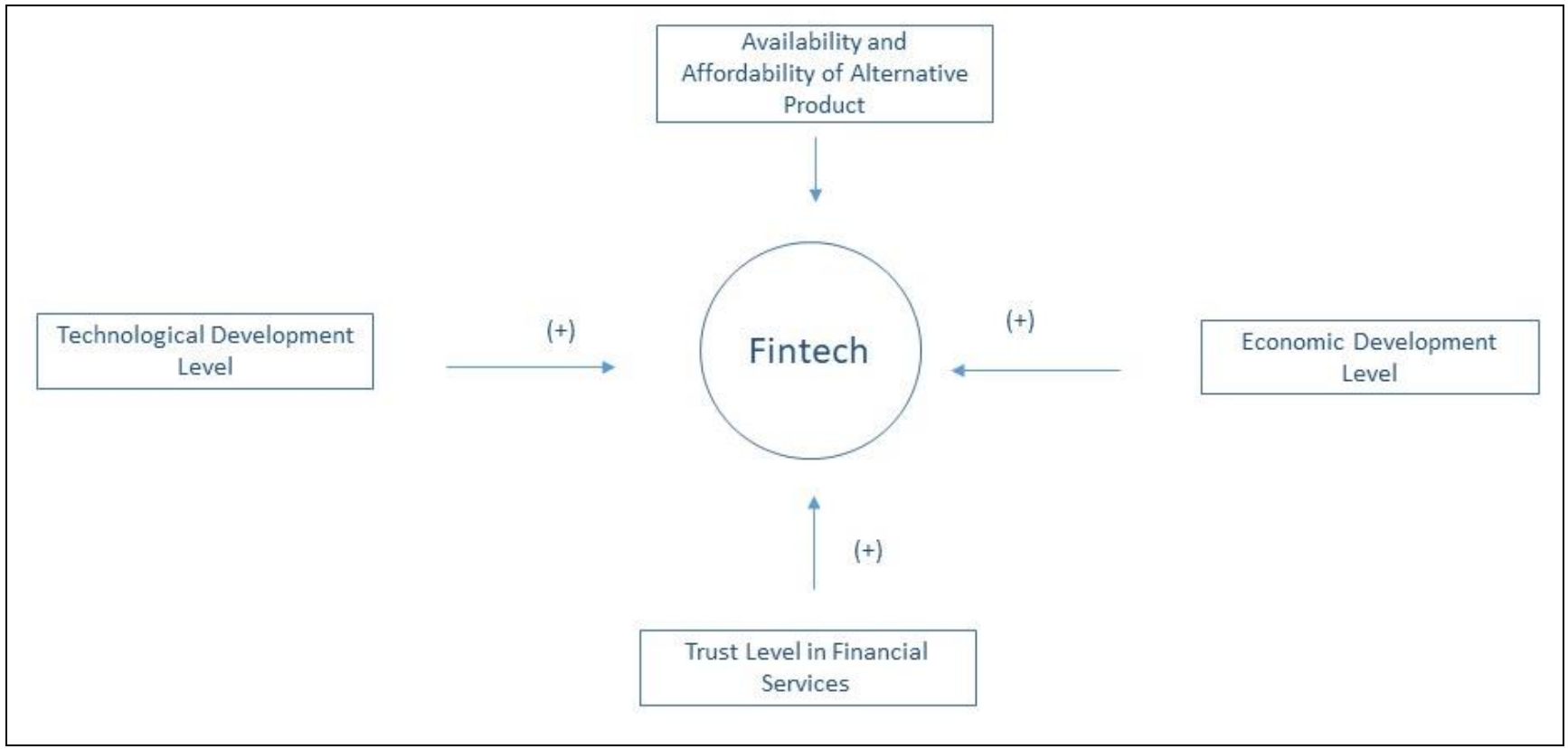

Figure 3 - Demand Conditions Effecting Fintech Entrepreneurship

illustrates the opportunities to become entrepreneur. Changes in regulation, technological development, economic development level of the country, availability and affordability of traditional banking services, and trust level of customers selected as the main factors in the model.

However recently technological advancement enables the creation of the worst enemies for banks: The Fintechs (Alt & Puschmann, 2016; Arner et al., 2015; Puschmann, 2017).

Starting from 1960s till early 2000s several technological changes are diffused and turned into an efficiency tool by banks. The adaptation of computer technology by banking incumbents create a digital industry from an analog one. With this adaption, the incumbent banks were able to serve their customers through multiple channels over the years - from branch network to ATM and from ATM to online banking (Haddad & Hornuf, 2018; Puschmann, 2017; Singh, 2011).

Customer engagement through multiple channels enable incumbents to decrease the fixed cost of service distribution. Moreover, technological advancements created scale advantage in certain banking products such as credit cards, asset management services, and risk management services that create a big network externality effect for incumbents. Furthermore, these advancements changed the provision of some banking services such as cash management, custody services, and back office operations that enable the incumbents to decrease sunk costs. In a nutshell, technological advancement helped to increase the strength of 400-year-old banking business model by creating economic barriers to enter other companies to the market for a long time.

After 2008 Global Financial Crisis, technological development especially digital technologies start to work against the incumbent companies. The innovations in digital technologies enabled small companies to enter to financial services industry. These small companies called Fintechs offers innovative solutions to banking customers by leveraging technology and undermines the need for traditional banking services. Some Fintech companies provide automated credit scoring services that solved the asymmetric information problem, some Fintech services provide online payment services that decrease the transaction costs, and some Fintech companies provide peer-to-peer lending services or crowdfunding services that provide a more efficient way of matching of lenders and borrowers.

Moreover, Fintech companies provide their services via internet; they do not need to share the burden of physical branch networks like incumbents. Utilizing cloud computing for data storage and processing, using internet to transfer bulk amount of

data enable them to exempt from huge fixed costs. Hence, Fintechs have advantageous cost model compared to incumbent banks.

Furthermore, most of the traditional banking business model is heavily depend on relationship banking. In other words, the data for the underlying risk assessment models for most of the banking products collected directly from customers. However, as Fintechs embedded big data computations into their risk models, these advanced data analysis methods allow them process and extract meaningful information from any available data on the internet.

Unlike traditional banking model, accessibility, speed, and user friendliness which increases customer satisfaction are the main focuses in customer acquisition process in Fintech service model (Bofondi & Gobbi, 2017).

Therefore, internet operability lowers the network externality effects and decrease costs (no fixed and sunk costs), leveraging social media platforms create a cross-sell opportunity for Fintech companies which creates a scope advantage, big data analytics based risk modeling allow them to extract more accurate information allow them to offer a customer oriented personalized service in a cheaper and more convenient manner (He et al., 2017; Lee & Shin, 2018). Hence, technological advancements decrease the importance of scale and scope economies in banking industry as a result it eliminates the importance of entry barrier.

Second, the expectation of banking customer has been changed dramatically due to technological development. This change is not a surprise as one thinks of how consumers are getting used to purchase personalized products and services via one click. Unthinkable is realized by companies such as Amazon, Apple, and Netflix. Digitalization and big data analysis allow this companies to serve their clients with more personalized products which increased customer expectation and create a behavioral change (Sharma, 2016).

High adoption rate in internet usage, raise in e-commerce, and increasing possession rate of smartphones, banking customers are increasingly interacting and transacting with banks through unconventional ways i.e. through computers, tablets, mobile phones, and smartphones (Sia, Soh, & Weill, 2016). Today, more than 50 percent of the world's population has access to internet. By the end of 2018, 4.2 billion people

has internet connection worldwide, almost half of the internet users are from Asia (49%) (Internet World Stats, 2018). The expansion of internet usage around the world transformed the commerce into e-commerce (Statista, 2019). E-commerce refers to purchasing and selling goods and services through internet. ("E-commerce," 2019). According to Statista, global retail e-commerce reached USD 2,774Billion in 2018 and will continue to increase 20% on average in upcoming years. By 2020, global retail e-commerce expected to reach 15% of total retail sales. In 2017, the first two most preferred payment methods for e-commerce was credit cards (42%) and electronic Fintech payment tools such as PayPal, AliPay, Apple Pay, etc. (39%) (E marketer, 2019). Given the high potential growth in global retail e-commerce, obviously there will be a huge payment services war to get lion's share from this market. Even with its short history, Fintech services successfully altered and improved online payment systems in e-commerce. Especially for customers who do not have debit cards, credit cards or bank accounts (Kaplan, 2017).

In addition to increase in internet penetration and e-commerce popularity among consumers, due to increase in smartphone possession rate in the world a new trend: m-commerce emerged in e-commerce arena. The smartphone possession rate reached 32% globally in 2017, which increased from 21% in 2014. Smartphones started to use as main internet access device worldwide. Mobile devices have shown a raising trend in internet access tool since 2016. In October 2016, for the first time in history, internet access via mobile devices exceeded internet access via desktops and notebooks. Asia and Africa listed as mobile first markets in Statistica's Mobile internet usage worldwide report. In the same report, it has been declared that among Africa and Asia, internet traffic coming from mobile devices are highest in Kenya. Nigeria, India, Singapore, China, Ghana, and Indonesia following Kenya in these regions (Statista, n.d.). Mobile internet is not only used for social networking, but also used in trade. Mobile commerce enables consumers to buy and sell goods and services by using a mobile phone or tablet device. Mobile commerce has been rising - the average value of global online mobile shopping value reached USD 104.63 (Statista, n.d.). It is no surprise that along with the rise of mobile shopping trend, mobile payment is also rising. As of 2016, 38% of worldwide internet users purchased a product or service via mobile commerce. A closer look revealed that the

first two leading countries were China(50%) and India (49%) in mobile commerce arena (Nielson, 2016).

Increasing appetite in e-commerce and m-commerce enabled Fintech companies to focus on payment business. Especially in emerging countries, Fintech is rapidly evolving. A survey conducted in 2018 revealed that 94% of respondents in China stated that they are using mobile payment. Indonesia (93%), India (83%), and Kenya (79%) follows Chinese respondents (CIGI, 2018). In the United States, alone the mobile payment volume reached USD 28billion by the end of 2016. Mobile payment business is especially raising in markets such as China- it reached USD 25.71Billion transactions at the end of 2016. Another prospective market is India, along with its consumer base National Payment Council of India has taken series of actions to boost non-cash payments in the country. They aim to increase number of mobile payment usage to 6 billion by the end of 2018.

Africa ranked as another highly digitally connected area in the world. In 2007, a revolutionary alternative banking service M-Pesa (M stands for mobile and Pesa stands for money) is a mobile phone-based money transfer, financing, and microfinancing services has been introduced by Vodafone in Kenya and Tanzania, (Safaricom and Vodacom) (Wikipedia, 2018). This banking service is available for individuals who do not even hold a bank account. M-Pesa offers a cashless service to its customers to purchase product and services, and customers can make fund transfers via Pin secured text messages (Jack & Suri, 2011). M-Pesa became popular and achieved a great success quickly in the area. By March 2016, Vodafone has extended its service through Africa, Europe, and Asia. In emerging countries, mobile payment services has served as a replacement for formal financial institutions, and as a result mobile payment service penetration now outstrips bank accounts in several emerging countries (GDMA, 2015).

In addition to M-Pesa's success in developing countries, there is an obvious increasing trend in mobile payment around the world. According a survey study conducted by Visa in 2016 revealed that regular mobile payment usage tripled since 2016 from 18% to 54% among the Europeans (Visa, 2016). All those studies indicate that technological enhancement changed customer habits and behaviors, hence this change favors Fintech demand (Lewan, 2018a).

To sum, advancement in technology especially in mobile internet technology changes the industry dynamics and customer behaviors. Both of those consequences expected to increase demand for Fintech entrepreneurship. Hence, this study proposes:

> **Hypothesis 5: The higher mobile phone subscription in a country/region expected to harness more Fintech startups and hence have higher Fintech entrepreneurship density.**

3.2.2.2. Economic Development Level

In classical entrepreneurship theory, many scientist showed that the level of entrepreneurship of a country is closely related with respect to its level of economic development (Acs et al., 2017; Audretsch & Acs, 1994; Carree et al., 2002; Iyigun & Owen, 1998; Kuznets, 1971; Schultz, 1990; Stel et al., 2003; Verheul et al., 2002; Wennekers, Stel, Thurik, & Reynolds, 2005; Yamada, 1996). The economic development is going through three major stages (i) a factor–driven stage, (ii) an efficiency-driven stage, and (iii) an innovation-driven stage. In factor-driven stage, the economic development mainly determined by mobilization of primary production factors: land, commodities, and labor. In efficiency-driven stage, the economic development level increased by implementing global technologies into local production by efficiently utilization of factors. Generally, these countries are utilizing foreign capital and proved technologies via Foreign Direct Investment inflows, or establishing joint ventures in the country. Establishment of Originally Equipment Manufacturers (OEM) are common in this stage. In innovation-driven stage, to sustain economic development being a technology generating society is the most important way. In this regards, science-based learning and human capital are becoming an important assets for this group of countries with the ability of rapid shift to new technologies (Porter et al., 2002).

Evidently, in their study, Stel et al. (2003) and Acs et al. (2008) showed that the relationship between entrepreneurship and economic development has a u-shape. There is a positive relationship between entrepreneurship density and factor-driven stage economies, and innovation-driven stage economies. For factor-driven stage economies, entrepreneurship density found to be high and the entrepreneurship type called necessity. As individuals cannot find jobs in these economies, they create their

own. On the other hand, for innovation-driven stage economies, the entrepreneurship density found to be high and this type of entrepreneurship called opportunity entrepreneurship. The individuals who want to be entrepreneurs become one once they got the opportunity (Acs, Desai, & Hessels, 2008; Stel et al., 2003).

Similar to entrepreneurship theory, empirical evidence support that the level of economic development has a positive impact on Fintech emergence. Increased level of prosperity urges an increasing demand for personalized services since prosperity is higher in the countries with high economic development level. Having an enhanced experience in service industries such as retail, media, and transportation, accommodation industries, customers are expecting more personalized and cheaper services in banking as well. The tailor-made banking experience that Fintech companies are offering are becoming more desirable by customers (Bofondi & Gobbi, 2017).

In addition to increase demand for Fintech services due to higher income levels, Fintech entrepreneurship can be seen as an opportunity entrepreneurship which is considered as a high valued occupation choice which allows talented individuals to self-realize themselves (Claessens et al., 2018; Haddad & Hornuf, 2016, 2018; Rau, 2017).

Hence, based on the previous studies in the literature, this study proposes:

Hypothesis 6: There is a positive relationship between economic development level of the country and Fintech entrepreneurship density.

3.2.2.3. Trust

…without the financial crisis and the popular anger, it spawned against the whole banking system, there would be no fintech" Fintech's Wakeup Call,

(Bloomberg, 2016)

Trust has been an essential part of financial markets even when the fundamental roles (the safekeeping and depository functions) of banks are taking into account (Thakor & Merton, 2018). As Fintech companies are directly in competition in financial institutions, trust has a similar importance in their business as well (Lewan, 2018b). Parallel to this view, during a discussion at World Economic Forum in 2016, AliPay

CEO and PayPal CEO explicitly mentioned that they put utmost importance to gain customer trust to increase their business.

In financial economics literature, the relationship between trust in financial services providers and utilization of the products is well documented (Georgarakos & Pasini, 2011; Guiso, Sapienza, & Zingales, 2008), for instance, Guiso et al. (2008) showed that the higher the generalized trust results in higher stock market participation in a cross-country setting. Similarly, Rau (2017) showed that there is a positive relationship between general trust level and crowdfunding lending in a cross-country setting. After financial crisis, many research documented trust deterioration towards financial institutions (Birth, 2014; Edelman, 2018; Stevenson & Wolfers, 2011). The increase in distrust in banks favored usage of online lending platforms such as P-2P lending and crowdfunding platforms over traditional banks (Binti Khalid & Kunhibava, 2018; Financial Stability Board (FSB), 2017). Bersch et al. (2017) and Broström et al. (2018) empirically showed that higher levels of distrust in banks are creating a positive demand towards peer-to-peer lending products in the USA and in the UK (Bertsch et al., 2017; Broström, Mohammadi, & Saiedi, 2018).

Thus, in the light of findings of previous studies, this study hypothesis that

> **Hypothesis 7: The lower trust in financial services incumbents, the higher the Fintech entrepreneurship demand**

3.2.2.4. Availability and Affordability of Traditional Banking Services

From a product market perspective, alternative products affect the demand of a product. If two products are substitute, then one of the product prices decreased, the other's demand expected to decrease. If two products are complementary, then one of the product prices decreased, the other's demand expected to increase.

While living the change in the industry, banking experts, academicians, and market players are constantly asking the same question: "Is Fintech really the future of the banking industry?" At this point, without being a fortuneteller, there is no way to tell Fintech is or is not the future of banking; however, possible future scenarios need to be discussed futher.

There are several possible scenarios about the future of banking - a detailed review can be found at Basel Committee's report on the implications of Fintech developments for banks and bank supervisions under forward-looking scenarios (Basel Committee on Banking Supervision, 2018). Among those scenarios, two opposed ones are the most voted ones. First one claims that the incumbents will adopt the Fintech technologies and collaborate with successful Fintech companies to absorb their ideas (Ernst & Young, 2017; Lee & Shin, 2018; Yang, 2015). EY which is one of the most fiery defender of this view argued that the Fintechs alone will not be the major competitor of incumbents in the arena, the banks which are better partnering with Fintech companies will be the main competitors in the industry (Ernst & Young, 2017). The banks which are sharing same view with EY, in countries such as in Luxembourg and Sweden, has already start to collaborate with Fintech companies in business areas such as IT, back-office like payments, investments, and credit processing to reduce in-house production (Alt & Puschmann, 2016). In summary, under collaboration scenario, even though business model of incumbents seemed to be preserved at some point, incumbents will change their business model towards partnerships. In other words, the industry will experience a vertical integration model to disintegration model.

The second scenario argues that FinTech's "disruptive", "revolutionary" properties will "tear down" barriers and traditional financial institutions (World Economic Forum, 2017). The believer of this view gives evidences from other sectors such as music, retail, and newspaper industries that digitization lowers entry barriers and tear down the incumbent power by disaggregation of value chain. Agile market entrants often scale up more rapidly than the incumbents (Hirt & Willmott, 2014). Even though, incumbents have the upper hand of economies of scale and financial resources, their existing business model which is based on providing one-stop comprehensive services by bundling banking products is compromising against unbundled specialized service model of Fintech. Hence, the supporters of this view believed that the observed disintegration trend in banking industry is the evidence that the no asset owned players will become the sole player in the industry.

