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Factors driving financial inclusion and financial performance in Fintech new ventures: An empirical study

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FACTORS DRIVING FINANCIAL INCLUSION AND FINANCIAL PERFORMANCE IN FINTECH NEW VENTURES: AN EMPIRICAL STUDY

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Factors Driving Financial Inclusion and Financial Performance in Fintech New Ventures: An Empirical Study

by
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ABSTRACT

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Financial inclusion, or providing access to and active use of affordable financial products to the 2 billion unbanked adults globally, can facilitate individual prosperity, reduce poverty and increase economic development. Digital technologies such as mobile phones, cloud computing, data analytics and blockchain are one of the biggest enablers of financial inclusion by making it economically possible to serve these individuals.

This dissertation examined the role of digital technologies in financial inclusion from the perspective of new financial technology (Fintech) ventures serving the unbanked and underbanked. Supported by strategy management theories, I identified key factors that impact the success of these Fintech startups, as measured by financial performance and financial inclusion. I collected primary data on 63 Fintech startups from Southeast Asia, India and Africa and ran multi-variate regression and binomial logit models to quantify the main effects of these factors.

The results showed that founders with prior financial services experience, the degree of customer centricity in the company's business model, and strategic partnerships with financial institutions and e-commerce firms, had a significant and positive correlation with financial inclusion (as measured by Active Customers) and financial

performance (as measured by Annual Revenue). A qualitative analysis of 4 Fintech startups from the data sample demonstrated that other factors such as scalability, prior startup experience, and type of product sold (pull vs. push) are also critical to the startups' success, and provide insights for further empirical research.

This study has immediate practical applications for VC firms and investors that evaluate new technology ventures in financial inclusion by providing a quantitative, data-driven methodology. Finally, the results highlight that a mix of quantitative and qualitative insights is important to move research forward on the vital role that Fintech startups play in driving financial inclusion in emerging markets.

Table of Contents

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I also want to thank the other members of my dissertation committee. Professor David Lee gave me the spark of inspiration to pursue the topic of financial inclusion and how technology is the key driver to helping the unbanked and underbanked. His creative thinking and optimistic views prompted me to pursue a topic that I had limited knowledge, but a very important area that deserves to be studied in more detail. Professor Francis Koh was the one who introduced me to the SMU PhD in Business General Management program, and also the one who connected to Professor David Lee – without these connections, I would not be here today. Last, but not least, Professor Aurobindo Ghosh, who provided tremendous support and advice on the quantitative analysis of my dissertation. He was instrumental in shaping my thinking about the empirical models that I developed.

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Chapter 1: Introduction

1.1 Background

Financial exclusion, or not having access to formal financial services such as bank accounts, is a pressing and pervasive global issue that affects more than 2 billion people, or about half of the global adult population, according to the World Bank's Global Findex survey for 2014. The majority of the people that are financially excluded are the poor, living on incomes of less than $2.00 per day, most commonly referred to as the "Base of the Pyramid" (BoP). This number significantly increases to 3.5 billion people if we consider the "underbanked", or people that have a savings and/or checking account, but rarely use it, and do not have access to other important financial products such as credit cards and/or loans. The problem expands when you consider that there are more than 200 million micro, small and medium enterprises (MSMEs) that currently do not have access to credit, representing a $2.1 trillion lending gap (Stein, Ardic, & Hommes, 2013). The greatest prevalence of financial exclusion is in emerging markets such as Africa, Asia and Latin America. According to the World Bank, approximately 55% of the adult population in Southeast Asia (excluding China) have no access to bank accounts. However, in some countries, such as Cambodia and Myanmar, that number significantly increases to 75% to 80% (Demirgüç-Kunt, Klapper, Singer, & Van Oudheusden, 2015).

Being excluded from the formal financial system means that these individuals and businesses have to rely on informal mechanisms such as pawn brokers, payday lenders and loan sharks that are often extremely expensive and unreliable. Realini

(2015) refers to these individuals as “financial nomads”, since they live from day to day, paying steep prices for financial products, penalty fees and high financing costs, which perpetuates their status and prevents them from rising up the steps of the financial pyramid. This situation is one of the biggest ironies in today’s world: the people with the most limited resources are the ones paying the highest fees for financial products and services. Therefore, providing access to affordable financial products to the unbanked and underbanked has tremendous potential to help them improve their social and economic status.

It has been widely studied and documented that financial inclusion, or providing access to affordable financial products and services, generates significant benefits to the poor, marginalized and MSMEs, and is also an important engine of economic development. Access to formal financial services and products allows households to expand consumption, manage risks and invest in durable goods, health and education. Financial inclusion is an important policy issue that is being addressed globally by many international agencies, the private sector and government bodies. The World Bank declared that one of its key objectives is to achieve universal financial access by 2020. The World Bank has already received commitments and pledges from 32 partners towards achieving this ambitious goal. The G20 launched the Global Partnership for Financial Inclusion (GPFI) in 2010 to carry forward work on financial inclusion, by developing a concrete action plan to accelerate financial inclusion through policies and regulations. Governments around the world have made significant progress in incorporating financial inclusion considerations and strategies into their guidelines for banking regulation and

supervision. According to Klapper, El-Zoghbi, & Hess (2016), financial inclusion plays a pivotal role in helping to achieve the United Nations' Sustainable Development Goals (SDGs) for 2030. In particular, financial inclusion facilitates the first SDG: eliminating extreme poverty. Moreover, financial inclusion can also help reduce hunger and promote food security, which is the second SDG. By having access to financial services such as credit, savings accounts and insurance products, farmers can increase their food production, make bigger investments and allow them to take risks which can lead to increased earnings (L Klapper et al., 2016).

Significant progress has been made in accelerating financial inclusion and increasing global awareness to this important issue. In a 3-year span (from 2011 to 2014), the number of adults globally who do not have a bank account declined from 2.5 billion to 2 billion, based on World Bank's Global Findex survey. While the improvement is impressive, there is still a tremendous amount of work needed to reach the 2 billion who are still unbanked. According to the Center for Financial Inclusion (CFI) at Accion, one of the largest non-profit organizations in the world, the use of digital technologies will be crucial to achieve full financial inclusion. The Bill and Melinda Gates Foundation reiterates this statement, confirming that providing access to financial services through digital-based tools is extremely important to help people in the world's poorest regions improve their lives and build sustainable futures.

Academics and practitioners agree that advances in mobile phone technology, cloud computing, big data analytics and blockchain are revolutionizing the financial services industry, by allowing any individual to access financial services for the first

time wherever they are and whenever they need them in a faster, cheaper, more transparent and more efficient way than traditional banks. According to Ericsson, out of the 2 billion adults that are unbanked globally, 1.7 billion have a mobile phone.[1] GSMA, a global organization that represents the interests of more than 800 mobile operators worldwide, states in their website that mobile phone penetration rate in most emerging market countries averages around 80% to 85% as of 2016, even though the banked adult population average in these countries may be well below 40%. Therefore, the mobile phone has become a key tool to access financial products for the unbanked and underbanked. In September 2016, the McKinsey Global Institute published a report which is the first to quantify the expected economic impact of digital finance. The report highlights that mobile technology can lower the cost of providing financial services by 80% to 90%, enabling providers to economically serve the BoP. Moreover, the significant savings will lead to higher financial inclusion and boost annual GDP of all emerging markets by $3.5 trillion by 2025 (Manyika, Lund, Singer, White, & Berry, 2016). The report also shows that digital finance could increase the volume of loans extended to individuals and businesses by $2.1 trillion and allow governments to save $110 billion annually, by reducing leakage in spending and tax revenue. Therefore, digital financial services through mobile phone technology will become one of the main ways to accelerate financial inclusion in the future. The next chapter discusses in more detail the type of companies that are leading the effort in driving higher financial inclusion using

[1] *Mobile Wallets*, Presentation at ADB Conference on Financial Inclusion in the Digital Economy, May 24-25, 2016, Ericsson.

technology, and presents the problem statement that will be addressed in this research study.

1.2 Statement of the Research Problem and Purpose of Study

New technology ventures in the financial services sector, or most commonly referred to as Fintech startups[2], are using technology to revolutionize how we do banking and all of the different financial products and services globally. A small subset of these Fintech startups is helping to drive financial inclusion for the unbanked and underbanked in emerging markets. Although there are different ways of driving higher financial inclusion in emerging markets, there are several advantages why these new technology ventures should take the lead in this effort. These Fintech startups can be viewed as social enterprises due to their dual goal of providing a social impact (through financial inclusion) and driving profitability. They are more likely to develop innovative solutions in a faster manner than established corporations, and also able to quickly identify new consumer needs. Given their entrepreneurial drive, these new ventures are adept at identifying gaps in the market and develop new business opportunities. In addition, these companies are nimble and flexible and quickly adapt to changes in the environment, typically a lot faster than the larger corporations. Although these new technology ventures are more innovative, they generally take significantly higher risks since they are fairly young companies which are just getting established. To compound the issue, these new

[2] Throughout the research study, I will interchangeably use the terms 'new technology ventures' and 'Fintech startups' to describe these companies. **Please note that I am only addressing a small subset of the Fintech startups universe in my research study – namely, those that are serving the unbanked and underbanked in emerging markets.** The Research Methodology chapter provides more information on the data sample used in this research study.

ventures often lack significant resources to scale up their efforts. Given these challenges, and the fact that the Fintech startups serving the unbanked and underbanked are essentially new technology ventures, it is highly likely that they may not succeed within the first 5 years of being founded. There have been numerous studies in the last 20 years confirming this issue. In 2012, Shikhar Ghosh from Harvard University published a study that looked at 2,000 U.S. companies over a 6-year period, and found that 75% of venture-backed firms failed. A larger study of 11,250 U.S. technology ventures that were founded between 1991 and 2000 showed that only 36% of companies in the technology sector survived after 4 years, and only 22% survived after 5 years (Song, Podoynitsyna, Van Der Bij, & Halman, 2008).