At this point, there is no solid evidence whether no asset holder Fintechs will be the sole player in the financial market or not. However, both of these scenarios agreed on the inevitable disintegration in banking industry that creates a real industrial shift.

Recalling two scenarios regarding future of banking industry, under the collaboration scenario, Fintechs and incumbent banks expected to work together, analogously they act like complementary services. On the contrary, under the rivalry scenario, Fintechs and incumbent banks are expected to fight against each other for market share, analogously they act like substitute products.

Normally while technological advancement improves quality of the product, the price of the product decreases. However, given the fact that banks have been enjoying efficiency gains from technological advancements, the average price of banking services has not been changed for the last 140 years. Interestingly, while banks enjoying the efficiency gains through technological advancements, they continue to build their brand value and increase customer base in order to increase the economic barriers to entrance. These economic barriers to entrance create a high concentrated industry where the incumbent banks gain high economic rents by providing inefficient and expensive services. (Bazot, 2017; Philippon, 2016; Rau, 2017).

Under either scenarios, the entrance of Fintech into financial industry may potentially create a lucrative competition environment which may limit the severity of inefficiencies (Philippon, 2016).

In the light of above-mentioned studies, this study proposes,

Hypothesis 8a: If the banks and Fintechs are working as collaboration, then the more affordable financial services provided by incumbent banks create a lower demand for Fintech services hence lower Fintech entrepreneurship density will be seen.

Hypothesis 8b: If the banks and Fintechs are working as substitutes, then the more affordable financial services provided by incumbent banks create a higher demand for Fintech services hence higher Fintech entrepreneurship density will be seen.

In a similar logic, the more attainable financial institutions create a higher demand for Fintech products

Hypothesis 9a: If the banks and Fintech companies are working in collaboration, then the higher the availability of financial services provided by incumbent banks would create a higher demand for Fintech services hence higher Fintech entrepreneurship density will be seen.

Hypothesis 9b: If the banks and Fintech companies are working as substitutes, then the higher the availability of financial services provided by incumbent banks, create a lower demand for Fintech services hence lower Fintech entrepreneurship density will be seen.

4. DATA AND METHODOLOGY

4.1. Data and Its Restrictions

The data source for our dependent variable is the Trancx database, which contains detailed information on Fintech startup formations. Trancx is a market intelligence platform with covering over 350,000 private companies worldwide. The platform covers Venture Capital and Private Equity analytics for over 250 industry sectors. Trancx database which provides detailed information on competitive landscape, funding information, and analyst rating for companies (Shapiro, n.d.), heavily used by practitioners (consulting companies such as EY) and private investors.

The data used in this analysis retrieved on April 19, 2019 covering a data period between 2007 and 2016. For dependent variable, the number of new startup formation in the calendar year taken account. This means the empirical analysis is not including established firms that provide Fintech services such as Amazon, Facebook, MPesa, etc.

The sample period covers **23,610** newly established Fintech startup companies in **115** countries all around the world over a ten-year period.

Moreover, the independent variables, different databases employed at country-year level to construct a panel data set. To test Hypothesis 1, the effect of business-friendly regulation on Fintech entrepreneurship density, variable DOI, the Worldbank's Doing Business Index is used. DOI is an index that based on the number of procedures, time elapsed, cost, and paid-in-capital required for new company to start-up in a country.

Next, to test Hypothesis 2, whether the existence of Venture Capital financing positively affect the density of Fintech entrepreneurship, the variable, VC, retrieved from World Economic Forum Executive Opinion Survey at the country-year level. The data is gathered from responses to survey questions from the Global Competitiveness Report Executive Opinion Survey:" In your country, how easy is it

for entrepreneurs with innovative but risky projects to find venture capital. [1 = extremely difficult; 7 = extremely easy]".

Then, to test Hypothesis 3, whether the existence of Regulatory Sandbox positively affect the density of Fintech entrepreneurship, the time invariant variable, Sandbox, created based on the declaration of regulatory bodies in countries. Countries which declared to have or actively have a regulatory sandbox receives 1 and otherwise 0 (European Supervisory Authorities, 2018; Jenik & Lauer, 2017).

Furthermore, to test Hypothesis 4, percentage of STEM graduates among all tertiary graduates, PISA test results, Quality of Education, Quality of Math Education, and Quality of Management Schools considered as proxy measures of high-quality STEM education.

Percentage of STEM graduates among all tertiary graduate data is retrieved from combination of different sources such as Worldbank's the Global Innovation Index data base, Bureau of Statistics of China, China Statistical Yearbook, annual series (Beijing) (various years), Organization for Economic Co-operation and Development (OECD). However, during data screening phase, the data has found to be inconsistent and to include heavily missing points. This leads to elimination decision of this candidate.

PISA test results are considered to be one of alternative measure for STEM education quality however PISA test results are collected every three-year period. Hence, measurement period is not matching for this reason; this measure eliminated.

Quality of Education, Quality of Mathematics education, and Quality of Education system considered the representative measure of STEM graduates. Especially, the close relationship between qualities of mathematics education in line with PISA results selected as the proxy of quality of STEM education. Variable Qualmath retrieved from World Economic Forum Executive Opinion Survey at the country-year level. The data is gathered from responses to survey questions from the Global Competitiveness Report Executive Opinion Survey: for variable Qualmath:" In your country, how would you assess the quality of math and science education? [1 = extremely poor-among the worst in the world; 7 = excellent among the best in the world]".

Furthermore, to test Hypothesis 5, where high mobile phone usage and mobile connectivity in a country/region expected to affect Fintech product demand hence Fintech entrepreneurship density, number of mobile telephone subscriptions per 100 adults are selected as candidate proxy. The data mobile retrieved from World Telecommunication/ICTD development report and database at the country –year level.

Next, to test Hypothesis 6, the effect of economic development on the dependent variable, GDP per capita per country selected in relation to the earlier studies in entrepreneurship theory. The data gathered from World Bank national accounts data. GDP per capital defined as gross domestic product divided by midyear population of the country. During data screening, it has been found that GDP variable is right skewed and in order to correct, this natural logarithm of this variable is decided to include in the analysis.

Furthermore, to test Hypothesis 7 on the effect of distrust in traditional financial system on Fintech entrepreneurship density, trust variable retrieved from Edelman Trust Barometer study on Financial Services. Edelman is a global communication firm founded in 1952. The trust index based on the data collected through online surveys in 27 countries recently. The financial trust measured through surveys of educated sample of 500 respondents in the U.S and China, and 200 individuals in all other markets. Based on Edelman's report, these respondents are representing 16% of total global population. Even the study does not cover all countries in the sample dataset in this study; a subsample of the data set constructed for this part of the analysis.

To test next two hypotheses, four candidates are considered. The first one is banking system concentration ratios - Herfindahl index or the share of top three banks in total banking system assets, the second one is Lerner Index for banking sector, the third one is responses to survey questions from the Global Competitiveness Report Executive Opinion Survey for variable affordability of financial services and the fourth one is Financial Institutions Efficiency Sub Index (FIEff) which shows the ability of traditional financial institutions to provide financial services at low cost and with sustainable revenues.

The first two of the candidates eliminated, as there is no clear evidence in literature that whether the concentrated banking systems are more efficient or not hence, they provide more or less efficient services to their customers and incompetency of their data range with the sample period used in this study.

The third candidate also eliminated due to incompetency of data range with the sample period of this study. The last candidate financial institutions efficiency sub-index selected as the proxy of affordability of alternative financial services. The index constitutes of three bank efficiency tools: (i) its first role of efficiency in intermediating savings over its investments. This is measured by net interest margin and lending-deposit spread. Net interest margin is calculated by accounting value of bank's net interest revenue divided by average interest-bearing assets; (ii) its second internal efficiency tool: operational efficiency, a general measures of operational efficiency are ratio of non-interest income to total income, and ratio of overhead costs to total assets; and finally (iii) bank's general profitability level which is generally measured by return on assets and return on equity. Financial institution efficiency sub-index covers the period of 2006-2016 and retrieved from IMF's financial development index database.

Lastly, to test last two hypotheses which investigates the effects of the availability of traditional financial services in the country on dependent variable. Two candidate variables considered as proxy measure. The first candidate is availability of financial institution that retrieved from World Economic Forum Executive Opinion Survey at the country-year level for period 2010-2015. The data gathered from responses to survey questions from the Global Competitiveness Report Executive Opinion Survey: "In your country, to what extent does the financial sector provide a wide range of financial products and services to businesses? [1 = not at all; 7 = provides a wide variety]. This candidate eliminated, as it does not match the data period of this study, in case of usage the analysis a subsample constructed to eliminate the problem of missing data that is not at random. The second candidate is commercial bank branches per 100.000 adults in a country that considered as a proxy of the availability of traditional banking services. The data retrieved from Financial Access Survey of International Monetary Fund for the years 2004-2016.

The final dataset includes an unbalanced panel of 494 observations from 115 countries over ten-year period from 2007 to 2016.

Even though, the high number of countries included in this analysis may cause serious heterogeneity problem, based on the research question it has been decided to include as much countries as possible to the analysis.

4.2. Methodology

To understand the factors affecting the Fintech Entrepreneurship across the world, country-time dependent data is collected. In line with entrepreneurship theory, three historically connected model in Entrepreneurship theory used to investigate the relationship between explanatory variables and dependent variable.

The first model relates the level of Fintech entrepreneurship to economic development level. Analogous to general entrepreneurship theory, I expect to find a second-degree polynomial relationship between these two variables. The density of Fintech entrepreneurship expected to increase from a certain level of economic development onwards. In other words, the entrepreneurship density starts to rise as per capita income increases further. In mathematical terms, the coefficient of lngdp expected to be negative and second-degree term expected to be positive.

$$lny_{it} = \beta_1\, lngdp_{it} + \beta_2\, lngdp_{it}^2 + T_t + R_{it} + \varepsilon_{it}\; where\; \varepsilon_{it} \sim N(0, \sigma^2) \qquad (1)$$

The second model relates mobile phone subscription level and the Fintech entrepreneurship density. Second-degree relationship between the variables. In line with entrepreneurship theory, if the technological development in this case mobile phone usage creates a regime switching effect in the market, then the coefficient of the first-degree explanatory variable is to be find positive and the second-degree explanatory variable is to be find negative. This means, for a certain level of widespread mobile phone usage creates an increasing demand towards Fintech products and entrepreneurs are able to serve this demand increase by disrupting industry (creative destruction phase) and after a certain level of increase in mobile phone usage the traditional banks are also provide their service as an alternative product. Hence, from this point onwards, the Fintech density will decrease.

$$lny_{it} = \beta_1\, mobile_{it} + \beta_2\, mobile_{it}^2 + T_t + R_{it} + \varepsilon_{it}\; where\; \varepsilon_{it} \sim N(0, \sigma^2) \qquad (2)$$

The third model is inspired from Verheul et al.'s Eclectic Theory of Entrepreneurship (2002) and combines findings of several qualitative study in Fintech emergence. The model combines model1, model2, and several additional variables that thought to be influencing factors in Fintech emergence. On top of the expectations in model 1 and 2, in eclectic model I expect to find coefficient of DOI, VC, Qualmath positive. Moreover, I expect to find coefficients of FIEff and branch to be negative as I expect Fintech startups and traditional banking services as substitute products.

$$lny = \beta_1 lnGDP_{it} + \beta_2\, lnGDP_{it}^2 + \beta_3\, mobile_{it} + \beta_4 mobile_{it,}^2 + \beta_5 DOI_{it} + \beta_6 VC_{it} + \beta_7\, Qualmath_{it} + \beta_8\, FIEff_{it} + \beta_9\, branch_{it} + T_t + R_i + \varepsilon_{it}\ where\ \varepsilon_{it} \sim N(0, \sigma^2) \quad (3)$$

5. RESULT

5.1. Summary Statistics

The sample period covers **23,610** newly established Fintech startup companies in **115** countries all around the world over a ten-year period. Figure 4 shows number of newly established Fintech startups during the period 2007-2017. Until 2015, there is an increasing trend in Fintech startup establishment around the world. In 2015, in line with a global conjecture in new startup formation all around the world, there is a slowdown in Fintech startup formation (Deloitte, 2017b). From the graph, it can be seen that the average Fintech startup formation has an increasing trend over the years.

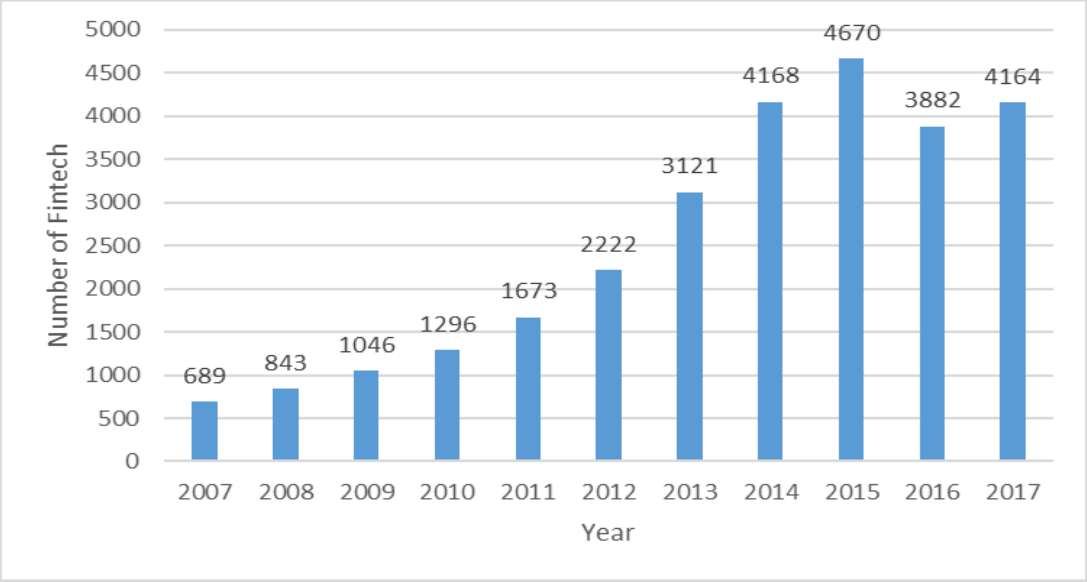

Figure 4 - Number of Newly Established Fintech Startup

during the year 2007-2016. Till 2015, there is an increasing trend in Fintech startup establishment around the world. In line with a global conjecture in new startup formation all around the world, there is a slowdown in Fintech startup formation in 2015, however the increasing trend continues after 2015.

It is obviously observed from the Pareto Chart in Figure 5, 95% of the newly established companies between 2007-2016, are established in 48 countries. Moreover, Fintech startup formation Pareto Chart shows that approximately 30% of the countries are representing over 75% of the Fintech startup establishment.

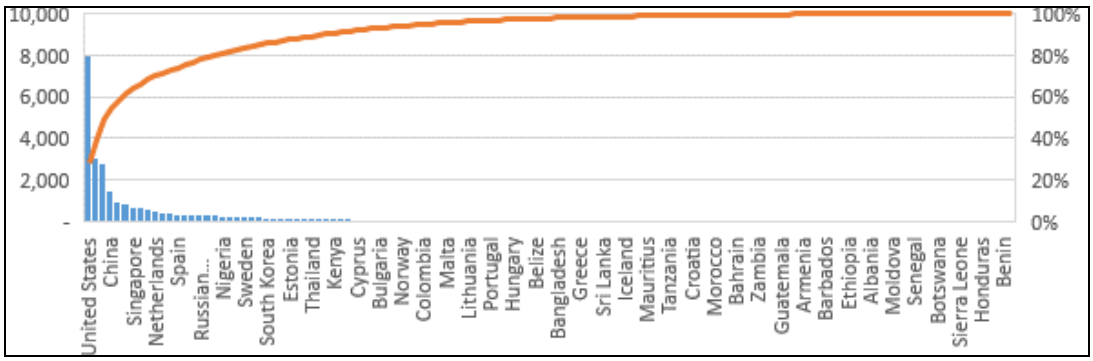

Figure 5 - Pareto Chart

represents 95% of the newly established companies between 2007-2016 are located in first 48 countries. Moreover, among these 48 countries first 14 of them home for 75% of these startups.

In the analysis, to compare countries with each other, the dependent variable defined as "Fintech startup density" which is calculated as the ratio of number of newly established Fintech startup companies per 1,000,000 working age population.

In entrepreneurship theory, three different measures used; Rate of New Entrepreneurs, Opportunity Share of New Entrepreneurs, and Startup Density. The first measure "Rate of New Entrepreneurs" which is calculated by the percentage of adults transitioning into entrepreneurship at a given point in time, the second measure, "Opportunity Share of New Entrepreneurs" which is calculated by the percentage of new entrepreneurs driven primarily by "opportunity" vs. "necessity", and finally the last measure, "Startup Density" which is calculated by the number of new employer businesses normalized by population or working age population (Klapper & Love, 2010; Morelix et al., 2016). Parallel to this view, the main variable of interest is "Fintech entrepreneurship density", calculated as the ratio of newly registered limited liability firms per 1,000,000 working age population (those ages 15-64). In Figure 6, the distribution of entry density across countries is shown, it has a minimum value of 0.01 in Brazil in 2007 which means less than one startup is established as per million working population. On the other hand, in Figure 6, a

maximum value of about 41 in Singapore in 2016 is seen which means that forthy one startups is established as per million working population. Even only, this figure shows the high variation among the countries over the years.