Within financial inclusion, there are unique factors that these new technology ventures should have in order to drive higher financial inclusion and higher financial performance. This research study will explore these factors for the Fintech startups serving the unbanked and underbanked by developing an empirical model to test their significance and quantify their main effects. Specifically, the exploratory model will evaluate the likely combination of internal and external factors in Fintech startups that may result in higher business performance and drive higher financial inclusion. My research study will attempt to answer the following questions:

(1) What internal factors related to resources/capabilities, business models and strategic partnerships will have the biggest impact on financial inclusion and financial performance of Fintech startups which are serving the unbanked and underbanked?

(2) How does the market/environment affect these startups, and what other factors may have an impact?

Many authors have studied the factors that drive the success of new ventures in both entrepreneurship and social entrepreneurship literature, however, most of this research is based on case studies, anecdotal evidence and interviews of VC firms and startup founders (Macmillan, Zemann, & Subbanarasimha, 1987; Hall & Hofer, 1993; W. Gartner, Starr, & Bhat, 1999; and Gurdon & Samsom, 2010). More recently, Lee & Teo (2015) developed the LASIC principles, which consists of five factors that they consider to be important for Fintech companies to succeed in financial inclusion; the authors demonstrated the presence of these factors through two case studies: Alipay and M-PESA. Short, Moss, & Lumpkin (2009) performed a detailed review of the social entrepreneurship literature over the last 20 years and noted that there is a lack of empirical research with operational hypotheses, and in order for the field to order to progress, it needs to have more theoretically driven questions and more quantitative analytical methods. To address this challenge, my research study will develop an empirical, data-driven model based on operational hypotheses that will determine the internal and external factors that have the largest impact on the success of Fintech startups in financial inclusion. The main factors are supported by major theoretical frameworks from strategy management, namely: (1) Resource Based View (RBV) theory; (2) Social Capital and Network theory; and (3) Industry Organization Economics. While this is an empirical study, it is exploratory in nature due to the limitations and challenges in accessing sufficient data on Fintech new ventures that are serving the unbanked and underbanked in Asia and Africa.

1.3 Contributions to Academic Literature and Practice

This research study has important implications to the academic literature on entrepreneurship and social entrepreneurship. First and foremost, it will expand the limited empirical research published in these fields. One of the main challenges with empirical research in these fields has been the limited amount of data from startups, as well as gaining access to the data since it is mostly private. I am addressing these issues by partnering with VC firms and Fintech startup founders to obtain the information that I need. Moreover, there are subscription-based, secondary data sources which are now capturing some of the private data from startups, which I have accessed for this research study. Finally, this research study will expand existing theoretical frameworks used in entrepreneurship and social entrepreneurship to help explain the key factors that impact the performance of new technology ventures in financial inclusion.

From a practical perspective, this research study will provide important contributions. The empirical models developed from this research study will serve as a data-driven tool that VC firms and investors can use to evaluate Fintech startup investment opportunities in financial inclusion. Currently, most VC firms use qualitative tools and past experience to evaluate the investment opportunities in startups. The results of my research study will serve as another tool, which is based on actual data, that can be used by VC firms to determine whether to invest in the new ventures. The Fintech new venture founders should also benefit from my research study, since it will provide a framework that they can follow in order to increase their chances of success. In addition, the empirical model can assist

governments and policymakers on how to help social entrepreneurs in their ventures which are targeting the unbanked and underbanked. Finally, the empirical model can be extended to other areas in the financial services sector, as well as other industries, specifically those which have similar characteristics and business dynamics such as the healthcare sector.

This research study is organized in the following manner. Chapter 2 provides a review of the extant literature on financial inclusion, digital technology and its impact on financial inclusion, and social entrepreneurship and entrepreneurship academic papers that are relevant to my research. Chapter 3 presents the theoretical model and proposed hypotheses and their supporting arguments. Chapters 4 and 5 review the research design, proposed methods/analysis and results. Chapter 6 highlights illustrative case studies to support the quantitative analysis. Chapter 7 offers the main conclusions. Chapters 8 and 9 discuss the weaknesses and limitations of the research study and suggest areas of future research.

Chapter 2: Literature Review

Financial inclusion and the use of technology to drive financial inclusion play a central role in this research study, so it is important to review the academic literature and research reports published in these areas. Moreover, given that the small subset of Fintech startups that I am evaluating can be viewed as enterprises using technology to drive a social impact, a review of the relevant academic literature on social entrepreneurship and entrepreneurship is also needed. The literature review is divided into the following three sections:

2.1 Review of the literature published on financial inclusion, specifically addressing how it is defined and measured, its importance and evidence on how it helps fight poverty and drive economic activity;

2.2 Review of the literature on the role that digital financial services play in driving higher financial inclusion, the different innovations and business models used, and empirical evidence on the impact on financial inclusion; and

2.3 Review of the relevant academic literature on social entrepreneurship and entrepreneurship.

My research study investigates how new technology ventures can help drive higher financial inclusion, so it is indispensable to gain an in-depth understanding of what is financial inclusion and the relevant work that has been published on this topic. Digital financial services have become a key enabler to financial inclusion, and the review of the academic literature showing how technology is solving this global

issue provides strong support for the selection of my research topic. While extensive work has been published showing the benefits of technology on financial inclusion, Financial technology startups have not been studied in detail regarding the contribution they make to increasing financial inclusion. My research study aims to close some of the gap in the literature, and focus on the different factors that these new ventures need to have in order to drive higher financial inclusion and higher financial performance.

2.1 Financial Inclusion

It has been widely studied and documented that financial inclusion provides significant benefits to the poor and marginalized, and is also an important engine of economic development. Access to formal financial services and products allows households to expand consumption, manage risks and invest in durable goods, health and education. Almost 40 years ago, Mohammed Yunus, the founder of Grameen Bank in Bangladesh and winner of the Nobel Peace Prize in 2006, pioneered the concept of microfinance as a way to help the BoP to improve their lives. An anecdotal example quoted by Chibba (2009) provides some evidence: "Sarah Doe of Liberia received micro-credit from an NGO to assist her to start a micro-enterprise. Her business did reasonably well, and, with an additional loan in a subsequent year, she was able to expand it. This (also) enabled her to send four of her children to school, open a savings account and build a better home for her family" (p. 2). As of July 2016, Grameen Bank has made $19.5 billion in unsecured loans to the poor since its founding with a 98.8% repayment rate, and has served almost 9 million people in

Bangladesh, of which 98% are women.[3] This innovative business model has inspired a global microcredit movement that has spread to over 65 developing countries and providing financial access to more than 200 million borrowers.

Before I discuss in more detail the supporting evidence highlighting the benefits of financial inclusion in today's world, it is worthwhile defining the concept of financial inclusion, how it is measured, the different barriers to financial inclusion, and the role of microfinance to address financial inclusion. Over the last 20 years, financial inclusion has been defined in many different ways in the existing literature. In early academic papers, financial inclusion is defined indirectly in terms of exclusion, and was related to the broader context of social exclusion. For instance, Sinclair (2001) defines financial exclusion as the inability to access financial services in an appropriate form, and it could be due to problems related to prices, marketing or self-exclusion in response to negative experiences. Moreover, the author highlights that the financially excluded are closely related to social exclusion: the low-income earners or unemployed living in poor housing and/or high crime environments. Kempson, Whyley, Caskey, & Collard (2000) re-affirm this relationship between social exclusion and financial exclusion, and identify the lack of access to financial services as one of the core elements of social exclusion. In their book "Financial Exclusion", Carbó Valverde, Gardener, & Molyneux (2005) broadly define financial exclusion as the inability of some societal groups to access the financial system. Therefore, these academic papers and books make the connection that the financially

[3] Grameen Bank, July 2016 Monthly Report.

excluded tend to be the poor and marginalized, and in most cases, live in developing / emerging countries.

More recent research has defined financial inclusion directly. As part of the World Bank's Global Findex Database developed in 2011 to measure financial inclusion, Demirguc-Kunt & Klapper, (2012) define financial inclusion simply as the number of adults that have an individual and/or joint account at a formal financial institution. While account ownership is a useful top-line indicator of financial inclusion, others, such as Amidžić, Massara, & Mialou (2014) use a broader definition. The authors define financial inclusion as "an economic state where individuals and firms are not denied access to basic financial services based on motivations other than efficiency criteria" (pg.5). These definitions are useful, but they are not comprehensive in addressing all of the issues and complexities related to financial inclusion. Sarma (2008) takes a more holistic approach in defining financial inclusion as a ***process that ensures ease of access, availability and usage of financial services by all members of society***. The advantage of this definition is that it views financial inclusion as a ***multi-dimensional concept, which requires three dimensions to be financially inclusive: accessibility, availability and usage***. The Center for Financial Inclusion at Accion, one of the largest non-profit organizations in the world, expands on Sarma's multi-dimensional concept, and defines financial inclusion across five different dimensions (Conde, Bykere, Cheston, & Rhyne, 2016):

(i) Access to a full suite of financial services – credit, savings, insurance and payments;

(ii) Quality of products and delivery – convenient, affordable, suitable, provided with dignity and client protection;

(iii) Financial capability – clients are informed and able to make good money-management decisions;

(iv) Inclusiveness – everyone who can and wants, has access including the poor, women, and rural; and

(v) Diverse and competitive marketplace – a range of providers, a robust financial infrastructure and a clear regulatory framework.

Based on the different financial inclusion definitions presented above, I adopt a modified version of the multi-dimensional approach from Sarma in my research study – namely, I define financial inclusion based on three key factors: (1) providing **access** to financial products and services through digital methods to all people irrespective of their economic status; (2) offering products and services which are **affordable** to all; and (3) are **actively used** by customers. My research study measures these 3 factors (accessibility, affordability and active usage), however, I selected active usage as the main measure for the empirical models. The Research Methodology chapter expands on the reason for selecting active usage to measure financial inclusion, and how I operationalize it in my models.

There is wide disparity in the way that financial inclusion is measured, with no standard method adopted as of today. Measuring financial inclusion is critical in order to have a better understanding of the magnitude of the problem and what factors are related and/or affect it. In addition, it can be a useful tool for policy making and policy evaluation. Honohan (2008) was one of the first authors to develop a financial

inclusion indicator using household survey data based on the fraction of the adult population in a given country with access to formal financial institutions. For those countries without household survey data on financial access, the author derived the indicator by using GDP per capita and bank account information for the entire country. One of the main limitations of Honohan's financial access indicator is that it only provides a snapshot of financial inclusion at one point in time, and thus it is not applicable for understanding changes over time. On the other hand, Sarma (2008) constructed an index of financial inclusion for each country based on the composite values of the three main dimensions he defined: accessibility, as measured by the number of bank accounts per 1,000 population; availability, as measured by the number of bank branches and number of ATMs per 100,000 people; and usage, as measured by the volume of credit plus deposit relative to the country's GDP. The advantage of this methodology is that the data is more readily available and tracked periodically by country, so it is easier to compare over time and across countries. With a composite index of financial inclusion, Sarma was able to identify which country-specific factors are related to the level of financial inclusion. Other authors have used variations of Sarma's financial inclusion index. For instance, Park & Mercado (2015) closely follow Sarma's methodology in constructing a financial inclusion indicator, but they include five different measures, and each measure is an average value from 2004 to 2012 for each country. The authors use their financial inclusion indicator to measure financial inclusion in 37 developing countries in Southeast Asia and more importantly, to determine the macroeconomic and country-specific factors that affect the degree of financial inclusion. Additional dimensions

have been used by other authors in constructing their own financial inclusion index such as: quality, as measured by disclosure requirement and cost of usage (Amidžić et al., 2014); barriers that lead to involuntary financial exclusion (Cámara & Tuesta, 2014); and sustainability, as measured by different factors that determine whether the financial product offered is profitable to the financial institution and affordable for the customer (Kessler, Ikdal, Naidoo, Portafaix, & Hendrickson, 2017).

As Cámara & Tuesta (2014) point out, a major limitation of the different financial inclusion indexes discussed above is that they are mainly based on supply-side aggregate data, which does not provide a complete picture of inclusiveness and may be misleading. For example, a supply-side indicator such as the number of loans or accounts in a country can overestimate the inclusiveness of financial systems, since an individual may have multiple accounts or loans. The authors are the first to develop a financial inclusion composite index using both demand and supply-side data sets. The demand-side data set comes from the World Bank's Global Findex database, the first public database that collects information from 150,000 nationally representative and randomly selected adults from 148 countries around the world. The Global Findex database was published in 2012, and it is updated every 3 years; currently, data is available for 2011 and 2014. The data is available at the individual, not household level, which helps improve accuracy and comparability.

The World Bank's Global Findex database has become the most important, reliable and most frequently cited source of data to measure financial inclusion. The database provides information on more than 100 indicators, including by age, gender and household income. The data provides tremendous amount of information and

insights regarding financial inclusion around the globe. Of the 2 billion adults that do not have access to an account at a formal financial institution, 46% of them live in developing countries. This number is in stark contrast to only 6% of adults in developed countries that are unbanked (Demirgüç-Kunt et al., 2015). Digging deeper, the database also shows that the poor, those adults living on less than $2 per day, show the highest incidence of financial exclusion: 77% of them lack a bank account. From a regional perspective, account ownership varies widely between emerging economies. In the Middle East, 86% are unbanked, while in Sub-Saharan Africa 66% of adults do not have a bank account. On the other hand, only 54% and 31% are unbanked in South Asia and East Asia & Pacific, respectively. Significant variations also exist within regions; for example, in the East Asia & Pacific region, China's unbanked population is at 21%, but Indonesia's unbanked population is at 66%, and Myanmar is at 77% (Demirgüç-Kunt et al., 2015). It is interesting to note that 25 countries around the world have 73% of the world's 2 billion unbanked – these countries are where the World Bank is focused on driving higher financial inclusion.

The Global Findex database shows there has been a significant improvement from 2011 to 2014 in the number of adults globally that have access to formal financial products and services. In a 3-year span, the number of unbanked decreased from 2.5 billion in 2011 to 2 billion in 2014, connecting about 700 million to formal accounts – the number is higher than 500 million due to population growth (Demirgüç-Kunt et al., 2015). Increase in account ownership was particularly strong in East Asia & Pacific, South Asia and Latin American and Caribbean regions, with each region

increasing by approximately 10%. However, the gap observed in account ownership between gender remained constant at 9% - women's access to formal financial products and services is 9% lower than men.

While the Global Findex database provides expansive data on access to formal financial products and services for individuals, it does not measure financial access for micro-, small- and medium enterprises (MSMEs). According to International Finance Corporation (IFC), the private arm of the World Bank, there are 200 to 245 million formal and informal MSMEs in emerging markets that do not have access to loans, but are in need of one, resulting in an estimated financing gap of $2.1 to $2.3 trillion (Stein et al., 2013). Prior research has demonstrated that MSMEs employ the largest number of people in aggregate, and generate the most new jobs (Ayyagari, Demirguc-Kunt, & Maksimovic, 2011). Therefore, it is essential to also address the financial inclusion issue for small businesses.

Now that I have defined financial inclusion and detailed the different ways it is measured, an important question to address is: what are the barriers that limit financial inclusion? Theory suggests that barriers that prevent broad financial access can be a critical mechanism for generating income inequality and poverty traps (Banerjee & Newman, 1993). By knowing the barriers to financial inclusion, it allows policymakers to design rules and regulations to potentially help reduce them. A large number of barriers and constraints have been cited in different academic papers and journal articles, including: lack of personal documentation, lack of financial infrastructure, limited amount of funds, high costs to maintain a bank account, lack of financial literacy and restrictive regulations. The key constraints to

financial inclusion can be categorized between supply-side barriers, which are related to the financial institutions that supply formal accounts and services, and demand-side barriers, which are barriers related to the individuals (Beck & De La Torre, 2007).

The main demand-side barriers to financial inclusion are the lack of formal identification and the lack of financial literacy. According to the World Bank, there are an estimated 1.5 billion people globally who do not have a government issued and recognized document as proof of identity.[4] As part of the Know Your Customer (KYC) process for opening an account at a bank, a proof of identity is required. Having a formal identification is essential not only to open a bank account, but also to gain access to important services such as health care, education and social safety net programs. To address the lack of formal identification, some countries have implemented biometric systems to identify individuals – the most successful example is Aadhar in India, where the government has set up a centralized database that issues a unique number to all individuals and also records their fingerprint and iris scan as a proof of identity. So far, Aadhar has been able to provide a digital identity to more than 1 billion people in India. I will discuss in more detail the Aadhar system in the Digital Financial Inclusion section. The lack of financial literacy has also been identified as one of the barriers why the poor do not have a bank account. By educating individuals on the different financial products and the benefits to having a bank account, it is expected that it could result in higher account openings and usage. A study conducted in western India providing female microentrepreneurs with financial literacy courses demonstrated no impact on their savings behavior (Field,

[4] The World Bank Group ID4D global dataset as of January 2016.