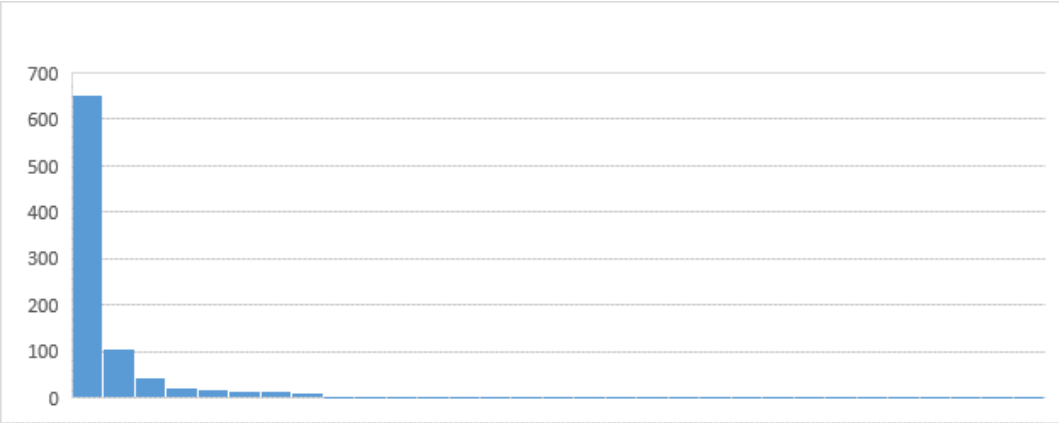

Figure 6 - Distribution of Fintech Entrepreneurship Density

shows the distribution of entry density across countries. It has a minimum value of 0.01 (in Brazil in 2007) and a maximum value of 41 (in Singapore in 2016)

Average Entrepreneurship density varies significantly by groups over the years. For instance, on average 5 times more Fintech startups established in developed markets than emerging markets over the ten-year period. Specifically, from Table 1, it can be seen that on average 2 Fintech startups are established for million working individuals. On the other hand, in developed markets this figure is increases to five on average as per million working individuals.

When time change considered, in addition to group variation, a similar variation over time obtained. In this regards, Table 1 indicate the existence of a time period effect in the data. For instance, after 2013, the Fintech emergence almost doubled for both developed markets and emerging markets. Eventhough, there seems to be a slowdown in year 2016 with respect to previous years, this has been found to be parallel to the rest of the conjuncture of the world economy. By using this clue, in the analysis, in addition to development level grouping, the data is grouped based on time. Period 1 represents the data between 2007 and 2013, and Period 2 represents the data between 2014 and 2016.

Table 1 - Average Fintech Entrepreneurship Density Across Groups over Years

Group	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*Ave*
Emerging	0.49	0.95	1.12	1.22	1.30	1.45	1.24	2.37	2.54	2.02	1.58
Developed	1.83	2.16	2.82	3.23	4.10	4.97	6.96	9.32	9.30	8.43	5.32

Before starting analysis, in data screening lognormal transformation of dependent variable and GDP variable found to be necessary.

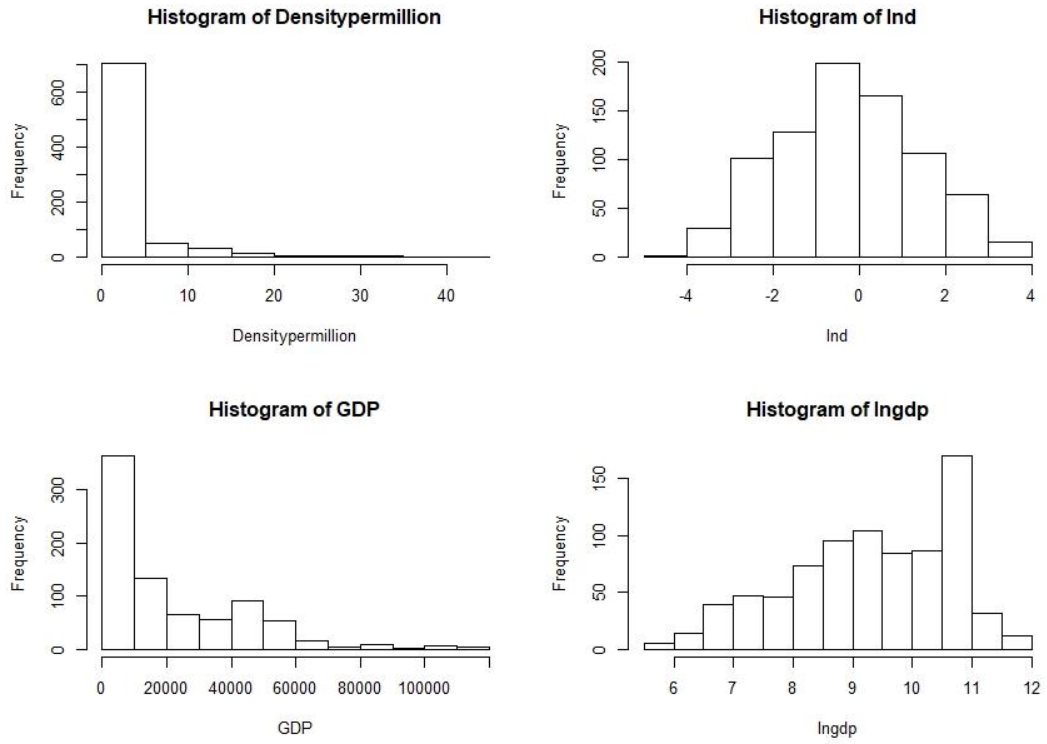

Figure 7 - Data Screening Logarithmic Transformation of Variables.

First column of the graph shows the distribution of dependent variable and explanatory variable GDP; the second column of the graph shows the distribution of lognormal transformed of these variables. To achieve normality assumption, lognormal transformation of these variables is necessary.

5.2. Explanatory Data Analysis (EDA)

Before starting analysis in Explanatory Data Analysis (EDA) phase, the relationship between variables investigated. For this purpose, Figure 8 and Figure 9 depicted. Figure 8 shows the individual relationships between each explanatory variables and dependent variable by using full data points. In Figure 9, the data divided into two. The countries grouped under developed countries or emerging countries.

As expected from theory in Figure 8, it has been captured a significant second-degree polynomial relationship between GDP variable and dependent variable and mobile variable and dependent variable. This is a supporting evidence toward the correctness of first two model.

In Figure 8, EDA illustrated a positive effect of the existence of business friendly environment, the existence of high quality of STEM education, and the availability of venture capital in a country on the emergence of Fintech startup. This result is parallel to entrepreneurship theory. The only suprising result is obtained from EDA in figure 8, the variables regarding to affordibility and availability of altenative product. Before starting analysis, the expectation was a negative relationship between availability and affordability variables and density of Fintech. As the expectation is to find a supporting evidence regarding the idea that the Fintech startups and traditional banks are substitutes. However, Figure 8 indicates that those two are complimentary products when the grouping effect is ignored.

When the data is analyzed under two subgroup as in Figure 9, the scheme is started to change. Especially for variables regarding to alternative products. To elaborate this result, in developed markets, while the relationship is negative, in emerging markets the relationship found to be positive. This interesting graphical analysis shows us two major results. The first one, there is a serious grouping effect in the data, the second one, these two subgroups have different properties. In emerging markets, Fintech startups and traditional banking services are complimentary, but in developed markets they are substitute. Moreover, the relationship between GDP and Fintech density seems to be differentiated as per developed and emerging markets. From the first panel of Figure 9, it can be concluded that the u-shaped relationship is only captured in emerging markets.

Table 2 illustrates the summary statistics of the data set. Neither a serious missing data problem nor outlier is observed. Even though, the data do not support balanced panal data analysis, it still has a good size of sample to conduct an unbalanced panel data analysis. Skewness in dependent variable and one of the independent variable may cause further problems and this eliminated by using logarithmic transformation of these variables. Moreover, to eliminate scale differences between explanatory

variables, percentage values are used (for instance instead of using 84% in doing business index, 0.84 is used.)

Table 2 - Summary Statistics

Variables	*Nbr. Obs.*	*Mean*	*Std.*	*Median*	*Min.*	*Max.*
Dependent Variables						
Fintech Density	801	2.651	5.186	0.667	0.011	41.718
ln(Fintech Density)	801	-0.247	1.639	-0.26	-4.53	3.73
Independent Variables						
VC	767	3.078	0.800	2.93	1.47	5.39
GDP	801	22,036.04	287,400	12,542.72	287.40	118,823.6
ln(GDP)	801	9.302	1.358	9.437	5.661	11.685
Mobile	801	1.099	0.348	2.930	1.470	5.390
FIEff	792	0.715	0.134	0.75	0.22	0.922
Branch	771	22.238	17.761	17.465	0.495	104.208
Qualmath	784	4.269	0.948	2.930	1.88	5.390
DOI	801	0.662	0.123	0.667	0	0.909

Furthermore, the correlation matrix (presented in Table 3) and the correlation matrix plot (presented in Figure 10) do not show any multicollinearity problem hence no additivity assumption violation expected in the model.

Table 3 - Correlation Matrix (Full Data)

Pearson	densityper million	lnd	DOI	branch	GDP	lnGDP	FIEff	Qualmath	VC	Mobile
densityper million	1	0.699 (0.000)	0.376 (0.000)	0.271 (0.000)	0.525 (0.000)	0.441 (0.000)	0.130 (0.000)	0.314 (0.000)	0.350 (0.000)	0.243 (0.000)
lnd		1	0.619 (0.000)	0.364 (0.000)	0.634 (0.000)	0.675 (0.000)	0.264 (0.000)	0.461 (0.000)	0.418 (0.000)	0.465 (0.000)
DOI			1	0.240 (0.000)	0.825 (0.000)	0.696 (0.000)	0.333 (0.000)	0.450 (0.000)	0.444 (0.000)	0.434 (0.000)
branch				1	0.409 (0.000)	0.474 (0.000)	0.258 (0.000)	0.217 (0.000)	0.539 (0.000)	0.552 (0.000)
GDP					1	0.847 (0.000)	0.410 (0.000)	0.512 (0.000)	0.581 (0.000)	0.336 (0.000)
lnGDP						1	0.432 (0.000)	0.529 (0.000)	0.499 (0.000)	0.549 (0.000)
FIEff							1	0.404 (0.000)	0.387 (0.000)	0.161 (0.000)
Qualmath								1	0.476 (0.000)	0.294 (0.000)
VC									1	0.237 (0.000)
Mobile										1

A visual presentation of Pearson correlation coefficients is presented in correlation matrix plot in Figure 8. The strong correlations between variables are indicated with darker colors in correlation matrix plot.

Initial analysis of correlation matrix and correlation matrix plot, indicated that there is a positive relationship between the dependent variable and independent variables.

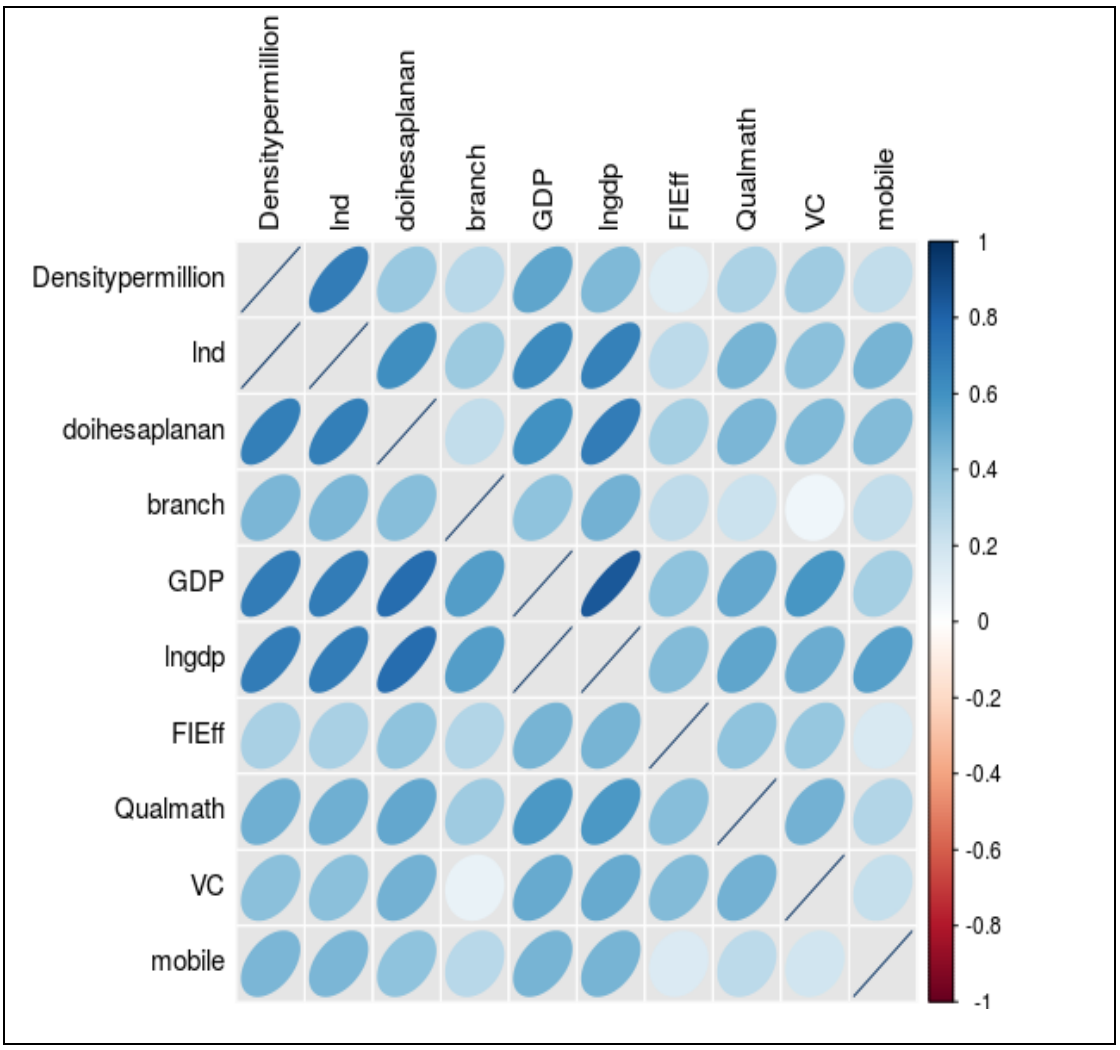

Figure 8 - Correlation Matrix Plot (Full Data)

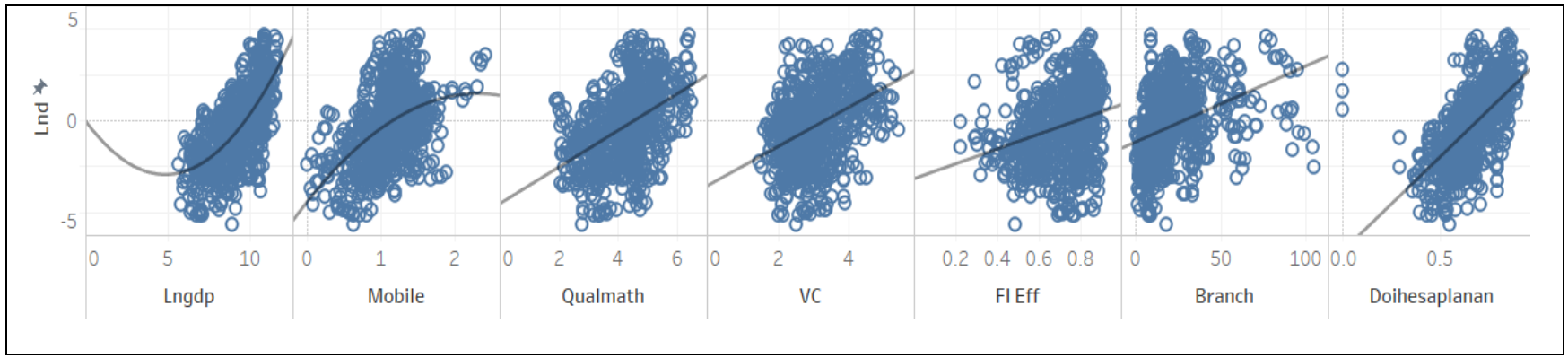

Figure 9 - Explanatory Data Analysis 1

illustrates the individual relationship between explanatory variables and dependent variable when the data is pooled. The first and second panel of the graph provide supporting evidence for the first two model. Interestingly, Panel 5 and Panel 6 suggests that Fintech Entrepreneur services and traditional banking services have a complimentary product nature.

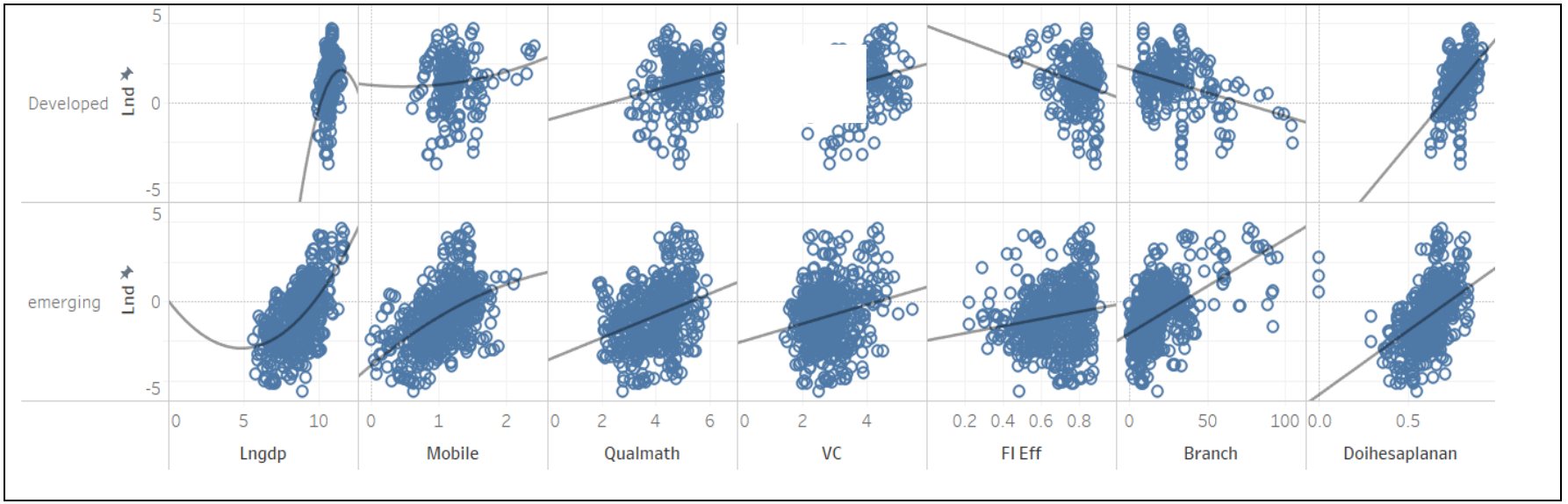

Figure 10 - Explanatory Data Analysis 2

Relationship between Variables (Subgroup) - illustrates the relationship between explanatory variables and dependent variable for subgroups. From the graphs, it can be easily seen that relationship between explanatory variables and dependent variable is significantly different for GDP, Mobile, FIEff, and branch. Evidently, this result support my initial idea regarding grouping effect within the data. Especially in Column 5 and 6 illustrates different characteristics. For developed markets, the relationship between Fintech entrepreneurship and traditional banking services seem to substitute, but in emerging markets those two offer complimentary products.