Jayachandran, & Pande, 2010). Miller, Reichelstein, Salas, & Zia (2015) performed a meta-analysis of the literature on financial literacy. Their paper reviewed 188 journal articles on financial literacy, and it shows that most literacy programs did not have positive impact on financial knowledge or behavior. Moreover, where it worked, the improvement was minimal. Beck (2015) offers an explanation of the low success of financial literacy interventions. He believes it could be due to an omitted variable problem; specifically, there may be psychological traits that impact both financial behavior and financial literacy, which have not been uncovered and thus results in some interventions being more successful than others. On a positive note, Beck (2015) points out there seems to be higher effectiveness in financial literacy programs that are short duration ("teachable moments"), and administered to individuals when they are in the process of making financial decisions.

The key supply-side barriers to financial inclusion are the high costs of financial products and services for the poor and marginalized, and the lack of banking infrastructure in rural areas due to dispersed population (Beck, 2015). The cost of setting up a bank account for the poor is extremely high relative to their income, which makes the provision of an account at a formal financial institution more difficult. To add to the maintenance costs, most bank accounts require a minimum balance, and also charge flat fees for withdrawing funds, irrespective of the amount withdrawn. The poor and marginalized usually have limited resources, and thus make smaller size and/or fewer transactions, which results in lower profitability for the banks. According to McKinsey Global Institute, the annual cost of opening and maintaining an account at a financial institution in emerging economies is

approximately $20 to $30 (Manyika et al., 2016), which can be costly for the poor if they maintain account balances that are at or below these levels. Beck, Demirguc-Kunt, & Peria (2008) performed a survey of the largest banks in 62 developing countries and document the variations in the cost of different financial products. For example, the authors highlight that it takes more than $700 to open a bank account in Cameroon, which is higher than the country's GDP per capita; fees to maintain a bank account in Sierra Leone exceed 25% of the GDP per capita in that country. While these figures may be a bit outdated, the cost relative to the low-income levels in emerging economies have remained very similar over the years. For MSMEs, high costs in the form of high interest rates and the requirement to have collateral for loans are also major constraints. In this case, due to lack of proper and typical financial information on these businesses, banks view them as high risk and thus charge significantly higher interest rates. Another major constraint is the limited number of branches and ATMs in rural areas where the population is more dispersed. Banks do not view it as economically viable to have branches in rural areas where the population is significantly lower than urban centers. To address these supply-side barriers, microfinance institutions have emerged.

Microfinance has been lauded as one of the most innovative and important ways to provide financial access to the BoP and microenterprises. Microfinance is the provision of credit without collateral, in relatively small amounts and for a short period of time, to the poor and marginalized. The objective of microfinance is to serve as a replacement to the informal financial arrangements that the poor use such as moneylenders and pawnshops to access credit, since they have been excluded from

the formal financial system. The modern microfinance movement originated in the 1970s when Accion in Brazil and Grameen Bank in Bangladesh, led by Muhammad Yunus, started experimenting with new models of lending to the poor. The key innovation introduced is the concept of group lending, whereby borrowers set up small groups and each group member receives a small loan. The repayment of the loans takes place at regular intervals, either bi-weekly or monthly in group meetings. The key aspect of group lending is that each member of the group is essentially responsible to monitor other members that they pay their obligations. If one member defaults on their loan, then other members will be affected as well. Stiglitz (1990) studied the idea of peer monitoring in microfinance, where members of the group have a direct interest in ensuring that no individual member defaults. He found that this model reduces moral hazard and adverse selection, since the borrowers who are presumed to have better knowledge of one another, will not select to be in groups with potential defaulters. In addition, he showed that by transferring the risk from the lender to the borrower, it leads to an improvement in the borrower's welfare. The concept of peer monitoring and joint liability lending is also related to the concept of social capital, where it has been shown that social capital among group members matters for default probability (Beck, 2015). Loan disbursements and repayments are often taken in group meetings, which also provides additional repayment incentives through peer pressure. Another feature of microfinance is the promise of repeat and larger loans if the borrower is able to pay the existing loans fully and on time. Academics have shown that this feature reduces default probability among borrowers (Karlan et al., 2009). The microfinance model has worked well, with typical

repayment rates higher than 95% in most cases, proving that the poor can and will repay their loans.

The microfinance sector expanded steadily in the 1980s and 1990s, reaching an estimated 31 million borrowers worldwide by 2000.[5] The sector continued to expand rapidly, especially after Mohammad Yunus, the father of microfinance, was awarded the Nobel Peace Prize in 2006. By the end of 2013, microfinance institutions (MFIs) had collectively served 211 million borrowers, of which 114 million were living in extreme poverty.[6] From a regional perspective, Asia is the leader in the global exposure to microfinance, with more than 75% of the world's microfinance borrowers are based in Asia.[7]

Initially, MFIs were set up as non-governmental organizations (NGOs), and received grants from different donors to fund for the microloans provided to the poor. However, the increased attention has attracted a large number of for-profit lenders and investors seeking higher yields, based on the fact that MFIs typically charge high interest rates. Based on data from the Microfinance Information Exchange (MIX), an organization that receives periodic financial statements and operating metrics from MFIs in developing countries, about half of all MFIs had annual yields (a good proxy for interest rates) greater than 30%, while about 33% had yields between 20% to 30%. In his paper discussing the challenges and issues of MFIs, Ghosh (2013) provides an explanation for the high interest rates charged: "Rather than engage in

[5] *The state of the microcredit summit campaign 2015: Mapping pathways out of poverty*, Microcredit Summit Campaign, December 2015.
[6] Ibid.
[7] Ibid.

costly screening of borrowers, it is easier for MFIs to charge excessive interest rates to everyone, through which they can absorb any losses on bad loans" (pg. 1206). Another explanation for the high interest rates is due to high operating costs at MFIs. Operating costs are significantly higher than traditional banks, since it costs more to lend and collect a given amount through thousands of small loans than to lend and collect the same amount in a few large loans. Rosenberg, Gaul, Ford, & Tomilova (2013) analyzed the data of more than 450 MFIs from the period of 2004 to 2011, and they found that operating costs for MFIs are typically 15% of MFIs' loan balances in 2011. While trying to help the poor by providing access to financial products they need, unfortunately, the effect is minimized by the fact that the poor pay excessive interest rates, which may perpetuate their economic status.

The rapid growth of microfinance in the mid-2000s led to a crisis in the sector. Ghosh (2013) summarizes key reasons that led to the meltdown. One major factor was the emergence of multiple MFIs in the same area resulting in intense competition for borrowers. In efficient markets, competition is encouraged and should be beneficial for customers since it can drive interest rates lower. However, the increased competition between MFIs actually had several negative consequences. First, it reduced the incentives of information sharing about clients among MFIs, which indirectly encouraged borrowers to take out multiple loans from different MFIs. Second, the competition also eroded the credit discipline of the MFI managers, due to the fact that they were incentivized to maximize the number of loans and clients. Another important factor was overstretched management systems and controls as a result of the employment of staff that were not adequately trained.

Therefore, monitoring became more challenging and mechanisms to control for fraud were relaxed. Finally, the conversion of MFIs to for-profit entities and the influx of funding sources for MFIs encouraged these organizations to take higher risks in underwriting in order to achieve higher returns for investors. In 2010, all of these factors (as well as a few others) contributed to a scandal in the states of Andhra Pradesh and Tamil Nadu in India, where more than 200 suicides were related to the aggressive sales and collection practices of MFIs. The crisis resulted in reforms in government policy and regulations towards MFIs in many developing countries, which have made the sector stronger and more mature over the last 5 years. In addition to providing group loans, MFIs have diversified into individual loans for productive and social uses (business, education, healthcare, farming), as well as providing savings and insurance for the benefit of their customers.

A key question remains: does microfinance and other financial inclusion efforts really help fight poverty and lead to economic growth? From a theoretical perspective, the answer is a resounding yes, and many researchers have performed numerous empirical studies over the last 15 years to try to prove it. Several authors have summarized the different empirical studies on financial inclusion and its impact on poverty and economic development (Beck, 2015; Cull, Ehrbeck, & Holle, 2014; Leora Klapper, Demirguc-Kunt, & Singer, 2017). These research papers mainly outline empirical studies that use randomized control trials (RCT) to assess whether different financial products have an impact on helping the poor and accelerating economic growth. Development economists believe that this is one of the most adequate tools to use since it allows you to assess whether an intervention works

when compared to a control group (Cull et al., 2014). In general, most studies have been conducted at individual financial product levels, and the impact varies across the different products. While it is important to evaluate the benefits of providing access to individual financial products so that you can understand which may be most effective, to date, there have been no empirical studies conducted to measure whether providing access to a broad range of financial products to the poor can have a higher impact rather than just evaluating individual financial products. Below, I provide a summary of some of the main empirical studies conducted for the four major financial product categories: Payments, credit, savings and insurance.

Payments

Payments represent one of most basic and common transactions that any individual performs on a daily basis. Payments are made when making purchases at retail stores, paying utility bills and taxes or sending money to someone (domestic and international). Similarly, people receive payments for work performed (wages), for the sale of products and services or for government/social programs. An important form of payment that is essential for the financial well-being of developing countries is remittances, or money transfers, which can take place domestically (within a country) or internationally (cross-border). The migration of individuals in emerging countries from rural areas to cities in search of better jobs and opportunities has led to the exponential increase of domestic money transfers to support their families. In most cases, the cost of remittances is high relative to the amount being sent due to lack of transparency, and take place through informal means, such as couriers who are entrusted to deliver cash to the family members in rural villages.

These informal methods are prone to theft and high charges (can be as high as 15% of total transaction size in some countries). Likewise, international remittances refer to person-to-person transfers, but across borders (i.e., between two countries). Donovan (2012) notes that international remittances are one of the largest sources of external financing in developing countries, and often serve as a lifeline to the poor. International remittances provide significant benefits to the poor by helping families raise their living standards and providing funds for education, healthcare and food. Indeed, there are more than 200 million migrants from low- and middle-income countries send money to their families back home, with an estimated 800 million people worldwide supported directly by remittances (Ponsot, Terry, Vazquez, & De Vasconcelos, 2017). The flow of international remittances as of 2016 was $445 billion, which has more than doubled over the last 10 years, and approximately 25 developing countries receive 10% or more of their GDP from remittances (IFAD & World Bank, 2015). However, one of the biggest issues with remittances is the high prices, which is mainly due to fragmented and inefficient payment systems and lack of liquidity. The average cost to send remittances from a money transfer organization (MTO) such as Western Union, or a bank in Sub-Saharan Africa is approximately 7.3% of the transaction amount.

Cash is the most convenient way of making payments. As Leora Klapper et al. (2017) point out, 59% of adults who received a wage payment, 91% of adults who received a payment for agricultural products and 48% of adults who received a government transfer payment did so in cash in developing economies in 2014. While cash is ubiquitous and readily available, there are inherent costs related to safety,

storage and time lost. For example, sending cash to family members in other regions via couriers is susceptible to theft and crime. Moreover, it may require significant travel time to go to the nearest bank branch or money transfer operator in order to receive a government transfer payment. Consequently, shifting payments from cash into bank accounts and digital payments has many potential benefits, including lower costs, higher transparency, faster transaction times and lower incidence of crime. Aker, Boumnijel, Mcclelland, & Tierney (2013) performed a rigorous study on social welfare programs in Niger, and they found that by disbursing the government payments electronically, it reduced overall wait time by 75% when compared to collecting the payments in cash. Advances in mobile phone technology have made digital transfers to be accessible to the poor, even if they may not have a bank account. I will discuss the benefits of digital payments in more detail in the Digital Financial Inclusion section of the literature review, and highlight more evidence on the benefits it provides to the poor.

Credit

Most of the empirical studies on the access to credit have been related to the effectiveness of MFIs to help lift the poor out of poverty, by providing them with small loans (also known as microcredit). Performing systematic reviews of numerous studies of the impact of microcredit on the poor, Cull et al. (2014) and Leora Klapper et al. (2017) both highlight that the results from most of these empirical studies have been mixed. Initial research on microfinance performed in the 1990s and early 2000s showed significant social and economic benefits, but were mostly based on anecdotal evidence and descriptive statistics (Banerjee, Karlan, & Zinman, 2015). More recent

empirical studies and evaluations have shown more modest conclusions. Bauchet, Marshall, Starita, Thomas, & Yalouris (2011) corroborate this point and mention that while increasing access to credit does not produce dramatic effects of completely lifting people out of poverty, it allows for the creation of new businesses and moving away from the consumption of temptation goods such as tobacco and alcohol. Also, microloans help some households to smooth consumption – an important aspect for the poor which suffer from unpredictable and irregular income streams. Banerjee et al. (2015) analyzed six extensive RCT studies across four continents and six countries on the impact of microcredit under different models, and they concluded that the effects were "modestly positive, but not transformative" (p. 1). Stewart et al. (2012) conducted a broad review of 17 microfinance interventions globally, and they find mixed results on the effect of microcredit on higher income and more economic opportunities. Although the evidence at the individual level is not very strong, there is evidence that microcredit provides positive benefits to microentrepreneurs by allowing them to borrow so that they can grow their businesses (Cull et al., 2014).

Savings

Savings is an important financial tool that allows individuals to set aside funds for future expenses such as large purchases, education, old age and potential emergencies. Savings can also help households manage cash flow spikes and smooth consumption. In developing countries, savings mainly takes place through informal means – one of the most common methods is through rotating savings clubs, also known as ROSCAs. These clubs operate by having members make weekly deposits, pooling the deposits together and then disbursing the entire amount to a different

member each week. Other forms of informal savings include cash under the mattress, jewelry, real estate or livestock. However, there are a few issues with these informal savings mechanisms. First, they tend to be risky due to potential theft and asset depreciation (in the case of jewelry and other physical assets). Second, informal savings options may not be very liquid, due to high transaction costs and how long it takes to sell the different items to get cash. Finally, the informal savings clubs tend to be community driven, and thus an individual's savings cannot be transferred to another community, if the individual is seeking better opportunities elsewhere. Saving at a formal financial institution can provide many potential advantages, including lower risk of theft and curbing impulse spending. Micro-savings, which is the ability to save small amounts at a high frequency in formal financial institutions, seem to provide a significant benefit for the poor. Similar to microcredit, Cull et al., (2014) and Leora Klapper et al. (2017) have reviewed empirical studies of micro-savings interventions to evaluate their impact on the poor. One study the authors highlight is a field experiment in Kenya which showed that women market vendors were able to save significantly more when they were provided with a savings account, and as a result increased their expenditures by 38% when compared to a control group (Dupas & Robinson, 2013a). The study speculates that by keeping the money in an account that was not immediately accessible, people are able to better resist the temptation to spend the money. Dupas & Robinson (2013b) performed another empirical study where they show that using a commitments savings account, which require the saver to deposit a certain amount of money in a bank account for a specified period of time, can help the poor better cope with health emergencies. In

particular, individuals increased their investments in preventive health by 138% when they were provided these savings accounts, as compared to a control group. Pande, Cole, Sivasankaran, Bastian, & Durlacher (2012) performed a systematic review of 12 micro-savings studies in emerging markets and they conclude that "innovative design of new savings products that increase the supply of savings and increase demand for savings by helping people address behavioral challenges were found to increase income at least in the short run" (pg. 5). Overall, most empirical studies on micro-savings seem to have a more positive impact on improving the livelihoods of the poor than the studies on the impact of microcredit. For the savings products to be effective, they need to be customized and tailored to overcome the behavioral constraints of the poor and marginalized.

Insurance

Insurance is an important financial product to help manage risks due to unexpected expenses from health emergencies, natural disasters or income loss from the death of wage earner, yet it is rarely used by the BoP. One reason for the lack of use is that in most cases these insurance products are difficult to understand and are very expensive relative to the limited income of the poor. Microinsurance, which refers to providing insurance for small amounts of coverage by paying very small premiums, has become the main way to provide insurance to the poor and marginalized. Several randomized control trials offering weather-related microinsurance products to farmers in India and Ghana encouraged them to take higher risks by investing in higher return, high risk crops and resulting in higher income for the farmers (Cole, Sampson, & Zia, 2011; Karlan, Osei, Osei-Akoto, &

Udry, 2014). The insured farmers had higher total revenues more assets post-harvest, and they were 8% less likely to report missed meals when compared to other farmers that did not get weather-related insurance. Empirical studies on the impact of microinsurance on the poor are fairly limited and little is known on the welfare benefits; therefore, more studies need to be conducted.

In summary, financial inclusion provides significant benefits to help the poor, and it is supported by a wide range of empirical studies. However, the effectiveness and impact in the reduction of poverty and economic growth varies by financial product. So far, savings accounts offer the biggest impact, provided that the accounts are customized, inexpensive and serve a specific purpose. Equally, digital payments offer significant impact on improving the livelihoods of the poor. Although research on microcredit has been the most extensive, its impact is only modest. Finally, initial studies on insurance show promising results, but they are still fairly limited and more work needs to be done in this area. As I will demonstrate in the next section, the use of technology in all of these financial products has the potential to significantly increase access to formal financial services to the unbanked and underbanked.

2.2 Digital Technologies and Financial Inclusion

Industry experts, academics and NGOs agree that the use of digital technologies will be vital in order to achieve the World Bank's ambitious goal of full financial inclusion by 2020. One of the largest supporters is the Bill and Melinda Gates Foundation; they firmly believe that providing access to financial services through

digital-based tools is extremely important to help people in the world's poorest regions improve their lives and build sustainable futures.