5.3. Region Level Determinants of Fintech Emergence

To analyze which factors, drive Fintech emergence in each region, I use multivariate panel regression to predict the density of Fintech emergence in developed and emerging markets with 115 countries between 2007 and 2016.

According to Model 1 (presented in Table 19 in Appendix B), where all sample points are considered without grouping, up to some point the increasing level of logarithmic transformation of gross national product decreases financial technology entrepreneurship, however a certain level of development onwards, it increases the Fintech entrepreneurship density. This is exactly what we expect from EDA and theory. This is particularly evident in the first period (2006-2013) and in developing countries.

According to Model 2 (presented in Table 20 in Appendix B), where all sample points are considered without grouping, the increase in mobile phone subscription to a certain point, as expected, positively affects financial technology entrepreneurship (creative destruction period), adversely affecting over a certain increase (creative accumulation period). This particular property observed for both periods. In addition to time effect, this feature clearly observed in the second period in developing countries.

According to Eclectic Model of Fintech Entrepreneurship (presented in Table 21 in Appendix B), where all sample points are considered without grouping, only after certain level of development level (second degree variable), Fintech entrepreneurship density is affected positively, availability of venture capital, availability of high quality of education, business friendly environment has positive impact on emergence of Fintech startups. Traditional banks and Fintech startups show the feature of substitute products; however, it can be clearly seen that existing financial services customers are using this new product. In emerging markets, quality of math & science education and business friendly environment is positively effective on dependent variable. Moreover, especially in emerging markets Fintech services and banking services are working as complimentary. On the other hand, in developed markets, while business friendly environment supports Fintech startup emergence, the Fintech services and banking services are substitute in nature.

Table 5 to Table 17 report analysis results for each hypothesis. In each table, first column represents results for full data without grouping effect; second and third column represents Subanalysis results for emerging and developed markets. Next two columns represent Subanalysis results for Period 1 and Period 2 that I found in summary statistics that there is a change between the periods. Last two columns show the Subanalysis for emerging market and developed market for period 1 and period 2 respectively. Model 1 and Model 2 are only related with hypotheses 5 and hypothesis 6.

5.3.1. The Effect of Existence of Business-Friendly Environment

As expected, business friendly environment encourages the Fintech emergence. In Table 4 for full data without considering grouping effect, Subanalysis for emerging markets, Subanalysis for developed markets shows that existence of business-friendly environment encourages positively Fintech emergence. However, the same results can not be obtained when the regional data is further divided by time. Therefore, it can be concluded that business friendly environment has a significantly positive effect on Fintech emergence.

Table 4 - The Effect of Business-Friendly Environment

Model		***Full Data***	***Emerging Markets***	***Developed Markets***	***Period 1***	***Period 2***
M3	DOI	2.419*	2.0975*	6.784 ***	2.4766	0.6055

Table 5 - The Effect of Business-Friendly Environment (Subanalysis)

Model		***Emerging Markets***		***Developed Markets***	
		Period1	Period2	Period1	Period2
M3	DOI	-0.2330	0.6064	0.129	1.637

5.3.2. The Effect of Availability of Venture Capital Financing

Availability of Venture Capital is positively affecting Fintech Emergence. Especially, availability of venture capital is crucial to explain first period (between 2007 and 2013). Table 7 reveals the information that that Fintech startups established in developed markets positively affected by availability of venture capital and for

emerging markets availability of venture capital found to be significantly positive for the period 2007-2013.

Table 6 - The Effect of Availability of Venture Capital

Model		***Full Data***	***Emerging Markets***	***Developed Markets***	***Period 1***	***Period 2***
M3	VC	0.3619**	0.2264	0.4959	0.4203**	-0.0099

Table 7 - The Effect of Availability of Venture Capital (Subanalysis)

Model		***Emerging Markets***		***Developed Markets***	
		Period1	Period2	Period1	Period2
M3	VC	0.2269***	-0.039	0.142*	0.472**

5.3.3. The Effect of Existence of Regulatory Sandbox

As regulatory sandbox variable is time invariant, the variable cannot be included in panel data analysis. However, as it can be seen clearly from Figure 11, neither in developed markets nor in emerging markets, establishing regulatory sandbox does not have a positive impact on Fintech emergence. In these markets, other factors could be effective on this new startup existence. This result shows that existence of regulatory sandbox is not an important factor in Fintech emergence.

5.3.4. The Effect of Supporting High Quality STEM Education

Table 8 shows that supporting high quality of STEM education in especially emerging markets help to reduce talent gap. However, in developed markets (presented in Table 9) the data do not reveal a supporting result for the same. Even though, most of the supporting qualitative study related to importance of STEM education to close talent gap in developed market, the sample data do not provide a supporting evidence for these studies. In developed markets, immigrants might close the talent gap rather than the individuals trained in these countries.

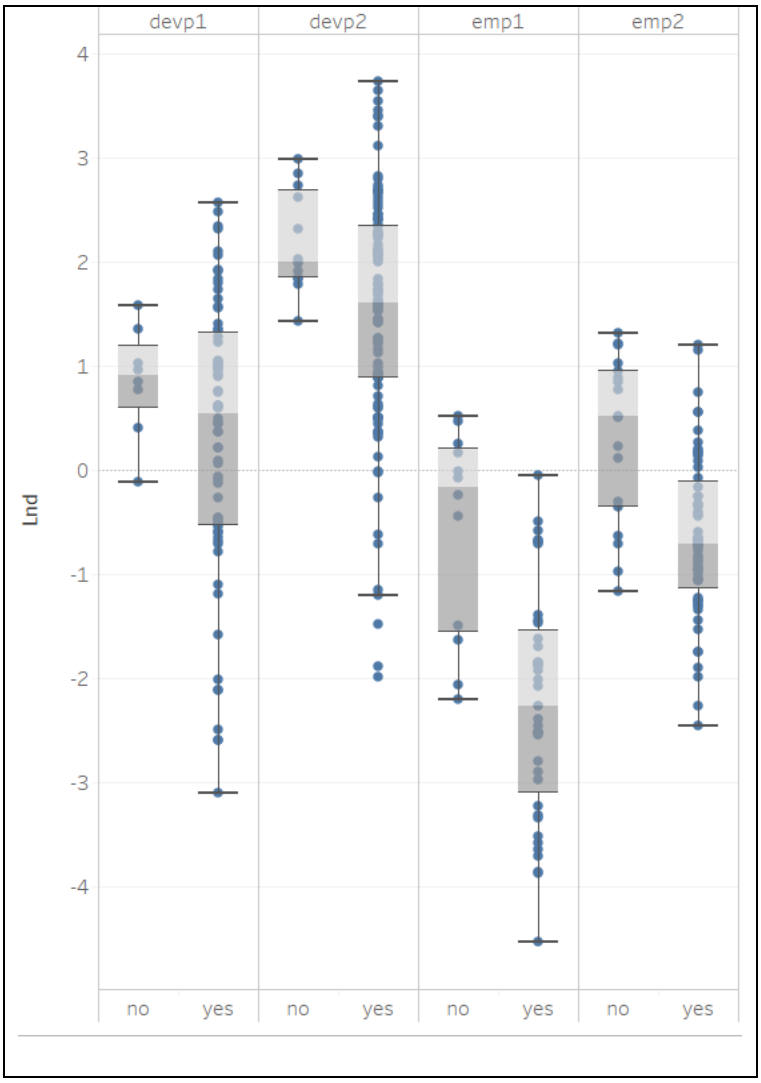

Figure 11- Existence of Regulatory Sandbox

Table 8 - The Effect of Supporting High Quality STEM Education

Model		***Full Data***	***Emerging Markets***	***Developed Markets***	***Period 1***	***Period 2***
M3	Qualmath	0.2692**	0.238**	0.061	0.2621**	-0.0575

Table 9 - The Effect of Supporting High Quality STEM Education (Subanalysis)

Model		***Emerging Markets***		***Developed Markets***	
		Period1	Period2	Period1	Period2
M3	Qualmath	0.089	-0.065	0.010	0.052

5.3.5. The Effect of Mobile Connectivity

Two different models test the effect of mobile connectivity on Fintech entrepreneurship density. The first model only includes mobile connectivity effect and the second model includes several different variables along with mobile connectivity.

The findings of the first model (represented by M2) presented in the first row of Table 10. The results obtained from this model found to be parallel to the predicted results of both theory and preliminary analysis in EDA. As an illustration, up to some point increase in mobile phone subscription is positively affecting the establishment of Fintech startups. While technological advancements allow startups to enter financial services industry, customers'demand shaped by enhanced technology. This situation forms a "Creative Destruction Phase". However, after a certain point of increase in technological advancement, in this case mobile phone subscription rate is negatively effect entrance of new startups into financial market. "Creative Accumulation Phase" indicates this phase. In this phase, the product offerings made either by traditional financial institutions or by early entrants. The same results obtained both in Period 1 and in Period 2 in Table 10.

Interestingly, while in developed markets, the sample do not reveal any supporting evidence, in emerging markets, the sample indicate that an increase in technological advancement resulted in an increase in Fintech emergence. This result is not a surprise when the rapid increase in mobile phone subscription rate considered around the world. Especially, the increasing appetite in m-commerce enabled the talented individuals to establish Fintech companies. Moreover, same demand increase in m-commerce directs the customers to use alternative payment methods. This also creates an increase in Fintech product demand. Hence, along with availability of technology, market readiness is also attracting the talented individuals to establish Fintech startups in these markets.

When the existence of disruptive effect of technology tested along with existence of other variables in eclectic model presented in the second row of Table 10 and Table 11 -indicated by M3-, the sample data do no provide any supporting evidence.

Table 10 - Effect of Mobile Phone Connectivity

Model		*Full Data*	*Emerging Markets*	*Developed Markets*	*Period 1*	*Period 2*
M2	Mobile	3.799 ****	2.552 **	-1.362	3.42124***	5.2176 ****
	$Mobile^2$	-0.8244*	-0.34266	0.5518	-0.6905 **	-1.3135 **
M3	Mobile	0.0962	-0.184	2.0694	0.349	-0.234
	$Mobile^2$	0.0468	0.2477	-0.7592	-0.016	0.2378

Furthermore, in subanalysis that presented in Table 11, a result parallel to theory and similar to the results obtained in full data analysis in Model 2 obtained only for Emerging Markets during Period 2. On the other hand, when the eclectic model applied to the same data set, sample do not provide a supporting evidence.

Table 11 - Effect of Mobile Phone Connectivity (Subanalysis)

Model		*Emerging Markets*		*Developed Markets*	
		Period1	Period2	Period1	Period2
M2	Mobile	1.644630	5.099 ****	-0.61102	-2.43706
	$mobile^2$	0.098288	-1.401**	0.25422	0.93593
M3	Mobile	-0.0867	-0.810	0.129	-2.336
	$mobile^2$	0.084	0.5324	-0.017	0.726

5.3.6. The Effect of Economic Development Level

The effect of economic development on Fintech entrepreneurship density tested by two different modes. The first model results presented in the first row of Table 12. When full data without adding grouping effect analyzed, and data after 2013 analyzed without adding grouping effect, the coefficient of lngdp found to be negative, and the coefficient of squared term found to be positive. This certain feature is what we expected based on theory and EDA results. This result explained by the fact that until a certain level of economic development level in a country, the talented individuals prefer to work as a paid employee rather than establishing their own job and being self-employed.

Interestingly, when the group effect is considered, emerging markets before 2013 (period 1) shows a similar result (provided in Table 13). However, in eclectic model

(presented in the second row of Table 13) where other variables added to the model along with lngdp, a robust result cannot be obtained. On the other hand, in eclectic model, similar reults obtained only for second period in other words, for the data after 2013.

Especially, between 2007 and 2013 emerging economies provide a similar result that found in all data points considered without grouping effect. It can be explained that in emerging economies, until a certain level of economic development the talented individuals may not be motivated enough to become entrepreneur. As Fintech entrepreneurship needs special talent including software and banking knowledge, those talented individuals might prefer to enjoy being a paid employee in emerging markets. However, after a certain level of economic development the individuals who has necessary talent started to motivated by the increasing demand for alternative banking services products.

Table 12 - Effect of Economic Development Level

Model		***Full Data***	***Emerging Markets***	***Developed Markets***	***Period 1***	***Period 2***
M1	lngdp	-1.2769 *	-1.2275	23.611	-1.4851*	-0.7708
	$lngdp^2$	0.117 ****	0.1143**	-1.041	0.1272***	0.0919*
M3	lngdp	-0.7845	-0.9134	15.7820	-0.9769	-0.9297*
	$lngdp^2$	0.0682*	0.0736	-0.7080	0.075	0.0514*

For instance, in markets such as China, India, and sub-Saharan Africa Fintech solutions initiated by big technology companies and telecommunication companies. After a certain level of economic development, talented individuals might have motivated by witnessing these successful attempts.

Hence, it can be concluded that the effects of economic development on Fintech emergence shows a similar pattern as effects of economic development on any other type of entrepreneurship.

In contrast, in Table 13 for developed markets in Period 2 an increase in the economic development found to be positively significant on Fintech emergence.

Specifically, in developed economies, when necessary conditions met, the talented individuals are seeking for entrepreneurial opportunities.

Table 13 - Effect of Economic Development (Sub analysis)

Model		*Emerging Markets*		*Developed Markets*	
		Period1	**Period2**	**Period1**	**Period2**
M1	lngdp	-1.6141*	-0.3125	21.725	25.6061*
	$lngdp^2$	0.1355**	0.0638	-0.9566	-1.1261
M3	lngdp	0.8923	-0.7831	6.8995	21.950
	$lngdp^2$	-0.042	0.0425	-0.322	-0.974

However, the eclectic model does not reveal any significant results in neither developed nor emerging economies.

5.3.7. The Effect of Availability and Affordability of Traditional Banking Services

The effect of availability and affordability of traditional financial services on Fintech entrepreneurship emergence tested with eclectic model. The results revealed in Table 14. When the full data and data before 2014 considered without grouping effect, Table 14 shows that Fintech entrepreneur services and traditional banking services are substitute in nature. Moreover, as the customers of Fintechs are the same as the customers of traditional banking services the positive effect of branch variable explained easily. Hence, it can be concluded that the same individuals who are already using banking services constitute the customer base. On the other hand, when grouping effect considered, in emerging markets, the sample does not provide a supporting evidence on the relationship between Fintech entrepreneurial services and efficiency of traditional banking services. However, it can be seen from Table 14, there is a positive relationship between availability of traditional banking services and Fintech. This indicates that Fintech services are preferred and are used by the same individuals who have bank accounts. In other words, the existing banking customers are the current customers of Fintechs. On the other hand, in developed markets, I found supporting evidence that Fintech services and traditional bank services are substitute in nature. When efficiency of banking services increases in

other words, the service provided by traditional banks became cheaper, the demand for Fintech decreases in developed markets.

Table 14 - The effect of Availability and Affordability of Traditional Services

Model		*Full Data*	*Emerging Markets*	*Developed Markets*	*Period 1*	*Period 2*
M3	FIEff	-1.763**	-1.128	-3.363*	-1.8766**	0.0105
	Branch	0.015***	0.0254****	0.007	0.0160***	-0.0005

When the data further divided into groups and time zones, the results shown in Table 15. The only significant results found in Period 1 for Emerging Markets and in Period 2 for Developed Markets. In Emerging Markets, only availability of traditional banking services found significant in Period 1. In Developed Markets, in Period 2 we found a substititute relationship. Those findings in this analysis is parallel to EDA results.

Table 15 - The Effect of Availability and Affordability of Traditional Services (Subanalysis)

Model		*Emerging Markets*		*Developed Markets*	
		Period1	Period2	Period1	Period2
M3	FIEff	-0.2527	0.030	-0.460	-4.384**
	Branch	0.0087**	0.0022	0.0025	0.0056

5.3.8. The Effect of Trust in Traditional Banking Services

A specific subsample established to test effect of trust in traditional banking services on Fintech emergence. This subsample constructed due to the fact that, the variable "Trust" does not available for all countries included in this study. In addition to limited availability for only 27 countries, the nature of the survey has been monotonous after 2012. Hence, a subsample constructed for these 27 countries between the years 2013-2016. A similar methodology followed to analyze the subsample of 27 countries. Initially, explanatory data analysis and assumption checkings are completed. Then same fixed effect panel models applied to this smaller sized sample data.

Table 16 illustrates the summary statistics for subsample. No serious missing data problem is observed. No outliers are found in the subsample. Similar to full sample same logarithmic transformations are applied to dependent variable and highly skewed independent variable.

Table 16 - Summary Statistics for Subsample

	N.br. Obs.	Mean	Std.	Median	Min.	Max.
Dependent Variables						
Densitypermillion	107	5.813	8.613	0.152	1.882	41.718
Lnd	107	0.809	1.429	-1.89	0.63	3.73
Independent Variables						
DOI	107	0.732	0.095	0.515	0.753	0.908
branch	104	23.299	13.671	7.776	19.654	73.562
GDP	107	30,458.30	19,587.13	1,452.20	34,567.75	68,042.54
lngdp	107	9.989	0.961	7.281	10.451	11.128
FIEff	107	0.747	0.119	0.36	0.758	0.906
Qualmath	107	4.495	0.94	1.89	4.58	6.39
VC	104	3.351	0.81	1.75	3.44	4.81
mobile	107	1.269	0.344	0.693	1.221	2.408
Edelman	107	0.484	0.157	0.18	0.46	0.77

For illustrative purposes, only correlation plot provided under this analysis. In a similar logic, the darker colors illustrate stronger correlations. In addition to dark-light differences, in this sample, one may realze that there are relationships depicted with reddish colors as well. The red ones are representing negative correlations. Correlation plot for subsample in Figure 12 shows that Edelman variable and the dependent variable has a negative significant correlation. Even though the correlation is not very strong, it is significant.

In addition to this, in subsample analysis, from correlation plot, some other interesting results revealed. When Edelman variable added and the data is subsampled, the sign of the relationship between branch variable and VC variable is

changed. Moreover, same figure shows that Edelman variable has a negative relationship with almost all other explanatory variables in the model. In addition to this, in this subsample, branch and FIEff variables have insignificant correlation with dependent variable.

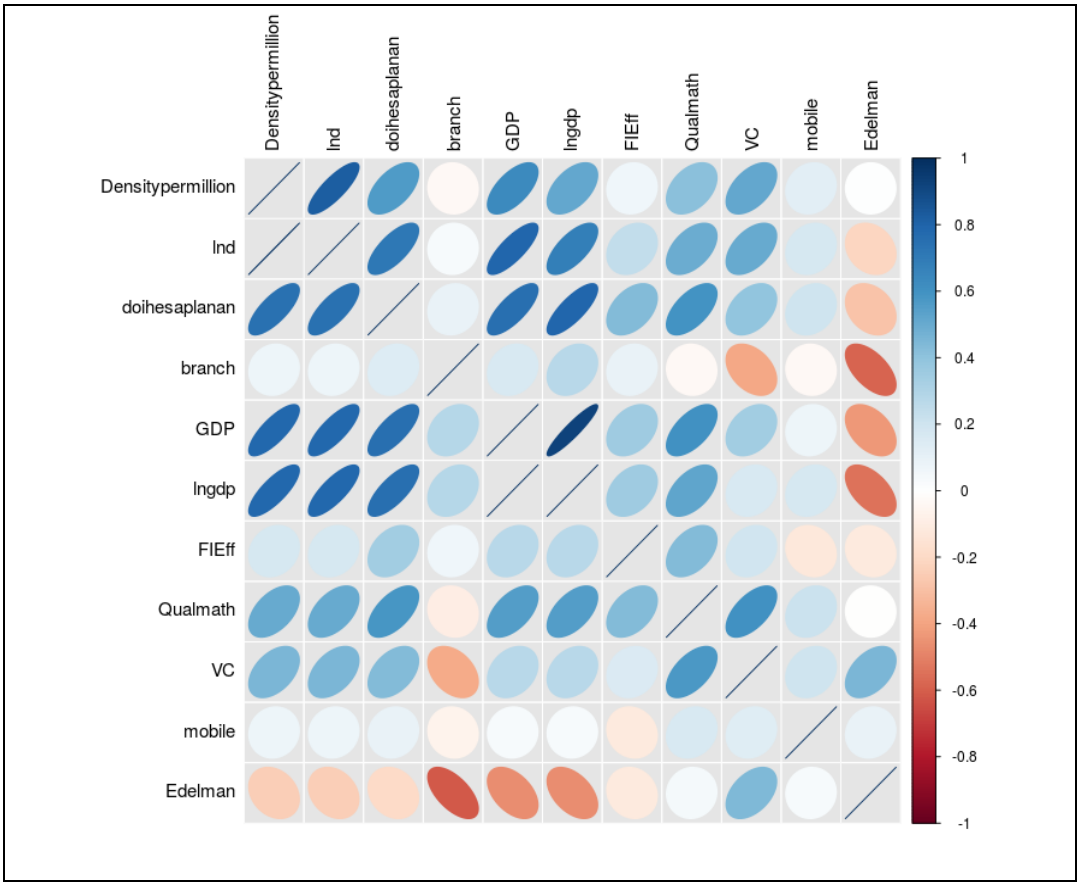

Figure 12 – Correlation Plot for Subsample

In order to capture the effect of distrust, the Edelman variable added to Eclectic Model. It has been found that distrust variable is statistically significant for full data without considering grouping effect and emerging markets, (results are presented in Table 17).

Table 17 - The Effect of Trust (Subanalysis)

Model		***Full Data***	***Emerging Markets***	***Developed Markets***
M3	Edelman	-2.0553***	-4.3273****	-0.43728

This can be interpreted as when the trust level in traditional financial service providers, Fintech entrepreneurs' emergence is increasing in emerging markets.

Subsample analysis results in eclectic model provided in Table 19 in Appendix C. For 27 countries, up to some point mobile connectivity is negatively affecting Fintech product demand, however after some point onwards the mobile connectivity has a positive effect in Fintech demand and entrepreneurship. Availability of venture capital, existence of business-friendly environment found to be positively effective on Fintech density. Interestingly, the higher the efficiency of traditional institutions, the higher the level of Fintech emergence. This is an indication that for these sampled countries, Fintech and traditional banking services are collaborating. On the other hand, when the trust in traditional financial institutions decrease, the Fintech emergence will increase.

For emerging markets, for a certain level of economic development level, talented individuals prefer to be paid employee instead of self-employed however, after certain level of economic development onwards talented individuals prefer to become self-employed. Availability of venture capital, governments that incorporates policies supporting aiming to decrease talent gap through high quality education, governments incorporate business friendly environments for startups is positively effecting Fintech entrepreneurship. Again, a parallel result to the full data findings exists in the case of efficiency and availability of traditional financial services. Again, the subsample shows that the traditional financial institutions and Fintechs are working together, hence number of branch network is negatively effecting Fintech emergence. When one thinks of Fintech services, it does make sense as all of the Fintech services are over the internet hence branch network became obsolete once Fintech products are on boarded by traditional financial services providers. Edelman trust index found to have a significantly negative effect on Fintech emergence. This is an expected result, as when consumers do not trust in banks, and then they started to seek for alternative services such as Fintech.

On the other hand, for developed markets, an aim of closing talent gap via providing a high-quality STEM education found to be statistically positively significant. In other words, empirical study proves that raising your own work force will be important for Fintech emergence. Moreover, the data found a supporting evidence on the relationship between traditional banks and Fintech startups. The data showed that once the financial services efficiency is increased the Fintech emergence will

decrease. In contrast, the data also showed that the branch network and Fintech startups are working together, even though in case using branch variable as a measure to availability of banks, it might be a sign of account holders, bank customer base. With this logic, once the banks provide inefficient services, consumers will use more Fintech products. However, an important point in here is the consumers who utilize banking services are account holders in other words people who are already in banking system.

6. CONCLUSION

In this thesis, the determinants of rapidly emerging Fintech startups investigated. It has been found that, this industry has been newly establishing since 2007, and the it increasingly continues to attract more attention around the world. However, the Fintech emergence is not significant in all countries, for instance **95%** of the newly established companies between 2007 and 2016, established in 48 countries among 115 countries. Moreover, currently Fintech entrepreneurship is more common in developed markets rather than emerging markets. This may suggest two possible explanation: in emerging markets either big companies such as Alibaba in China (technology companies), or M-Pesa in Sub-Saharan Africa (telecommunication companies) become the dominant player in the market or the huge room for Fintech availability in the market is still not fed enough. At this point, the first alternative seems to be supported by the scene but based on the sectoral reports it can be changed to the second alternative explanation.

Moreover, this study showed that Fintech Entrepreneurship density is higher where the economies are well developed, technological advancements are available, business friendly local regulations in place, venture capital funds are readily available, and high quality of education provided. All these factors creating an environment where any kind of entrepreneurship can proliferate including Fintech. In addition to this, the model suggests that while in emerging markets Fintech startups are working along with traditional banks, in developed markets, they are competing each other. Hence, both of the scenarios that we mentioned in this thesis still probable. However, the upcoming moves of traditional banks could change the scheme towards the collaboration scenario that is claiming that the incumbents will adopt the Fintech technologies and collaborate with successful Fintech companies to absorb their ideas, in future financial services industry.

Interestingly, even though governments all around the world put so much importance on establishing regulatory sandbox to support Fintech emergence, this study found that these attempts do not effective on Fintech emergence. In other words, most

probably, Regulatory Sandboxes are only benefiting regulatory rather than entrepreneurs.

An interesting result in previous section- subsample analysis shown; distrust found to be negatively effective in Fintech development in emerging markets. Especially in emerging markets, Fintech services are working as a complementary service and given the electronic nature of the product offering, the traditional banks collaborating with them might be decreasing number of branches, or the negative relationship with branch could indicate that in emerging markets Fintech could help financial inclusion. Using Fintechs products instead of traditional services, underserved individuals might receive banking services.

On developed market case, government policies effecting quality of education found to be important. The efficiency of traditional banks and Fintech has a negative relationship. This indicates that those two are substitute products, however positive significant branch variable indicates that the ones who are using Fintech services in developed countries are people who are already has records of financial system.

Furthermore, three important aspects of Fintech entrepreneurship revealed based on this study. First, Fintech Entrepreneurship is nothing but a special type of entrepreneurship that has the same features. Second, Fintech entrepreneurship is at its baby stage and it will continue to capture more attention. Third, except the importance of Regulatory Sandbox this thesis found an empirical evidence that supports qualitative studies on Fintech emergence. Hence, it can be concluded that Fintech is a phenomenon.

Based on the results of this study, different implications can be drawn for different stakeholders of Fintech industry:

6.1. Implications for Regulators

The insights of this study might guide regulators on how they promote this new sector. The regulators should incorporate regulations that create a business-friendly environment, support technological developments, accept legislations to attract venture capital to the country, and support to create a high-quality education system to educate available labor force. On the other hand, establishing a regulatory Fintech Sandbox will not create expected result of increasing Fintech emergence.

6.2. Implications for Traditional Banking Organizations

The empirical analysis shows Fintech entrepreneurial activities often take place in developed countries. These regions attractive due to its available high-quality experienced work force, capital, and supportive regulations. Moreover, the study revealed that banks should not combat against Fintech entrepreneurs but try to establish collaborative work with them especially in emerging markets. Even if currently in developed markets, these tiny balance sheet intruders seem to be substitute product, the banks can try to establish strong partnership with these agile startups. At this point, emerging markets seems to be luckier than their counterparts as the collaboration opportunities is higher.

6.3. Implications for Fintech Entrepreneurs

Fintech startups has agile business model that provide them an advantage over traditional banks, however the scale of traditional players is unnoticeable. The ones located in emerging markets may prefer to create a business that will collaborate with traditional players. The ones located in developed markets may prefer to create a business that will be rival to traditional financial services.

6.4. Implications for Investors in Fintechs

In this study, empirical evidence supported that venture capital is an important factor to emergence of Fintech entrepreneurship especially in developed markets. Accessibility of venture capital is different among startups across the world. The same problem is also applicable for Fintech startups. Hence, this creates a huge inequality in Fintech emergence across the world. Although, the developed markets show an advantage to receive more venture capital funds. The low level of Fintech entrepreneurship density could be served as a possible opportunity for investors to eager to take higher risk in emerging countries.

6.5. Implications for Financial Services Users

Based on the empirical evidence Fintech entrepreneurships services and traditional bank services are rivals in developed markets. Moreover, in emerging markets the same individuals, who have bank accounts, are utilizing Fintech services. This result

has validated the consumer's dream that the financial services sector's inefficient pricing policy will be over.

6.6. Limitations of the Study

In this study, the direct investments of incumbent companies, big technology companies, and telecommunication companies excluded. Moreover, this study does not focus on focus on one particular Fintech business model or business categories that may well established in one region and less established in one region. Furthermore, combining different natured regions may create unexplained heterogeneity across the data. While developing countries are acting in a similar manner, the emerging markets can be affected a specific factor which is not considered by this study. Because it is a newly formed industry, the time range of this study leads to a short panel data, which may not allow further analysis and may not reflect the most important features of industry. In next couple of years, once Fintech companies become a dominant player in financial market, more quantitative work will be seen.

6.7. Future Studies

The present study explores the determinants of Fintech emergence in developed and emerging markets over the period 2007-2016. Due to several data restrictions, it cannot be applied different models in this analysis. In the future, once the industry matured enough there will be sufficient data to conduct detailed specific analysis for instance, region specific studies that eliminate uncontrolled heterogeneity and reveal common features of specific regions. Another future study can be based on classification of categories and subcategories of Fintech specializations. In this study, due to scarce data this classification can not be done however, with the development of the industry this analysis can be easily done in the future. Categorization of Fintech startups may show specific features and reveal different results for emerging and developed markets. For instance, payment services could be more common in emerging markets while financing services such as robo-advising could be more common in developed markets. This type of distinction may shape determinants of Fintech emergence even further.

Similar to entrepreneurship studies, different measures could be considered as dependent variable to understand other features of this industry. For instance, in case the number of partners for each startup retrieved the "Rate of New Entrepreneurs" can be calculated and an occupational choice-oriented analysis can be conducted. The results for different dependent variables expected to reveal similar results.

Moreover, in this analysis I only consider macroeconomic variables; however, entrepreneurship proved to be affected by several other factors including micro variables such as age, education background, and ethnicity. Those personal preferences could be taken into account in a future study. The expected results will be parallel to classical entrepreneurship theory results.

Furthermore, in order to establish a more parsimonious model, specific determinant can be selected and a dedicated analysis can be applied. To elaborate this, the level of regulation in financial services companies may have a positive impact on the emergence of Fintech startups worldwide (Freij, 2018). In relation to this, open data policies such as PSD2 which became effective in January 2018 in Eurozone is expected to motivate competition (Derebail et al., 2016; Freij, 2018). Hence, this change expected to create an improvement in the accessibility of markets by lowering barriers to entry for small business. In addition to this, regulators overlooked the activities of non-financial companies in financial services industry. Hence, this may create an arbitrage effect that encourage Fintech startups to access the financial services industry. Several authors argued that the higher stringency level of regulation which intensify barriers to entry may deteriorate Fintech emergence and Fintech related entrepreneurial supply (Boot, 2017; Claessens et al., 2018; Cumming & Schwienbacher, 2016; Navaretti & Calzolari, 2017; Rau, 2017). For instance, in alternative fund transfer services sector, Boot (2017) argued that regulatory developments such as PSD2 in EU would elaborate competition by allowing payment information share among the competitors. In lending side of Fintech market, Rau (2017) found that the crowdfunding volume affected by regulatory strength. Moreover, Navaretti and Calzolari (2017) depicted that more regulated banking sector lowers investment in Fintech firms. Furthermore, Cumming and Schwienbacher (2018) suggested that due to regulatory arbitrage the less

stringent regulated markets attract more venture capital funds to support Fintech startups.

Finally, Claessens et al. (2018) showed that higher stringent banking regulation has a negative impact on Fintech credit activity. Even though individual studies suggest different methods to evaluate stringency level of banking regulation, currently none of them widely accepted criteria. Once necessary amount of data is available, this specific regulatory change can be modelled and its impact can be calculated on Fintech emergence.

Unfortunately, currently most of the studies are follow qualitative path due to unavailability of data. In the future, we will see more quantitative studies in this field.

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APPENDICES

A. VARIABLE LIST

Table 18 - Variable List

Variable Name	*Definition*
Dependent Variable	
Number of Fintech Startup Founded	The number of Fintech startups founded in a given country and year. Source: Trancx
Fintech Density (lnd)	The number of new business founded divided by labor force. Source: Trancx, World Development Indicator database, and own calculation
Independent Variables	
Labor Force	Total labor force including people ages between 15 and 64 who meet the definition of the economically active population by International Labor Organization definition. Source: World Development Indicators database.
Ln(GDP per capita) (lngdp)	GDP per capita is the gross domestic product per capita in USD. Source: World Development Indicators database.
Venture Capital (VC)	Response to the survey question: "In your country, how easy is it for entrepreneurs with innovative but risky projects to find venture capital? [1 = extremely difficult; 7 = extremely easy]". Source: World Economic Forum, Global Competitiveness Report, Executive Opinion Survey.
Doing Business Index (DOI)	The World Bank's Doing Business Index. DOI measures the number of procedures, time, cost, and paid-in-capital required for micro-small and medium sized limited liability company to start-up in a country. Source: World bank.
Quality of STEM Education (Qualmath)	Response to the survey question:" In your country, how would you assess the quality of math and science education? [1 = extremely poor-among the worst in the world; 7 = excellent among the best in the world]". Source: World Economic Forum, Global Competitiveness Report, Executive Opinion Survey.
Commercial bank branches	(Number of institutions + number of bank branches) × 100,000 / adult population in the country. Source: International Monetary

(Branch)	Fund, Financial Access Survey.
Financial Institutions Efficiency Sub Index (FIEff)	FIEff indicates whether a bank can provide its services at a low cost with a sustainable revenue. The index is calculated based on three parts: (i) is it efficient in terms of intermediating savings: Net Interest Revenue/Average interest-bearing assets, (ii) is it operationally efficient: non-interest income/ (total income+overhead costs), and (iii) is it profitable: ROA and ROE. Source: IMF's financial development index database.
Trust (Edelman)	Edelman Trust Barometer study on Financial Services. Edelman is a global communication firm founded in 1952. The trust index based on the data collected through online surveys in 27 countries recently. The financial trust is measured through surveys of educated sample of 500 respondents in the U.S and China, and 200 individuals in all other markets. Based on Edelman's report, these respondents are representing 16% of total global population. Source: Edelman Trust Barometer (2013-2016)
Mobile Phone Subscription (Mobile)	A mobile telephone subscription refers to a subscription to a public mobile telephone service that provides access to the public switched telephone network using cellular technology; this includes both analog and digital cellular systems (IMT-2000, Third Generation, and 3G) and 4G subscriptions, but excludes mobile broadband subscriptions via data cards or USB modems. The variable measures the number of mobile telephone subscriptions per 100 adults in the population. Source: World Telecommunication database.

B. *TABULATED LITERATURE REVIEW*

In this part, tabulated literature review presented. Earlier studies enlighten this thesis and understanding the framework used in these studies are important to explain the work in this thesis. Several different proxies used to explain Fintech Entrepreneurship emergence as well as general entrepreneurship all over the world. The reason behind different proxies used attributed to the nature of the topic.

To explain Fintech entrepreneurship emergence, this study utilizes several different studies. In this regard, this study based on both recent Fintech entrepreneurship literature and general entrepreneurship.