Advances in mobile phone technology, cloud computing, big data analytics and blockchain / distributed ledger technology are transforming the financial services industry, allowing people to access financial products and services at anytime and anywhere in the world in a cost efficient and fast manner. CGAP defines digital financial services as providing financial products and services via mobile phone and/or online using any electronic instrument (card, mobile phone, internet) and where accounts can be accessed remotely.[8] Digital financial services help overcome the major supply-side barriers to financial inclusion: the high cost of bank accounts and the limited number of bank branches in far-flung rural communities. Mobile phones have become one of main channels for processing small-value transactions for poor people at low cost and at scale. According to Roger Nord, Deputy Director of the IMF's African Department, technological innovations within the financial sector is the most promising way to advance financial inclusion. He states that: "Access to formal financial services is often difficult in low-income countries; bank branches are concentrated in urban areas and costs & fees can be high. Financial technology can tackle both problems at once: suddenly financial services are available to anyone with a mobile phone at a fraction of the cost".[9] Overall, digital technologies are transforming the financial services industry in three main ways. First, digital financial solutions are expanding access and reach to all customers, especially the

[8] *Digital Financial Services: The Current Landscape*, CGAP presentation, January 2015.
[9] *Leveraging Financial Technology for the Unbanked*, by Rodolfo Maino, IMF Country Focus Blog, September 19, 2016.

unbanked and underbanked. Second, digital technologies are significantly lowering the costs of providing financial services, making it possible to serve the BoP in a profitable way, which was not possible before. Finally, digital technologies enable new business models, offering expanded services to customers and generating new revenue streams for financial service providers. Therefore, both the provider and the customer benefit from it, creating a win-win situation. In this section, I will discuss in detail how digital financial services drive financial inclusion through different technology platforms, innovations and business models. Specifically, I will discuss the benefits and potential economic impact of digital financial services on financial inclusion. Then, I will provide an overview of the key role that mobile phone technology plays in driving higher financial inclusion for the poor. Finally, I will discuss the main technology platforms and innovations that have emerged to provide access to financial products and services to the poor, as well as the empirical evidence on the benefits of these technologies, through the lens of the four main financial products: payments, credit, savings and insurance.

Potential Economic Impact and Benefits of Digital Financial Services

In 2016, McKinsey Global Institute published a report that is the first to quantify the potential financial effect of "digital financial inclusion", or providing the unbanked and underbanked with digital financial services, in emerging markets. The report crystallizes some of the key benefits of digital financial services by providing calculated figures and estimates. According to the report, digital finance has the potential to provide access to financial services to 1.6 billion people in emerging economies by 2025, with more than half of them being women (Manyika et al.,

2016). The report also highlights that the widespread use of digital finance could boost annual GDP of all emerging economies by $3.7 trillion, with the majority coming from increased productivity as a result of digital payments, and the remainder coming from additional investments that people and MSMEs would make by being part of the formal financial sector. Furthermore, digital finance would unlock $2.1 trillion in new credit to MSMEs and reduce government costs by $110 million since there would be higher transparency resulting in lower leakage. One of the key benefits of the digitization of financial services is that it can lower the cost of financial transactions by 80% to 90% when compared to traditional financial products from bank branches. According to the McKinsey report, the total cost of providing traditional financial products for an individual in emerging markets is approximately $75 to $130 annually. However, by using digital technologies, the cost can be reduced to $10 to $20 annually (Manyika et al., 2016). Most of the reduction is generated from the cost of supporting money transfers which can be reduced by more than 90%. One of the most powerful aspects of digital financial inclusion is the network effects that can further accelerate adoption (Voorhies, Lamb, & Oxman, 2013). For instance, it took M-PESA, one of the most successful mobile money transfer companies in the world, only three years to grow to 40% of the adult population that uses their service in Kenya, and achieve 70% of the adult population by end of 2015. This adoption rate is exponentially faster than using traditional bank accounts, which usually increases in line with GDP growth rate. Another advantage of digital financial services is the ability to quickly implement it, since it does not require any major investments or costly infrastructure. The report concludes by

reviewing three building blocks that are required to achieve the potential economic impacts of digital financial inclusion: (1) Widespread digital infrastructure in the form of robust digital payments and widespread connectivity; (2) Dynamic financial services market, with an enabling regulatory framework that promotes financial innovation; and (3) New digital products that truly solve the customers' problems and provide an advantage in cost and utility (Manyika et al., 2016).

Mobile Phone Technology and Financial Inclusion

Digital financial services through mobile phone technology has become one of the primary ways to accelerate financial inclusion for the unbanked and underbanked in emerging markets. According to Ericsson, out of the 2 billion adults around the world that do not have a bank account today, 1.7 billion have a mobile phone.[10] Indeed, mobile phones are widely available and used in developing countries, with 89 active subscriptions per 100 people (Neef et al., 2014). The total cost of ownership of mobile phone usage is falling rapidly, and poor people increasingly view mobile phones as a necessity, not a luxury. Mobile money is the main mechanism to drive financial inclusion through the mobile phone. Donovan (2012) defines mobile money as the provision of a broad array of financial products and services through a mobile device (feature and smart phones). The author states: "Mobile money could become a general platform that transforms entire economies, as it is adopted across commerce, healthcare, agriculture, and other sectors" (p. 61). Using mobile money typically involves two different stakeholders – consumers and agents – and four different steps:

[10] *Mobile Wallets*, Presentation at ADB Conference on Financial Inclusion in the Digital Economy, May 24-25, 2016, Ericsson.

(1) Consumer uses a mobile phone to add value to his mobile wallet (digital way to store the money) through a retail agent – this is referred to as the cash-in step; (2) Consumer sends money from his mobile wallet to someone else via their mobile phone; (3) The other person receives a text message in their mobile phone saying that someone has sent them money; and (4) The digital value sent can be converted to cash simply by visiting a retail agent who verifies the user's identity and makes the switch – this is referred to as the cash-out step. The process is relatively simple, more reliable than informal methods, and can cross enormous distances at the speed of a text message.

Mobile money has been successfully demonstrated to serve the financial needs of the poor and achieve significant scale. The most successful example is M-PESA in Kenya, which is part of the mobile network operator (MNO) Safaricom. Founded in 2006, M-PESA currently reaches at least 84% of Kenyans living below $2 per day (Costa & Ehrbeck, 2015), with more than 16.6 million active users and 101,000 agents. The company was able to grow very quickly, achieving 1 million active users in just 8 months (GSMA, 2016b). Ten years after the launch of M-PESA, mobile money is commonplace in Kenya and an essential part of the country's financial system. The company has launched new products and services and has significantly expanded the ecosystem through partnerships with different financial institutions. The transformative power of M-PESA in Kenya is clearly visible in the financial access it has provided to Kenyans: while there are only 11 ATMs and 6 commercial bank branches per 100,000 adults in the country, there are 538 mobile money agent outlets per 100,000 adults (GSMA, 2016b).

M-PESA in Kenya is not the only mobile money success story in the world. GSMA published a report at the end of 2016 which highlights the state of the mobile money industry over the last 10 years. According to the report, there are 277 mobile money services in 92 countries around the world, with more than 500 billion registered accounts (of which 174 million are active) and more than 43 million transactions processed per day (GSMA, 2016b). The scale of financial access in emerging and low-income countries is enormous: more than 40% of the adult population in Kenya, Tanzania, Zimbabwe, Ghana, Uganda, Gabon, Paraguay and Namibia are using mobile money on an active basis. In Sub-Saharan Africa, there were 277 million registered accounts in December 2016, which is more than the total number of bank accounts in the region. In addition, there are currently 35 mobile money providers globally with each having more than 1 million accounts, proving that scale is possible in diverse geographies (GSMA, 2016b). The spread of mobile money has been attributed to a large portion of the reduction of the unbanked population from 2.5 billion to 2 billion from 2011 to 2014 (Demirgüç-Kunt et al., 2015). Mobile money has also been demonstrated that it can lift people out of poverty. Suri & Jack (2016) conducted a study over a 6-year period in Kenya on the long-run impact that M-PESA has had on the economic lives of Kenyans. In addition to showing that access to mobile money allowed individuals to protect themselves against health and income risks, the authors found that M-PESA increased per capita consumption levels and lifted 194,000 households, or 2% of Kenyan households, out of poverty. The impacts were mainly driven by changes in financial behavior, and were more pronounced for households led by females.

Despite the success of mobile money over the last 10 years, the industry faces a number of challenges. Mobile money services represent a two-sided market, with agents (supply side) and customers (demand side), and thus signing up both sides in sufficient quantity is needed in order to be viable. The agents are an essential part of the model since they are the ones that exchange digital money for cash; therefore, the profitability of the agents is vital for the success of mobile money. Maurer, Nelms, & Rea (2013) outline four inter-related problems that have emerged regarding the agent networks: profitability, proximity, liquidity and trust. If the agent network grows too fast and saturates the market, this could lead the mobile money agents to have insufficient transactions to be profitable. If the agents do not have enough liquidity to meet the customers' needs, then it will negatively affect them. Finally, if the agents do not build a relationship with the customers, then client trust will not develop and the number of transactions may be very low. From the customer side, a key challenge is winning and retaining the trust of customers, where many of them are poor and have never used technology before. The result is that even though mobile money is available to customers, they are not necessarily using it. For instance, out of the 556 million mobile money accounts that were registered globally in 2016, about 31% of these accounts are active (GSMA, 2016b). Mobile money operations need to create a clear and trustworthy value proposition that fits within the social and cultural practices of customers, so that they can trust it and adopt its use (Donovan, 2012). Another hurdle related to the issue of account inactivity is the apparent lack of interoperability between mobile money providers, which means that individuals are limited to transferring money to those who are using the same mobile network

operator (MNO). Since interoperability is closely related to competition, this issue is already being addressed at the government level through regulations that require interoperability at different levels of the value chain. Several countries in Africa such as Tanzania and Nigeria have introduced regulations that require interoperability. From an economic perspective, mobile money operators have to strike the right balance in terms of the fees they charge for their services. According to Mas & Radcliffe (2010), many mobile money operators are faced with the trade-off between charging higher costs for their services to make profits sooner but not scale as quickly, or lower costs to reach scale and build a mass market at the expense of waiting longer to achieve profitability. Regulation is also a major challenge for mobile money. The mobile money industry is at the intersection between the telecommunications and banking sectors, and thus faces regulation from both areas. In order to have a successful mobile money implementation, regulators must encourage these new technologies, while minimizing fraud and risk. Successful regulation should be proportional and incremental, and involve the collaborative exchange between industry, government and the society (Donovan, 2012). Through the lens of new technology ventures serving the unbanked and underbanked, my research attempts to empirically show that adopting a customer centric and interoperable business model will help drive higher financial inclusion, thus expanding the academic work mentioned above.