Year	*Author*	*Proxy for Fintech Emergence*	*Framework*	*Measure*	*Method*	*Period*	*Result*
2013	Gordon et al.	Digital banking	Entrepreneurship ecosystem	interviews with over 50 commercial bank executives	Qualitative study	2013	Digitalization trend in banking is the main driver of Fintech. Regional banking capabilities, domestic customer demands, external market dynamics, and regulation level of the market triggers the digitalization trend.
2015	Diemers et al.	Fintech ecosystem comparison	Case study of US and Gulf Cooperation Council (GCC) countries	Technological innovation and players of Fintech ecosystem: Entrepreneurs, Governments, and Financial Institutions	Qualitative study. Case study	2015	Technological innovations and its applications are the main trigger of Fintech. Governments are the most nurturing factors
2016	Ernst & Young	Fintech Ecosystem	Qualitative study – Case study	Interview with 65 external and 30 internal executives in 7 Fintech hubs	Qualitative study	2016	Fintech hubs compared and defined 4 attributes 4 attributes: talent, capital, demand, and existence of friendly business environment compared. Interview results show how these 4 attributes affected these ecosystems
2017	Schindler	Depth of Innovation	Supply & Demand Factors of Financial Innovation	Abstract Paper	The author is a thought leader and executive of Federal Reserve, DC		Technology, increased regulatory burden after 2008, macroeconomic conditions-low interest rate environment, changes in demographics such as millennials, and change in demand in consumer's mobile first technologies are main drivers.

Year	*Author*	*Proxy for Fintech Emergence*	*Framework*	*Measure*	*Method*	*Period*	*Result*
2017b	Deloitte	Fintech Ecosystem	Qualitative study – Case study	Interview with executives of 44 Fintech hubs	Attributes: existence of government support, availability of innovation culture, customer readiness, talent availability, existence of foreign startups, regulatory support	2017	Fintech hub index is created to compare Fintech emergence
2016 & 2018	Haddad & Hornuf	Number of Fintech startup established	Supply and Demand forces of Entrepreneurship Framework	Number of Fintech startup established in 55 countries for 10 years period	Panel data analysis with negative binomial model	2005-2015	Development level, available sizable workforce, readily available technology, availability of venture capital, loan inaccessibility for SME are major indicators for Fintech emergence.

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
2015	Arner, Barberis, & Buckley	The Evolution of Fintech: A New Post-Crisis Paradigm?	Position paper	Technological development reshaped the banking industry and allow new startups to enter the financial market.
2015	Financial Conduct Authority (FCA)	Regulatory Sanbox-November 2015	Regulator Information Document	How regulatory sandboxes are affecting Fintech development
2016	Alt and Puschmann	The Rise of Customer-Oriented Banking – Electronic Markets are Paving the Way for Change in Financial Industry	Position Paper	Collaboration between Fintech and traditional banks are the future of the banking industry. Technology is one of the most important determinants of Fintech emergence.
2016	Derebail et al.	European Payment Services Directive to Address New Requirements and Capiatalize on Emerging Opportunities with IBM.	Regulatory Information Document	Special regulations supporting competition such as policies on PSD2 may effective in emergence of Fintech.
2016	Digital Financial Institution	Fintech in Canada: The British Colombia Edition.	Case study: Canadian Market	Talent gap can be closed by, supporting STEM education, immigration policy to attract foreign talent, incubator program

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
				offerings, and college level direct education programs.
2016	Dorfleitner & Hornuf	The Fintech Market in Germany	Qualitative study – Case study on German Market	Proactively established regulatory sandboxes have positive impact.
2016	Pollari	The rise of Fintech opportunities and challenges.	Position paper. Thought leader views.	Existence of venture capital is an important factor on Fintech development.
2019	Allen	A US Regulatory Sandbox?	Qualitative Research, Case study. Comparison report USA & UK market	How regulatory sandbox positively affecting Fintech establishment in the UK.
2017	Autio	Digitalization, Ecosystems, Entrepreneurship, & Policy	Technical report	Proactively established regulatory sandboxes have a positive impact on Fintech emergence.
2017	BBVA	What is a Regulatory Sandbox?	News BBVA blog	Positive effects of regulatory sandboxes on Fintech development.
2017	Bersch et al.	The Role of Trust in Online Lending	Working paper. Case study in the USA market	Distrust in banks leads to increasing demand in a special form of Fintech peer-to-peer lending in the US market.

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
2017	Bofondi & Gobbi	The Big Promise of Fintech	A chapter in a special edition on Fintech journal.	Increase in economic development level changes customer desires hence it positively affect Fintech emergence.
2017	Boot	The Future of Banking: From Scale & Scope Economies to Fintech	Position paper	Specific Fintech startups such as alternative fund transfer service provider Fintechs will be affected by regulatory interventions. Moreover, technological inventions especially mobile internet technology has a boosting effect on Fintech.
2017	Bromberg, Godwin, & Ramsay	Fintech Sandboxes: Achieving a Balance between Regulations and Innovations	Position paper	Proactively established regulatory sandboxes have a positive impact on Fintech emergence. Advantages of having regulatory sandboxes.
2017	Ernst & Yang	Unleashing the Potential of Fintech in Banking	White Paper	Fintech and banks will collaborate and reshape the industry.
2017	Flanagan, Modjtahedi, & Coe	Investigating the Global Fintech Talent Shortage	Case study: comparison of 3 Fintech hubs	How talent gap is closed and what will be the necessary steps to close the gap.
2017	Fenwick, McCahery, &	Fintech and the Financing of Entrepreneurs: From	Case study: Comparison	Venture capital that is probed by level of regulation in the country, is an effective

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
	Vermeulen	Crowdfunding to Marketplace Lending	of 12 countries	factor in Fintech. Proactive governments to establish Regulatory Sandbox attract more Fintech.
2017	Jenik & Lauer	Regulatory Sandboxes and Financial Inclusion	Working paper	Establishing regulatory sandbox expected to support Fintech emergence of the nation.
2017	Karkaınen et al.	On the Educational Curriculum in Finance and Technology	Position paper	To close talent gap in Fintech necessitate a new educational reform involves multidisciplinary approach.
2017	Navaretti & Calzolari	Fintech and Banks: Friends of Foes?	Chapter in Special edition called Fintech and Banking, Friends or Foes.	Higher the regulation in banking sector, lower the Fintech emergence.
2017	Puschmann	Fintech	Position paper	Technological advancements are the most important factors effective in Fintech emergence.
2017	Rau	Law, Trust, and the Development of Crowdfunding	Working Paper	Specific Fintech startups such as crowdfunding startups positively attracted by low level of regulatory strength. Increase in development level

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
				changes the customer demands and increase Fintech emergence. Furthermore, there is a positive relationship between general trust and crowdfunding lending.
2017	Zetzsche et al.	Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation	Case study: Comparison of 7 Fintech hubs	How different regulatory approaches affect Fintech emergence. Proactively established regulatory sandboxes have a positive impact on Fintech emergence.
2018	Basel Committee on Banking Supervision	Implications of Fintech Developments for Banks and Bank Supervisors	Regulatory Information Document	Several different scenarios considered to understand how Fintech will affect of future of banking industry.
2018	Binti, Khalid, & Kunhibava	Regulatory Sandbox: Malaysia's Response in Regulating Fintech	Case Study: Malaysia	Establishing regulatory sandbox is a supportive tool to increase Fintech emergence. Decreasing trust in bank after 2008 Global Financial Crisis, there is an increase in demand in crowdfunding platforms than banks.
2018	Block et al.	New players in entrepreneurial finance and	Position paper	Fintech startups active in funding is a serious alternative to VC funds and

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
		why they are thee?		traditional funding methods. Reasons behind these new entrepreneurial type finance providers are emerging.
2018	Bömer & Schwienbacher	Resource based perspective of VC investments in Fintech	Case study on German Market	Resource rich locations offer necessary high-quality labor force. Fintechs and banks will collaborate to change the industry
2018	Broström, Mohammadi, & Saiedi	Distrust in Banks and Fintech Participation: The Case if Peer-to-Peer: Lending	Case study on peer-to-peer lending in the UK market	Distrust in banks leads to increasing demand in a special form of Fintech peer-to-peer lending in the UK market.
2018	Capgemini, Linkedin, & Efma	World Fintech Report 2018	Sector Report based on case study	Importance on exıstence of venture capital on Fintech entrepreneurship
2018	Claessens et al.	Fintech Credit Markets around the world: Size, Drivers, and Policy Issues	Working Paper	VC interest in Fintech leveraged by regulators to attract these funds of regulatory arbitrage created by lack of regulation. Moreover, higher regulatory environment in banking has negative impact on Fintech financing activity. Furthermore, increase in economic

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
				development level is positively affecting Fintech emergence.
2016/2018	Cumming and Schwienbacher	Fintech Venture Capital	Regression Analysis	The amount of VC backed in Fintech companies are proportionally move to countries with weaker financial regulations.
2018	Faykiss et al.	Regulatory tools to encourage Fintech innovations: The innovation hub and regulatory sandbox in international context	Qualitative research – case study on Hungarian Market	Establishing regulatory sandbox or regulatory innovation hub by leveraging supportive legislative actions help to flourish Fintech emergence.
2018	Freij	A Regulatory Innovation Framework: How Regulatory Change Leads to Innovation Outcomes for Fintechs.	Book Chapter	Rapid technological development and government interventions that creates a change in industry structure, allows new entrepreneurs to enter.
2018	Lee & Shin	Fintech Ecosystem, Business Model, Investment Decisions, and	Qualitative Research	Resource rich locations attract more Fintechs. Fintechs and banks will collaborate to change the industry.

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Fintech emergence*
		Challenges		Fintech startups provide a more efficient and cheaper service than banks.
2018	Lewan	The Internet as an Enabler of Fintech	Book Chapter	Technological advancements especially in mobile internet technology has a positive impact on Fintech emergence.
2018	Lewan	The Role of Trust in Emerging Technologies	Book Chapter	In increase, in general trust level of customers will increase the demand for alternative services such as Fintech. Eventually it creates a domino effect in emergence of Fintech.
2018	Press	The Role of Venture Capital in the Success of the Swedish Fintech Industry.	Case study: Swedish Market	VC availability is important for Fintech development

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Entrepreneurship*
2017	Acs, Szerb, & Autio	The Global Entrepreneurship Index	Index study based on global survey results	Several different determinants are to use to explain the level of difference in entrepreneurship across the countries.
2007	Audretsch	Entrepreneurship Capital and Economic Growth	Literature review, theory paper	Significant relationship between per capita income level and entrepreneurship level. Supportive governmental interventions are important to accelerate entrepreneurial development.
1994	Audretsch & Acs	New Firm Startups, Technology, and Macroeconomic Fluctuations	Pooling a cross-section of 117 industries over 1976-1986	A model proposed to explain startup activity by macroeconomic growth rate, the cost of capital, and the unemployment rate, and to industry-specific characteristics, technological conditions.
1994	Audretsch, Acs, & Evans	Why does the Self-Employment Rate Vary Across Countries Over Time?	Panel data study on 23 OECD country between 1970-1990	The paper shows that the major explanation for the diversity of self-employment is due to economic development.
2001	Audretsch & Thurik	What's New About the New Economy? Sources of Growth in the Managed and	Theory Paper evidence based on literature	Technological development created an industrial shift and decreases the importance of economies of scale hence allow entrepreneurs to enter many mature markets. Moreover, unemployment found to be an

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Entrepreneurship*
		Entrepreneurial Economies		effective factor.
2000	Blanchflower	Self-employment in OECD Countries	Determinants of self-employment rate modeled via panel data for 23 countries for 1966-1996	Level of economic development, difference in demographic features of countries, cultural and institutional differences, and fast pace of technology is determined as the main drivers of the self-employment rate.
2002	Careere et al.	Economic Development and Business Ownership	Panel data of 23 OECD countries in 1976-1996.	Significant relationship between per capita income level and entrepreneurship level. This is the most famous study summarized the arguments behind a u-shaped relationship.
2017	Dvouletý	Determinants of Nordic Entrepreneurship	Panel data analysis between years 2004-2013 for Nordic Countries	Positive relationship between unemployment rate, GDP per capita, and entrepreneurial activity has been shown and a negative relationship between administrative barriers are shown.
2016	Morelix, Reedy, & Russell	The Kauffman Index: Growth Entrepreneurship	Index study based on global economic indicators and global survey results	Introduces the measures of level of entrepreneurship.

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Entrepreneurship*
2017	Nicolae, Lupu, & Ion	What Matters for Entrepreneurship? A Global View on its Determinants	Panel data analysis including 57 countries between 2004 and 2012. Density of newly established companies used as dependent variable	Factors effective global level is considered. Bankruptcy, the economic situation, producer price & competitiveness found as the main factors of entrepreneurial density. Moreover, wage rate, the bank lending to the private sector, the bankruptcies has a lagged effect on entrepreneurial density.
2002	Porter, Sachs, & McArthur	Competitiveness and Stages of Economic Development	Global Entrepreneurship Monitor Study	Significant relationship between per capita income level and entrepreneurship level
1994	Reynolds, Storey, & Westhead	Cross- National Comparison of the Variation in the New Firm Formation Rates	Comparison of seven countries	The relationship between economic growth and entrepreneurship level is modeled and analyzed. the demand changes during the short-run business cycle fluctuations found to be effective in the entrepreneurship level
2002	Reynolds et al.	Global Entrepreneurship Monitor 2002	Research Study based on global level survey	The relationship between economic growth and entrepreneurship level is modeled and analyzed. the demand changes during the short-run business cycle fluctuations found to be effective in the

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Entrepreneurship*
				entrepreneurship level
1934	Schlumpeter	The Theory of Economic Development	Seminal work	Framework of the effect of technological advancement and its usage. How technology creates creative destruction and how it evolves into creative accumulation phases.
2003	Stel et al.	Explaining Nascent Entrepreneurship across Countries	White Paper	Comparison of three main models of entrepreneurship to explain the determinants of nascent entrepreneurship by using Global Entrepreneurship Monitor 2002 data.
2003	Thurow	Fortune Favors the Bold: What We Must Do to Build a New and Lasting Global Prosperity.	Book	In his book Thurow illustrated how globalization effective in growth of a national economy in an entrepreneurial perspective.
2006	Wennekers	Entrepreneurship at Country Level: Economic and Non-economic Determinants	PhD Thesis	Several different determinants are to use to explain the level of difference in entrepreneurship across the countries.
2002	Weenerkers, Uhlaner, &	Entrepreneurship and its conditions: A Macro	Theory paper and	Significant relationship between per capita income

Year	*Author*	*Name of the Article*	*Method*	*Relationship with Entrepreneurship*
	Thurik	Perspective	literature review	level and entrepreneurship level
2013	Valdez & Richardson	Institutional Determinants of Macro-Level Entrepreneurship	Panel data analysis based on multi country	Cultural-cognition of the society and regulations have greater impact on GDP level on entrepreneurial activity. Paper suggests that entrepreneurial activity is mostly personal beliefs rather than pure economic availability.
2002	Verheul et al.	An Eclectic Theory of Entrepreneurship	Literature Review, Theory Construction Paper	Formed a coherent and unified theory to gather necessary pieces of different disciplines to explain the determinants of entrepreneurship.

C. MODELS USED TO EXPLAIN FINTECH EMERGENCE

In this part, the results of the models used in empirical analysis presented.

Table 19 - Economic Development Effect Model

shows the results of Model 1: Effect of Economic Development Level on Fintech Emergence – in full data analysis, up to some point, increase in economic development has a decreasing effect in Fintech entrepreneurship density, however from some point onwards it is positively affecting. This result is particularly evident in the first period (2006-2013) of the data and in emerging countries group

		Full Data	***Emerging Markets***	***Developed Markets***	***Period 1***	***Period 2***
M1	lngdp	-1.2769 *	-1.2275	23.611	-1.4851*	-0.7708
	$lngdp^2$	0.117 ****	0.1143**	-1.041	0.1272***	0.0919*
	R^2	0.52338	0.3992	0.14278	0.49866	0.57477

Significance Codes: * 0.1, **0.05, ***0.01, ****0.0001

Table 20 – Economic Development Effect Model (Subanalysis)

		Emerging Markets		***Developed Markets***	
		Period1	Period2	Period1	Period2
M1	lngdp	-1.6141*	-0.3125	21.725	25.6061*
	$lngdp^2$	0.1355**	0.0638	-0.9566	-1.1261
	R^2	0.38164	0.43825	0.10997	0.23513

Significance Codes: * 0.1, **0.05, ***0.01, ****0.0001

Table 21 – Creative Destruction

shows the results of Model 2: in full data analysis, up to some point, increase in mobile phone subscription to a certain point, positively affects Fintech Entrepreneurship density (creative destruction period), after a certain point of increase in mobile phone subscription the Fintech entrepreneurship density is adversely affected (creative accumulation period). This result is evident in both first period (2006-2013) and second period (2014-2016) of the data. Moreover, especially in emerging markets in second period this feature clearly observed**.**

Variable	***Full Data***	***Emerging Markets***	***Developed Markets***	***Period 1***	***Period 2***	***Emerging Markets***		***Developed Markets***	
						Period1	Period2	Period1	Period2
Mobile	3.799****	2.55229 **	-1.36247	3.42124***	5.2176****	1.644630	5.099****	-0.61102	-2.43706
$mobile^2$	-0.8244*	-0.34266	0.55186	-0.69051 **	-1.3135**	0.098288	-1.401**	0.25422	0.93593
R^2	0.19373	0.20004	0.0092822	0.19616	0.19674	0.19444	0.2341	0.00147	0.039439
Significance Code: * 0.1, **0.05, ***0.01, ****0.0001									

Table 22- Eclectic Model of Fintech Entrepreneurship

shows the results of Model 3: in full data analysis, after certain level of development level, Fintech entrepreneurship density is affected positive, availability of venture capital, availability of high quality of education, business friendly environment has positive impact on emergence of Fintech startups. Traditional banks and Fintech startups show the feature of substitute products, however, it can be clearly seen that customer base is same for both services. In emerging markets, quality of math & science education and business friendly environment is positively effective on dependent variable. Moreover, especially in emerging markets Fintech services used by banking clients. On the other hand, in developed markets, while business friendly environment supports Fintech startup emergence, the Fintech services and banking services are substitute in nature. Apart from these results, Fintech startups established in previous year is positively affecting this year's establishments.