Digital Payments

Originally, mobile money was used to send money to others within the same country or topping up the airtime available in your mobile phone. Over the last 5

years, mobile money has evolved into a more sophisticated proposition, and now serves as an access point to the basic financial products such as payments, credit, savings and insurance. One of the fastest growing financial products within mobile money is digital payments – in the form of bill payments, merchant payments, international remittances and government disbursements. In 2011, these transactions accounted for only 7.8% of total mobile money transactions; however, by 2016, this share has more than doubled to 18.8% (GSMA, 2016b). Digital payments represent the second stage in the pathway towards digital financial inclusion (Radcliffe & Voorhies, 2012). According to the authors, countries will go through several stages of market development to achieve a fully digital economy, with each stage serving as a building block for the next stage, and taking place over a period of time. The first stage, basic connectivity, is having a critical mass of mobile coverage and penetration within rural areas, providing the "rails" for the use of financial products and services. Once the connectivity layer is in place, digital payments (Stage 2) can be adopted to make some of the most basic transactions, namely transfers between people over long-distances and remote areas, as well as making bill payments and government disbursements. The subsequent stages deal with the adoption of more complex financial products through digital technology, such as credit, savings and insurance. Digital payments therefore serves as the initial step towards adopting other digital financial products. Radcliffe & Voorhies (2012) believe that leading with digital payments helps overcome trust barriers that may prevent people from adopting a new technology platform. Since digital payments are more immediate, their usefulness can be validated more quickly.

The benefits of digital payments have been well documented in numerous empirical studies conducted over the last 10 years. The impact of these studies can be viewed from the perspective of different stakeholders: governments which digitize payments and the recipients of digital payments. From a government perspective, by moving towards digital payments, it increases transparency by improving the traceability of government disbursements and having a more accurate record of the amount of the payments that each individual is going to receive. In turn, this effectively may lower the incidence of bribes which may take place when cash is used. A study performed in India shows that making social security pension payments digitally via smart cards reduced the incidence of bribes by 47% when compared to manual cash payments (Muralidharan, Niehaus, & Sukhtankar, 2014). As mentioned previously, another key benefit of digital payments is that it significantly lowers the transaction costs of government transfers. Aker et al. (2013) conducted a rigorous evaluation of a social transfer program in Niger, and they show that the cost of administering the program is 20% lower by using mobile transfers than by cash distribution. Another study in India shows that using digital financial services to transfer funds for a public works program lowered program fund expenses by 38% and also reduced corruption by 25% (Banerjee, Duflo, Imbert, & Pande, 2015).

From the perspective of the recipients of digital payments, it is clear that lower cost is the most significant benefit. By having the disbursements of government programs and/or paying bills electronically, it can save the poor who live in remote, rural areas a significant amount of travel cost and time required to go to a bank

branch or government office. In the same Niger study (Aker et al., 2013), the authors found that the time savings attributable to the mobile transfers for each payment translated into an amount large enough to feed a family of five people for a day. Moreover, digital payments are nearly instantaneous, regardless of the distance. This is highly beneficial in emergency situations that lead to unexpected income shocks, such as natural disasters or health issues, where you need the money almost immediately. An indirect benefit of using digital payments, especially for regular bill payments, is that it can help people build a "digital footprint" in the form of a payments data history which can then be used to assess their credit risk for a potential loan. Since most poor people lack a credit history, digital payments of utility bills can assist in determining whether the individual is able to pay its obligations on time. In Kenya, M-Shwari, which is a combined savings and loan product offered in partnership with Safaricom and The Commercial Bank of Africa (CBA), offers short-term loans to its customers based on their transaction and payments history with M-PESA (Cook & McKay, 2015).

Digital Credit

One of the most significant effects of mobile money has been the ability to provide loans to the unbanked and MSMEs that did not have access to credit in the past. As of 2016, there were 52 mobile money-enabled credit companies, up from seven companies in 2011 (GSMA, 2016b). Most of the growth has taken place in Sub-Saharan Africa, where the mobile money industry is more established and mature. M-Shwari is a perfect example of a mobile money-enabled credit product, which is offered by CBA and Safaricom. A similar product to M-Shwari, M-Pawa

was introduced in Tanzania in 2014, and as of May 2016, has 4.8 million accounts and disbursed $179 million to entrepreneurs – mostly young people and women (GSMA, 2016b).

Credit risk assessment is an essential step needed to provide a loan to an individual or a business. The bank will assess the individual's or the business' ability to repay the interest and principal of the loan within the agreed timeframe, by reviewing different data points such as their income, employment and other debt obligations that they may have. Unfortunately, the unbanked and most microenterprises may not have this information available, and thus banks consider them as high risk and usually refuse to extend them a loan. If the banks extend loans to these "thin file" customers, it is typically at exorbitantly high interest rates to cover the potential risk of default. Therefore, the lack of data is a key barrier to provide access to credit to the poor and microenterprises.

The internet, computers, mobile devices (phones and tablets) and Internet of Things (IoT) devices are generating a staggering volume of digital data – in a 30-minute span, all of these devices will generate digital data equal to all of the written works in human history (Yaworsky, Goswami, & Shrivastava, 2017). All of this data has powerful implications for driving higher financial inclusion, specifically by providing access to loans to the BoP, MSMEs and the underbanked. New companies have emerged that are using varied forms and combinations of non-traditional data – mobile call data records, user location and movement patterns, psychometric data, bill payments, internet browsing patterns, and social media behavior – and analyzing it with predictive and complex algorithms to develop a new way to assess the

creditworthiness of the consumers and the MSMEs. Since the cost of data storage and computing power has significantly declined and data analytics has become more mainstream, these new companies use their alternative credit assessment methods to offer convenient, quicker and lower cost unsecured loans to the unbanked, underbanked and MSMEs when compared to traditional banks. The use of these digital data sources has the potential to help between 325 million and 580 million people in the world's six largest emerging economies (Brazil, China, India, Mexico, Indonesia and Turkey) gain access to formal credit for the first time (Costa, Deb, & Kubzansky, 2016). A perfect example of using digital data to develop alternative credit scores and lend to the unbanked is M-Shwari in Kenya. As mentioned above, M-Shwari is a savings and loan product launched by a partnership between Safaricom and CBA in Kenya. M-Shwari relies on mobile phone records to set initial credit limits and their subsequent savings and borrowing to adjust credit limits. In the first 22 months of operations, M-Shwari has reached 7 million people, and disbursed 20.6 million total loans with only a 2.2% default rate (Chen & Faz, 2015). Another example is a company called Entrepreneurial Finance Lab (EFL), based in the U.S., and providing credit scores based on psychometric data in 16 developing countries around the world. Unlike other companies which use mobile data, social media and internet data, EFL uses a behavioral science assessment to uncover personality traits that are predictive of credit risk. The company partners with financial institutions to supply the psychometric assessments on their customers to ultimately create a credit score in conjunction with more traditional credit information. Firms with different business models are emerging in this area, using a wide range of digital data sources

to provide a credit score. Some of these firms position themselves as pure data science companies offering algorithm-driven credit scores to the financial institutions which ultimately supply the unsecured loans to the unbanked; while others are developing the credit score and lending directly to the consumers. However, the jury is out on which business model has been the most successful – it is still too early to know. In addition, which kinds of data will prove the most predictive when evaluating creditworthiness, and which will be supplementary, remains to be seen (Costa et al., 2016).

As part of the loan application process, every financial institution performs a Know Your Customer (KYC) check, which requires the prospective borrower to provide proof of identity. While this requirement may be very easy for customers in developed economies, it is a significant barrier for the poor in developing economies. In section 2.1, I highlighted that there are approximately 1.5 billion people in the world that do not have an identity document, which excludes them from not only accessing formal financial products and services but also basic needs such as healthcare, education and social welfare programs. Having a legal identity document is one of the United Nations' Sustainable Development Goals (SDG) – providing a legal identity for all by 2030. Also, proof of identity is a key enabler to other SDG targets, particularly those related to financial inclusion. In fact, the World Bank's Identity for Development (ID4D) Program has suggested that accessible, secure and verifiable identification systems could help expand financial services by approximately 375 million unbanked adults in emerging countries (*Identification for Development Strategic Framework*, 2016).