Variable	***Full Data***	***Emerging Markets***	***Developed Markets***	***Period 1***	***Period 2***	***Emerging Markets***		***Developed Markets***	
						Period1	Period2	Period1	Period2
lngdp	-0.7845	-0.9134	15.7820	-0.9769	-0.9297*	0.8923	-0.7831	6.8995	21.950
$lngdp^2$	0.0682*	0.0736	-0.7080	0.075	0.0514*	-0.042	0.0425	-0.322	-0.974
Mobile	0.0962	-0.184	2.0694	0.349	-0.234	-0.0867	-0.810	0.129	-2.336
$mobile^2$	0.0468	0.2477	-0.7592	-0.016	0.2378	0.084	0.5324	-0.017	0.726
VC	0.3619**	0.2264	0.4959	0.4203**	-0.0099	0.2269***	-0.039	0.142*	0.472**
Qualmath	0.2692**	0.238**	0.061	0.2621**	-0.0575	0.089	-0.065	0.010	0.052
FIEff	-1.763**	-1.128	-3.363*	-1.8766**	0.0105	-0.2527	0.030	-0.460	-4.384**
Branch	0.015***	0.0254****	0.007	0.0160***	-0.0005	0.0087**	0.0022	0.0025	0.0056
DOI	2.419*	2.0975*	6.784 ***	2.4766	0.6055	-0.2330	0.6064	0.129	1.637
Lag(lnd)					0.850***	0.6926***	0.8280****	0.8724****	
R^2	0.63325	0.5644	0.45367	0.62478	0.65785	0.56363	0.58028	0.51441	0.41842

Table 23 – Eclectic Model Including the Effect of Distrust

shows the Subanalysis results of Model 3: in full data analysis, data indicates creative destruction and creative accumulation phases clearly. Moreover, availability of venture capital, availability of business-friendly environment has positive impact on emergence of Fintech startups. Furthermore, traditional banks and Fintech startups shows the feature of complimentary products. When loss of trust in traditional financial services increases, Fintech entrepreneurship is affecting positively. The addition of trust variable has different impacts on emerging and developing markets. In emerging markets, it is clearly seen that the till a certain level of economic development level individuals prefers to be paid employee rather than being an entrepreneur. Moreover, in emerging markets, availability of venture capital, availability of high-quality mathematics and science education, and having business friendly legislation has positive impact on dependent variable. Increasing distrust in traditional financial system increases Fintech startup emergence. One interesting point even though the Fintech startups are found to be complimentary to traditional banking services in emerging markets, the customers of Fintech services are not customers of traditional banking services which can be interpreted as Fintech services may help financial inclusion in emerging markets. On the other hand, in developed markets there is no evidence that distrust in traditional financial services are supportive factor in Fintech startup emergence. However, existence of high quality of mathematics and science education is positively affecting Fintech startup emergence. Moreover, it has been found consistent with previous analysis that in developing markets Fintech startup services and traditional banking services are substitute to each other and the customer base of these two services are same.

Model		***Full Data***	***Emerging Markets***	***Developed Markets***
M3	lngdp	-2.651	-8.2855****	-64.214
	$lngdp^2$	0.1148	0.446****	3.1718
	Mobile	-3.0525*	-0.3524	-3.237
	$mobile^2$	1.198**	0.49055	1.0207
	VC	0.57793****	0.675****	-0.040
	Qualmath	0.8688	0.5068***	0.8296**
	FIEff	1.360*	1.6678**	-6.0099**
	Branch	0.022	-0.0243*	0.0389*
	DOI	3.714***	3.948***	8.2211
	Edelman	-2.0553***	-4.3273****	-0.4372
R^2		0.20091	0.79176	0.72295

Significance Code: * 0.1, **0.05, ***0.01, ****0.0001

D. *TURKISH SUMMARY/TÜRKÇE ÖZET*

Finansal Teknoloji (Fintech) girişimciliğinin yaygınlığı ülkeler arasında farklılık göstermektedir. Fintech girişimciliğinin ülkeler arasında bu denli farklı ortaya çıkmanın olası nedenleri ve olası sonuçları, akademisyenler, finansal sektör temsilcileri ve politika yapıcılar tarafından tartışılmaktadır. Bu tez, Fintech girişimciliğinin belirleyicilerini araştırmaktadır. Bu çerçevede, muhtemel belirleyicilerin etkilerini göstermek için, girişimcilik teorisi çerçevesinde arz ve talep faktörleri arasındaki farklılığa dayanan bir model ampirik bir analiz ile test edilmiştir.

Bu tezde önerilen model, Fintech fenomenini etkileyen arz ve talep faktörlerini araştırmaktadır. İşgücü piyasası perspektifinden, modelin arz tarafı kaynakları, yetenekleri ve Fintech başlangıcını kurmak için kullanmak isteyen bireylerin tercihlerini etkileyen faktörleri temsil etmektedir. Bu bağlamda, bu tez, iş yaşamını destekleyici (vergi indirimleri, sosyal sigorta destekleri, şirket kurmanın ve fesih etmenin kolaylaştırışması), girişim sermayesini çekmeye yönelik, piyasadaki bilgi açığını azaltmaya yönelik, yüksek kaliteli eğitim sağlayarak yetenek açığını kapatmaya yönelik hükümet müdahalelerinin Fintech'in tedarikinde en önemli etken faktörü olduğunu savunmaktadır.

Öte yandan, ürün pazarı açısından; modelin talep tarafı, Fintech girişimcisi olmak için fırsatlar yaratan faktörleri inceler. Bu açıdan, müşteri talebindeki herhangi bir değişikliğin veya endüstrinin yapısındaki herhangi bir değişikliğin potansiyel girişimcilere yer açması beklenmektedir. Buna paralel olarak, tezde, teknolojik gelişme, ekonomik gelişme, geleneksel bankacılık ürün ve hizmetlerinin erişilebilir ve satın alınılabilir ölçüde uygun olması ve tüketicilerin güven düzeyindeki değişim, Fintech talebinin ana etkileyicileri olarak belirlenmiştir.

Bu tezde önerilen model, Verheul ve arkadaşları tarafından 2002 yılında oluşturulan Eklektik Girişimcilik teorisini baz almaktadır. Bu teoride Verheul ve arkadaşları

disiplinler arası bir çalışma yaparak gerçek ve denge girişimcilik oranlarındaki farklılıkların arz, talep, ve hükümet politikaları ile nasıl dengelenebileceğini göstermektedir. Çalışma, arz ve talep faktörlerinin ayrımının yanı sıra politikalar yoluyla hükümet müdahalelerinin temel belirleyici rolünü anlatmaktadır.

Bu tezde benzer çerçevede önerilen model ile arz ve talep faktörlerinin Finansal Teknoloji şirketlerinin gelişimini nasıl etkilediği araştırılmaktadır. Gelişmekte olan bir alan olan finansal teknoloji şirketleriyle ilgili veri sıkıntısı sebebiyle literatürdeki çalışmaların pek çoğu kalitatiftir. Bu çalışmada amacımız kalitatif çalışmalarda belirlenen bulgular ile geleneksel girişimcilik teorisinin modellerini kullanarak ortak bir sonuca varılıp varılamayacağını belirlemektir. Bu çerçevede tezde önerilen eklektik teorinin ilgili ajanları kısaca tartışılacaktır.

Finansal Teknoloji Şirketleri Girişimciliği için Eklektik Teori ve Ajanları

Bu tez Verheul ve arkadaşlarının 2002 yılında oluşturdukları Girişimcilik için Eklektik teoride yer alan prensipler ile Finansal Teknoloji şirketlerinin varoluşlarını açıklamaya çalışan kalitatif çalışmalarda yer alan ajanlar kullanılarak oluşturulmuştur. Bu tezde önerilen modelde finansal teknoloji girişimciliğin etki eden faktörler arz ve talebin farklılıklarına göre yorumlanmaktadır.

Finansal Teknoloji Şirket Girişimciliğine Arz Yönünden Etki eden Ajanlar

Fintech Girişimciliğine arz yönünden etki eden başlıca ajanlar ülkedeki işletme dostu düzenlemelerin varlığı, risk sermayesini ülkeye çekecek düzenlemelerin varlığı, yüksek kaliteli Bilim, Teknoloji, Mühendislik ve Matematik (BTMS) eğitimininin varlığı, ve düzenleyici kuluçla merkezleriların varlığı gibi doğrudan devlet müdahalelerinin sonuçlarından kaynaklandığı düşünülmüştür. Her girişimcilikte olduğı gibi Fintech Girilimciliğinde de ülkede var olan işletme dostu düzenlemelerin örneğin işe alım ve işten çıkarmanın kolaylaştırıldığı düzenlemelerin varlığı, şirket kurulum ve fesih işlemlerinin kolaylığı, yeni kurulan şirketlere dair kurulum sermayesi miktarının görece düşük tutulduğu ve ilgili girişimlere yönelik vergi ve çeşitli sosyal güvenlik ödemelerinin indirimli olarak uygulanması gibi indirimlerinin olumlu etkisinin olacağı öngörülmüştür.

Benzer biçimde her yeni girişimin en önemli ihtiyacı olan yatırım sermayesinin kolaylıkla teminine yönelik risk sermayesinin ülkedeki varlığının önemli bir diğer ajan olduğu düşünüşmüştür. Literatür çalışmaları ve sektör raporları finansal teknoloji şirketlerinin özellikle çekirdek ve gelişme risk sermayesinin varlığıyla olumlu yönde etkilendiğini göstermektedir (Pollari, 2017; Fenwick, 2017; Claessens et al., 2018, Cumming & Schwienbacher, 2018, Haddad & Hornuf, 2018; Consultancy UK, 2018).

Bir diğer direk devlet müdahelesi olan düzenleyici kuluçla merkezlerilarının (kuluçka merkezlerinin) ülkede kurulumunun bu girişimcilik çeşidini olumlandırdığı düşünülmektedir. Kalitatif literatür taramalarında düzenleyici kuluçka merkezlerinin hem bu tip girişimciliğe yönelik kültüre katkı sağlaması, hem de bu giriş modelinin düzenleyiciler tarafından tam anlaşılarak yüksek oranda denetlenen finansal sektöre tam uyum göstererek sektöre girmelerine olanak tanıyacağı savunulmaktadır (Doefleitner & Hornuf, 2016; Autio, 2017, Bromberg, Godwin, & Ramsay, 2017; Zetzsche et al., 2017; Fenwich, McCahery, & Vermeulen, 2017; Faykiss et al., 2018; Block et al., 2018).

Finansal bilgi ve yazılımın birleştirilmesi sonucu oluşan Fintech girişimciliğinin ana sorusallarından bir tanesi de yetenekli iş gücünün kısıtlı olmasıdır. Bu girişimcilik özellikle dünya üzerinde halihazırda arz eksiği gösteren mühendis, yazılımcı, matematikçi gibi çalışanlara ihtiyaç duymaktadır. Bu boşluğun kapatılmasına yönelik olarak uygulanacak kaliteli BTMS eğitiminin ülkedeki varlığı hem bu alandan mezun olmuş hazır iş gücünün ülkeye çekilmesini sağlayacak hem de ileriye yönelik insan kaynağının oluşturulmasına yönelik alt yapı hazırlayacaktır. Bu çerçevede ülkedeki BTMS'ye destek devlet müdahelelerinin ülkedeki finansal teknoloji şirketi kurulumunu artıracağı düşünülmektedir (Digital Finance Institute, 2016; Reynolds et al., 2016, World Economic Forum, 2016; Karkkainen et al., 2018).

Finansal Teknoloji Şirket Girişimciliğine Talep Yönünden Etki Eden Ajanlar

Finansal teknoloji şirketlerinin ortaya çıkmasına vesile olan talep ajanları girişimci olmak için fırsatları temsil etmektedir. Mikroekonomik teoriye göre, işgücü talebi ürün pazarından türetilen bir taleptir. Yani ürünlere olan talebin artmasıyla, daha fazla ürün üretilmek için emek talebi artar (Investipedia, 2018). Buna paralel bir benzetimle, Fintech girişimcilik talebi de Fintech ürün ve hizmetlerine artan talebi karşılamak üzere artacaktır. Piyasada meydana gelecek herhangi bir talep artışı, ya da piyasa koşullarında meydana gelebilecek bir değişiklik Fintech girişimcisi olma potansiyeline sahip olan kişileri harekete geçirerek ücretli çalışan olmak yerine iş sahibi olmayı tercih etmelerine sebep olur.

Bu çerçevede, teknolojik gelişmeler - özellikle son yıllarda ortaya çıkan mobil teknoloji gelişimleri ve artan mobil bağlantılar, ülkenin ekonomik gelişmişlik düzeyi, geleneksel bankacılık sistemine olan güven, ve geleneksel bankacılık sisteminin erişilebilirliği ve fiyatı Fintech girişimciliğinde talep kaynaklı ajanlardır.

Ekonomik gelişmişliğin Finansal teknoloji girişimciliğine etkisi, belirli bir düzeye kadar artan kişi başı milli gelir, girişimci adaylarını tetiklememekte yani yetenekli kişilerin ücretli çalışan olarak kalmasını örgütlemekte ancak belli bir gelişmişlik düzeyinin üzerinde işveren haline dönüşmelerine olanak sağlamaktadır. Bu durumun altında yatan iki makul açıklama vardır. Birincisi, ekonomik gelişmişliğin geçirdiği 3 temel basamağın anlaşılmasıyla gözlemlenecektir. Ekonomik gelişmişlik üç temel basamaktan geçer. Birinci aşamada yer alan ülkeler faktör-güdümlü ülkelerdir, bu ülkelerde üretim çoğunlukla tarıma dayalıdır ve ekonomik gelişmiş seviyeleri genellikle düşük olan ülkelerdir. Bu tip ülkelerde iş bulma sıkıntısı sebebiyle özellikle yeteneksiz kişiler kendi işlerini kurarlar (örneğin limon satmak, pazarcılık, vs), bu tip ülkelerde girişimcilik oranı yüksek gözükse de bu girişimcilik zorunluluktan ötürü olan tipte girişimciliktir. Bu tip ülkelerde Fintech girişimciliğinin varlığı beklenmemektedir. İkinci aşamada yer alan ülkeler verimlilik odaklı aşamada yer alan ülkelerdir. Bu ülkeler özellikle gelişmekte olan ülkeleri temsil ederler. Genellikle dış yatırımların yoğun olduğu gelişmiş ülkelerin üretim arka kapısı olan bu ülkelerde iş bulma sıkıntısı daha azdır ve Fintech girişimcisi

olmaya aday bireylerin bu ülkelerde kolaylıkla yüksek gelirli işlerde çalışması beklenmektedir. Üçüncü aşama inovasyon güdümlü ülkelerden oluşur. Bu aşamadaki ülkelerde yetenekli bireyler için iş bulmak güç olmadığı gibi piyasa talebine cevap verebilecek tarzda bir fikir ile risk sermayesi yardımıyla kendi işlerinin sahibi olmaları sistem tarafından desteklenir. Bu tip ülkelerde hem gelişen ekonomik koşullar neticesinde terzi dikim ürün arayışındaki müşterilerin varlığı alternatif ürünlere ciddi bir talep oluştururken yetenekli bireyler bu talebi karşılayacak yönde girişimci olmak için heveslidirler. Bu girişimci insanlar için kendi işini kurmak aynı zamanda kendini gerçekleştirme anlamına gelmektedir (Carree et al., 2002)

Ekonomik gelişmişliğe ek olarak teknolojik ilerleme iki önemli sonuç doğurarak Finansal teknoloji girişimciliğini desteklemektedir. Birincisi, teknolojik gelişmeler girişimcilerin atik iş fikirleri ile ölçek ve kapsam ekonomisinin öneminin azaltmasıyla girişimcilere olgun sektörlere girmesine olanak tanır. İkinci olarak da gelişen teknolojiye alışan müşterilerin de terzi dikim ürünlere olan ihtiyaçlarından kaynaklanan ürün pazarındaki artan talebin bu girişimler vasıtasıyla doyurulmasına olanak vererek kişileri girişimciliğe doğru sevk eder (Audretsch & Thurik, 2001; Singh, 2011; Puschmann, 2017; Boot, 2017; Lewan, 2018a, Haddad & Hornuf, 2018; Bofondi & Gobbi, 2017).

Üçücü olası ajan özellikle 2008 global finansal krizin ardından Banka müşterilerinin geleneksel finansal kuruluşlara olan güvenlerinin sarsılmasıyla birlikte alternatif yöntemlere olan talebin artmasıdır. Özellikle, finans sektörü ve güven birbirinden ayrılmaz parçalar olduğu düşünüldüğünde neden bu tip alternatif bir oluşumun kendine alıcı bulacağı kolaylıkla anlaşılır (Guiso, Sapienza, & Zingales, 2008; Georgarakos & Pasini, 2011; Stevenson & Wolfers, 2011; Birth, 2014; Rau, 2017; Edelman, 2018). Bersch ve arkadaşları (2017) ve Broström ve arkadaşları (2018)'de geleneksel finans kurumlarına artan güvensizliğin eşler arası borçlanmayı (peer-to-peer) Amerika ve İngiltere marketlerinde artırdığını gözlemlediler.

Aynı ürün marketindeki talep gibi, finansal teknoloji girişimciliği talebini de erişilebilir ve ulaşılabilir alternatif ürünlerin etkileyebileceği düşünülmektedir. Bu çerçevede geleneksel bankacılığın erişilebilir ve ulaşılabilir olması Fintech firmaları

ile bankaların arasındaki ilişki göz önüne alındığında eğer bu ikisi tamamlayıcı ürünlerse birlikte hareket etmeleri beklenirken, eğer bu ikisi rakip ise ters yönlü hareket etmeleri gerekir. Bir diğer deyişle, geleneksel bankaların erişilebilir ve ulaşılabilirliği artıkça Fintech girişimciliği azalıyorsa bu iki tipteki finansal servis sağlayıcılarının rakip olduğu düşünülür. Öte yandan geleneksel bankaların erişilebilirliği ve ulaşılabilirliği artıkça Fintech girişimciliği artıyorsa bu iki tipteki finansal servis sağlayıcılarının tamamlayıcı oldukları düşünülür.

Method ve Veriler

Bu tezde kullanılan bağımlı değişken Trancx isimli bir veri tabanından elde edilmiştir. Bu veri tabanı özellikle risk sermayesi yatırımcıları ve analistleri tarafından kullanılmaktadır. Veri tabanı kapsadığı girişim şirketlerine yönelik müşterilerine çeşitli analiz raporları ve istatistikleri sağlamaktadır. Bunun dışında kullanılan açıklayıcı değişkenler dünya bankası, IMF, ve World Economic Forum, OECD gibi benzeri kurum ve kuruluşların veri tabanlarından alınmıştır.

Birinci hipotezi ölçmek için, dünya bankası tarafından ölçümlenen ülke iş endeksi (DOI) verisi kullanılmıştır. Bu veri bir ülkede mikro, küçük ve orta ölçekli limited şirket kurmak için gereken prosedürleri, gereken zamanı, maliyeti ve ödenmiş sermayenin sayısını ölçer.

İkinci hipotezi ölçmek için ülkeye gelen risk sermayesinin yeterli olup olmadığını ölçer. Bu veri, Rekabet Edebilirlik Raporunda yer alan Global Dünya Ekonomik Forumu Yönetici Görüş Anketinde yer alan soruya verilen yıllık cevaplar toplanmıştır. Anket sorusu: "Ülkenizdelki girişimciler riskli ama inovatif olan bir projeleri için risk sermayesi bulmakta zorlanıyorlar mı?" [1 = çok zor; 7 = çok kolay]".

Üçüncü hipotezi test etmek için kullanılaak ölçüm ülkedeki düzenleyici kuluçka merkezlerinin varlığının listesi kullanılmıştır.

Dördüncü hipotezi test edebilmek için, ülkedeki BTEM gibi yetenek boşluğunu doldurmaya yönelik verilerin belirlenmesi gerekmetedir. Bunu ölçmek için Matematik Eğitiminin Kalitesinin nasıl olduğunun sorulduğu bir anket sorusu

seçilmiştir. Bu veri, Rekabet Edebilirlik Raporunda yer alan Global Dünya Ekonomik Forumu Yönetici Görüş Anketinde yer alan soruya verilen yıllık cevaplar toplanmıştır. Anket sorusu: "Ülkenizdelki matematik ve fen biliimleri eğitimi kalitesin nasıl buluyorsunuz?" [1 = çok iyi; 7 = çok kötü]".

Hipotez 5'i test etmek için mobil telefon abone sayısı seçilmiştir. Veri dünya telekomunikasyon gelişmişlik veri tabanınndan elde edilmiştir.

Hipotez 6'yı test etmek için kişi başına düşen Gayri Safi Milli Hasıla ölçüm olarak alınmıştır. Bu veri Dünya Bankası veri tabanından alınmıştır.

Hipotez 7'yi test etmek için geleneksel bankalara olan güvenin araştırıldığı bir anket olan Edelman Güven Barometresi çalışması kullanılmıştır. 2002 yılından bu yana Edelman özellikle anket deneklerine pek çok endüstrinin yanı sıra bankacılığa dair güvenlerini de sormakta olmasına rağmen hem ülke sayısı hem de verinin yeknesaklığı açısından veri yıl aralığı 2013-2016 olarak alınmıştır. Yıldan yıla artarak eklenen anket ülke sayısı 27'ye çıkmıştır. Çin ve Amerika'da yapılan anketlerde 500 anket deneği kullanılırken diğer ülkelerde 200 anket deneği kullanılmıştır ve toplumu %16'sını temsil ettiği düşünülmektedir bu anket deneklerinin. Bu hipotezi içerecek şekilde yapılan bir analiz veri setinin kısıtlı olmasından ötürü bir alt analiz olarak sunulmaktadır.

Bu çerçevede oluşturulan veri seti 494 The final dataset includes an unbalanced panel of toplam 494 gözlem içermekte olup 115 ülkeden oluşan 2007-2016 yıllarını içeren bir dengesiz panel veridir.

Literatürde, girişimcilik seviyesini ölçmek veya karşılaştırmak için birçok farklı ölçüm kullanılmıştır. Kullanılan ölçümlerden en yaygın olanları: Yeni Girişimcilerin oranı (belirli bir zamanda girişimciliğe geçiş yapan yetişkinlerin yüzdesi), Yeni Girişimcilerin Fırsat Payı (yeni girişimcilerin yüzdesi "fırsat" ve "zorunluluk" motivasyonu baz alınarak), ve Girişimcilik Yoğunluğu (ülkede bir yıl içerisinde kurulan yeni girişimcişik sayısının nüfus veya işgücü tarafından normalize edilen yeni işveren sayısı). Bu çalışmada, Girişimcilik Yoğunluğu, Fintech girişimciliğinin seviyesini ölçmek için kullanılmıştır.

Çalışmanın Yöntemleri

Bu çalışmada girişimcilik yoğunluğunun çeşitli ajanlar yardımıyla açıklanmasına yönelik üç temel tarihsel model kullanılmıştır. Birinci model, girişim yoğunluğunu sadece ekonomik gelişmişlik düzeyi ile açıklamakta olup, aradaki ilişkinin ikinci derece bir denklem olduğunu savunmaktadır.

İkinci model, finasal teknoloji girişimciliğini gelişen teknolojinin destekleyeceği öngörüsüne dayanır. Yine beklenti ikinci derece bir ilişkidir. Gelişen teknoloji hem endüstrinin dinamiklerini hem de müşteri talebini değiştirerek girişimcileri destekler. Özellikle mobil teknolojinin hızlı bir biçimde gelişmesi, müşterin diğer sektörlerde deneyimledikler hızlı, müşteri odaklı, terzi dikim ürünleri bankacılık hizmetlerinden de beklemelerine yol açmıştır. Bu çerçevede, beklenen teknoloji ölçenin ilk etapta Finansal teknoloji girişimlerini desteklemesi beklenirken (yaratıcı yıkım dönemi), belirli bir seviyenin üzerinde geleneksel bankaların da benzer ürünler çıkartarak markete girmeleri beklenir veya ilk etapta markete giriş yapan girişimlerin büyüyerek yeni girişimlere engel olmaları beklenir (yaratıcı birikim dönemi) (Schumpeter, 1934).

Üçüncü model, Verheul ve arkadaşlarının (2002) oluşturduğu eklektik girişimcilik modelinden esinlenerek oluşturulmuştur. Önerilen modelde çeşitli ajanlar finansal teknoloji girişimciliğinin arz veya talebi üzerine etkilidir. Beklenen sonuçlarda, ülkedeki işletme dostu kanunların varlığının, risk sermayesinin varlığının, düzenleyici kuluçla merkezlerinin kurulmasının (Sandbox), kaliteli BTSM eğitiminin varlığının olumlu yönde etkileyeceğini öngörmektedir. Ayrıca, ekonomik gelişmenin belirli bir seviyeye kadar ters yönde etki gösterirken belirli bir seviyeden sonra olumlu etkilerinin olacağını beklemekteyiz. Buna ek olarak teknolojideki gelişmelerin ilk etapta yaratıcı yıkım etkisi yaratacağını ve belirli bir seviyeden sonra yaratıcı birikim etkisinin gözlemleneceği beklenmektedir. Bunlara ek olarak, geleneksel bankacılık sistemine olan güvendeki azalmanın finansal teknoloji girişimciliğini olumlu yönde etkilemesi beklenmektedir. Ayrıca finansal teknoloji girişimciliği ile geleneksel bankacılık hizmetlerinin birbirine rakip şekilde hareket ettiği beklenen sonuçlardır.

Çalışmadan Elde Edilen Ampirik Sonuçlar

Açıklayıcı Veri Analizi Sonuçları

Bu çalışmada ampirik analiz de öncelikli açıklayıcı veri analizi (AVA) yapılarak, verilerin içerik kontrolü, dağılım kontrolleri, ve birbirleriyle yalnız başlarına ilişki kontrolleri yapılmıştır. AVA'da bağımlı değişken ile gayri safi milli hasıla açıklayıcı değişkenlerine logaritmik dönüşüm uygulanması gerekliliği görülmüştür. Ayrıca verilerden Seyşeller ülkesine ait verinin aykırı olması gerekçesiyle atılmasına karar verilmiştir. Bunların dışında, bağımlı değişkene ait verilerde 2006-2013 ve 2014-2016 yılları arasında bir kırılım olduğu gözlemlenmiş ve bu sebeple, veriler alt analizlerde bu iki perioda ayrılarak incelenmiştir. Ayrıca yine bu analiz esnasında ülkelerin birbirlerinden çok yüksek oranda heterojen oldukları gözlemlenmiş ancak ülkeler arasında bir gruplama olduğu gözlemlenmiştir. Literatür çalışmaları ve veri yeterliliği göz önüne alınarak ülkelerin gelişmiş ve gelişmekte olan olarak ayrımlandırılabileceğine karar verilmiştir.

AVA'ya göre, açıklayıcı değişkenler ve bağımlı değişken arasında ülke gruplarına ayrıştırıldığında, özellikle gayrisafi milli hasıla, mobil, FIEff, ve şube sayısı arasında farklı ilişkilerin varlığı gözlemlenmektedir. Ayrıca, gayrisafi milli hasıla ve mobil değişkenleri ikinci derece bir ilişkinin varlığını işaret etmektedir. Gelişmiş ülkelerde geleneksel bankacılığın erişilebilir ve ulaşılabilir olmasını ölçen değişkenlerle bağımlı değişken arasındaki ilişki ters yönlü gözlemlenirken, gelişmekte olan ülkeler de bu ilişki aynı yönlüdür. Bu basit ayrım her iki ülke grubunda finansal teknoloji girişimciliği ile geleneksel bankacılık arasında rakip ve tamamlayıcı roller olmak üzere iki farklı ilişkiye işaret eder.

Panel Veri Analizi Sonuçları

Bu tezde yapılan panel veri analizi sonuçlarına göre,

Birinci modele göre (Tablo 19), tüm verilerin kullanıldığı analiz sonuçlarına göre, aynı beklendiği gibi belirli bir gelişmiş düzeyine erişilinceye kadar artan gayri safi milli hasıla finansal teknoloji girişimciliğini azaltmakta, ancak belirli bir gelişmişlik

düzeyi sonrasında artırmaktadır. Bu durum özellikle birinci period (2006-2013) döneminde ve gelişmekte olan ülkelerde net bir biçimde gözlemlenmektedir.

Ikinci modele göre (Tablo 20), tüm verilerin kullanıldığı analiz sonuçlarına göre, aynı beklendiği gibi belirli bir noktaya kadar mobil telefon aboneliğin artması finansal teknoloji girişimciliğini olumlarken (yaratıcı yıkım dönemi), belirli bir artışın üzerinde olumsuz yönde etkilemektedir (yaratıcı birikim dönemi). Bu durum hem birinci period (2006-2013) hem de ikinci period (2014-2016) arasında gözlemlenmektedir. Ayrıca bu özellik gelişmekte olan ülkelerin ikinci döneminde açık bir biçimde gözlemlenmektedir.

Model 3'e göre (Tablo 21), tüm verilerin analizi yapıldığında, belirli bir ekonomik gelişmişlik seviyesinden sonra Fintech girişimciliğinin olumlu etkilendiğini görmekteyiz. Ayrıca, risk sermayesinin varlığı, yüksek kaliteli matematik ve fen bilimleri eğitiminin varlığı, işletme dostu yasal düzenlemelerin varlığı finansal teknoloji girişimciliğini olumlu yönde etkilemektedir. Yine bu modelin sonucunda, finansal teknoloji girişimciliği ile geleneksel bankaların birbirine ikame özellik gösterdiğini söyleyebiliriz ancak bu yeni girişimin de müşterilerini geleneksel bankacılık müşteri tabanı oluşturmaktadır. Gelişmekte olan pazarlarda, yüksek kaliteli matematik ve fen bilimleri eğitiminin varlığı ve işletme dostu yasal düzenlemelerin varlığı bağımlı değişken üzerinde olumlu etkilerde bulunmaktadır. Ayrıca, özellikle gelişmekte olan pazarlarda finansal teknoloji girişimleri tarafından sunulan hizmetler geleneksel bankacılık uygulamalarına tamamlayıcı olarak işlev görmektedir. Ancak gelişmiş pazarlarda durum tam tersi olarak gözlemlenmektedir. Yani finansal teknoloji girişimleri tarafından sunulan hizmetler geleneksel bankacılık uygulamalarına rakip olarak hareket etmektedir. Bunların dışında, hem gelişmekte olan pazarlarda hem de gelişmiş ülkelerde daha önceki yıllarda kurulan finansal teknoloji girişimleri yeni kurulacak olan girişimlere örnek teşkil etmekte ve yeni oluşumları desteklemektedir.

Finansal sisteme duyulan güvensizlik değişkeninin modele eklenmesiyle yaptığımız alt analiz sonucunda, alt analizde ülkeler gruplara ayrılmaksızın bakıldığında, veriler yaratıcı yıkım ve yaratıcı birikim aşamalarını daha önceki kısımlarda bulunan

sonuçlarla paralel sonuçlar göstermektedir. Ayrıca, risk sermayesinin mevcudiyeti, işletme dostu yasal düzenlemelerin varlığı Fintech girişimlerinin ortaya çıkmasında olumlu etkiye sahiptir. Ayrıca, geleneksel bankalar ve Fintech girişimleri, birbirini tamamlayıcı özellikler göstermektedir. Geleneksel finansal hizmetlerdeki güven kaybı arttığında, Fintech girişimcilik olumlu yönde etkilenmektedir. Güven değişkeninin eklenmesinin, gelişmekte olan ve gelişmiş piyasalar üzerinde farklı etkileri vardır. Gelişmekte olan pazarlarda, aynı daha önceki veri analizlerinde ulaşılan sonucu destekleyici şekilde, belli bir ekonomik gelişim düzeyi seviyesine kadar bireylerin girişimci olmak yerine maaşlı çalışan olmayı tercih ettiği sonucuna varılmaktadır. Ayrıca, gelişmekte olan piyasalarda risk sermayesinin kullanılabilirliği, yüksek kaliteli matematik ve fen eğitiminin mevcudiyeti ve işletme dostu mevzuatın olması bağımlı değişken üzerinde olumlu etkiye sahiptir. Geleneksel finansal sistemdeki güvensizliğin artması, Fintech girişimlerinin ortaya çıkmasına destekleyici yönde etki etmektedir. Gelişmekte piyasalarda, Fintech girişimleri ile geleneksel bankaların birbirlerini tamamlayıcı rollerde bulunmalarına rağmen, Fintech hizmetlerinin müşterilerinin geleneksel bankacılık müşterilerinden farklı olduğunu söyleyebiliriz. Bu durum gelişmekte olan pazarlarda finansal teknoloji girişimlerinin finansal kapsayıcılığa katkı sağlayabileceğini söyleyebiliriz. Öte yandan, gelişmiş piyasalarda, geleneksel finansal hizmetlerdeki güvensizliğin Fintech'in ortaya çıkışında etkili olduğu yönünde destekleyici bir sonuç bulunamamıştır. Bununla birlikte, yüksek kalitede matematik ve fen eğitimi varlığı, finansal teknoloji girişimciliğinin ortaya çıkışını olumlu yönde etkilemektedir. Ayrıca, gelişmiş pazarlarda finansal teknoloji girişimleri ile geleneksel bankacılığın rakip oldukları ve her iki hizmetin de müşteri tabanının aynı olduğu veri analizinin bulguları arasındadır.

Tartışma ve Sonuçlar

Yapılan çalışmada bulunan ampirik kanıtlar, Fitech girişimcilik yoğunluğunun, ekonomik gelişme düzeyi, teknolojik gelişmeler, risk sermayesi mevcudiyeti, işletme dostu düzenlemelerin varlığı ve yüksek kaliteli eğitimin doğrudan bir sonucu olan mevcut yüksek kaliteli işgücünden olumlu yönde etkilendiğini göstermektedir. Öte

yandan, sonuçlar piyasadaki bilgi açığını azaltmayı amacıyla kurulan düzenleyici kuluçla merkezlerinin ne gelişmiş ülkelerde ne de gelişmekte olan ülkelerde finansal teknoloji girişimciliğine olumlu yönde bir etkisini göstermemektedir. Bu sonuç, düzenleyici kuluçla merkezlerinin kurulmasında taklitçi olarak hareket etmek yerine, her bölgenin Fintech girişimcilerini desteklemek için kendi yolunu bulması gerektiğini göstermektedir. Ayrıca, bu düzenleyici kuluçka merkezlerinin girişimcileri desteklemekten çok düzenleyiciler için hazırlandığını bize düşündürmektedir. Bu yolla düzenleyiciler tarafından bu girişimlerin finansal hizmetler sektörünü nasıl etkileyecekleri anlaşılabilecektir.

Bu çalışmanın önemli bir diğer sonucu olarak finansal teknoloji girişimlerinin gelişmiş ülkelerde geleneksel finansal sisteme rakip olarak hizmet verdiğini söyleyebilirken, gelişmekte olan ülkelerde finansal sistemi tamamlayıcı olarak hizmet verdiğini söyleyebiliriz. Ayrıca genel kanatin aksine özellikle gelişmiş pazarlarda, bu ürünlerin kullanıcılarını geleneksel bankacılık müşterileri oluşturmaktadır.

Finansal sisteme duyulan güvensizlik değişkeninin modele eklenmesiyle yaptığımız alt analiz sonucunda, genel kanate paralel olarak geleneksel finansal sisteme duyulan güven azaldıkça finansal teknoloji girişimciliğinin özellikle gelişmekte olan piyasalarda arttığını söyleyebiliriz.

İlginç bir şekilde, bu çalışma ile elde edilen deneysel kanıtlar finansal teknoloji girişimciliğinde bölgesel bir kümelenme etkisi olduğunu göstermektedir. Özellikle gelişmiş ülkelerde finansal teknoloji girişimcilik yoğunluğunun gelişmekte olan ülkelere kıyasla daha yüksek olduğu tespit edildi. Bu sonuç iki ana çıkarıma ulaşılmasını sağlayabilir; birincisi dev teknoloji şirketlerinin bu düşük yoğunluklu ülkelerde baskın bir oyuncu olduğunun kanıtı olabilir veya ikincisi bu düşük yoğunluklu ülkelerde çok büyük bir potansiyelin varlığını işaret edebilir.

Bu bulguların dışında, araştırma ayrıca Fintech Girişimciliğin özel bir Girişimcilik türü olduğunu ve bu yeni girişimcilik türünün hala evrim sürecinin başlarında olduğunun açık olarak göstermektedir.

Sonuç olarak, ilginç sonuçları ile birlikte, bu çalışma, önde gelen danışmanlık şirketleri ve akademi tarafından sektör uzmanlarıyla mülakat yoluyla yapılmış olan kalitatif çalışmalarda sunulan sonuçlarla benzerlik göstermektedir. Kısacası, bu çalışma girişimciliğin finansal hizmetler sektörüne özel bir uygulaması olarak değerlendirilebilinir. İyi bilinen girişimcilik teorisinin ana prensiplerinin bu özel uygulama alanında da geçerli olduğunu gösteren bu çalışma, girişimcilik literatürüne katkıda bulunmaktadır.

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