Digital identity refers to providing a proof of identity through electronic means, such as a numeric identification stored electronically, biometrics in the form of fingerprint and iris scans stored digitally, and facial recognition. A digital identity can be more efficient than a traditional identification system since it may be able to process the identification check in a faster and more efficient manner than traditional manual checks, which can enable higher financial inclusion. To date, the most successful digital identity implementation globally is the Aadhaar program in India. Aadhaar provides a permanent identity number to every resident of India, including migrants and citizens living abroad. In addition to the unique identification number, biometric scans in the form of fingerprints and iris scans are stored electronically for every individual, together with a photo. The advantage of the Aadhaar digital system is that it allows identities of individuals to be verified anytime, anywhere. By mid-2016, the number of residents registered in Aadhaar had surpassed 1.1 billion, or 94% of the Indian population, making Aadhaar the world's largest biometric database and the first online biometric-based identity system in the world (GSMA, 2017). Aadhaar has become an essential component to provide access to financial services to the unbanked population in India in a cost-efficient manner. According to GSMA, the Aadhaar-enabled e-KYC platform reduces the cost of KYC process for mobile money providers from $0.60 per customer to only $0.07 (GSMA, 2017). In addition, the Aadhaar platform is now being used to biometrically identify and authenticate residents that are eligible for government transfers, and using mobile money accounts as well as bank accounts to deposit the funds quickly and securely. The success of Aadhaar has prompted different emerging market countries to explore the

implementation of digital identity systems. In addition, different technology firms are working on a number of initiatives to provide global digital identities. For instance, Microsoft, Consensys, and Blockstack Labs announced in June 2016 that they are collaborating to create a blockchain-based, open-source digital identity system.[11] Similarly, Deloitte has developed a Smart Identity prototype, which also uses blockchain technology.

Over the last 10 years, new and innovative digital lending business models have emerged to provide loans to both individuals and businesses. Peer-to-Peer (P2P) lending is one of the most popular of these new models, achieving significant growth and widespread adoption globally. P2P lending, or also commonly referred to as debt crowdfunding, is the matching of borrowers (individuals and businesses) who need money with investors (individuals, financial institutions) who have money, through an online platform or mobile phone. The emergence of P2P lending has its roots on the "crowdsourcing" idea, where you tap into the power of the crowd to increase efficiency and realize tasks that would be difficult to accomplish by one individual (Brabham, 2008). In this case, you are targeting the wallet of the crowd, bringing individuals and financial institutions that have capital to lend, and matching them with borrowers that need a loan. While this concept is not new, the use of technology is facilitating the process and making it easier and more efficient. The P2P lending platform allows investors to make fractional investments in multiple loans of different borrowers, thereby diversifying their risk. Initially, P2P lending emerged in the UK

[11] https://cointelegraph.com/news/id2020-how-blockchain-could-be-used-to-solve-global-identity-crisis.

and the U.S. in 2006, and since then it has been adopted in most developed countries and now quickly growing in emerging markets. In fact, China is the largest P2P lending market globally, with more than $100 billion in loan volumes as of 2015, followed by the U.S. at $36 billion and the U.K. at $4.6 billion.[12] Although the volumes are still relatively low, other emerging markets are showing strong growth rates, with total volume of all emerging markets at approximately $1.5 billion as of 2015.[13] P2P lending has the potential to drive financial inclusion, by providing loans to the unbanked, underbanked and MSMEs, which the banks have ignored.

There are two different categories of P2P lending, which are mainly distinguished by who is the borrower: (1) P2P lending, where the borrowers are individuals seeking a loan for personal use; and (2) P2B lending, where the borrowers are SMEs seeking a loan for their business. In addition, P2P lending platforms have diverse operational models. Jenik, Lyman, & Nava (2017) define 3 major operational models, which are typically present in emerging markets:

(i) Client-segregated account = in this model, an individual borrower is matched with investors through the P2P lending platform. The platform is mainly a matching mechanism, which evaluates the credit risk of each borrower to determine the appropriate interest rate to charge. The investors will earn interest on their investment and have the capability to invest in many different loans to build a portfolio. The platform does not

[12] http://pubdocs.worldbank.org/en/150621476811901072/Session-5A-Kieran-Garvey-Crowdfunding-Panel-21-9-16-final-final.pdf
[13] Ibid.

assume any risks related to the loan, and earns revenue by charging a service fee to both the borrower and investor for the matching process;

(ii) Balance sheet lending = the platform lends directly to the borrowers and holds the loan on its balance sheet. In this model, the platform makes revenue through transaction fees charged to the borrower and investor, as well as the spread in the interest rate (the difference between the platform cost of borrowing and the interest it charges to borrowers);

(iii) Notary = loans are not provided by investors, but by partner banks and financial institutions through the platform.

P2P lending platforms can provide significant benefits to the unbanked, underbanked and MSMEs in emerging markets. The most immediate and obvious benefit is improved access to access to loans which was not available before, or was too expensive. In 2013, the World Bank performed a study on crowdfunding for development, and it indicates that there are is an opportunity for up to 344 million people to participate in crowdfunding, in particular P2P lending (InfoDev, 2013). The report also highlights that by accessing loans through P2P lending platforms, the poor and marginalized can effectively build a credit history, which may allow them to get offers for loans from traditional banks in the future. Similar to the benefits listed for microcredit, P2P lending offers the opportunity to access loans that can help households and businesses smooth out consumption and deal with unexpected emergencies and income shocks. Another important benefit is the ability to borrow at potentially lower rates than traditional financial institutions and informal financial services, since the use of technology can make the process more efficient and a lot

faster. For instance, a loan that may have taken 5-15 days to obtain approval from a traditional bank, may only take 1-3 days for approval when using a P2P lending platform. Since P2P platforms are online, they have no physical presence. To add to these features, most P2P lenders use innovative algorithms to determine creditworthiness of applicants, and have a streamlined application and approval process. The result is lower operating costs which could be passed on to the borrower in the form of lower interest rates. Finally, P2P lending platforms provide convenience, since most online platforms are available 24/7 from the comfort of your home. Also, the use of technology makes the application, approval and disbursement process more streamlined and efficient.

Despite the benefits of P2P lending, there are a few risks and challenges that need to be addressed so that this innovative business model can continue to scale and drive higher financial inclusion. First, in most emerging market countries there are no clear regulations established yet for P2P lending. Jenik et al. (2017) define a few additional challenges related to infrastructure and individual behavior. Specifically, the authors mention that the limited access to technology may make it difficult to access the P2P lending platforms. In many developing countries, access to the internet is still limited to urban areas, with limited availability in rural areas. Finally, from a customer perspective, a major obstacle to overcome is the lack of general awareness and trust. Due to the fact that P2P lending is a fairly new concept, there is still limited awareness from potential borrowers and investors on this innovative model. Therefore, more education is needed to build the trust with the potential users.

Digital Savings

The mobile phone has become a powerful enabler to provide access to savings to the poor, whether it is through storing cash through a mobile money account or a dedicated savings account linked to mobile money. The main benefits of using digital tools for savings over informal methods are higher transparency, lower costs, increased liquidity (since funds can be available immediately) and significantly lower risk of theft and/or asset depreciation. According to GSMA, as of 2016, there were 36 dedicated mobile savings services in 18 countries (two thirds are in low income countries), which has enhanced the availability of formal savings products to the poor. In fact, the percentage of mobile savings accounts with a positive balance increased from 43% in June 2014 to 69% by the end of June 2015 (GSMA, 2016a). The two most common types of mobile savings accounts are: (1) Using mobile money accounts to store cash; and (2) Using a dedicated savings account at a financial institution linked to mobile money so that it allows users to top-up their savings account by using mobile money. As GSMA highlights in their 2015 report, both types of savings account have shown significant growth over a 1-year period, growing from 22 million accounts in 2014 to 32 million in 2015 (GSMA, 2016a). The most popular and easiest method of savings through mobile for the poor is by using their mobile money accounts, or mobile wallets, to store cash. Although growth in mobile savings accounts has been impressive, it is still relatively small when compared to the individuals which do not yet have a savings account. A key challenge is understanding the consumers' behaviors and ways they currently save in order to design products that truly meets their needs. Morawczynski & Krepp (2011)

performed a survey in Kenya in 2011 of the use of M-PESA accounts for mobile savings to get a better understanding on how consumers were using their mobile phones to save. The authors uncovered that the respondents had different ways on how they saved with their mobile money accounts. The first method was a temporary accumulation of cash in their M-PESA account before transferring the amount to a recipient. Since there are no transaction costs for deposits, this alternative was very attractive to individuals. In addition, by setting aside the funds in the mobile money account, rather than having it in cash, it acted as a deterrent from spending the money. The second method is referred to as "saving down", and this involves the regular withdrawal of small increments of money from the mobile money account which had accumulated cash received from a relative or family member. The final method is using the mobile money wallet to save for a particular goal, such as education, healthcare and other important life events including weddings. Typically, the individual would develop a savings schedule indicating the frequency and amount of their deposits.

A study in Bangladesh evaluated the informal savings methods used by the poor in the country, and provided guidance on how digital technology can help improve the number of savings accounts and make the process more efficient (Parvez & Chowdhury, 2016). The authors recommend that mobile savings products should be designed to be customer centric and experience centric. In essence, these new mobile savings products should try to replicate the customers' current experience to lower any resistance to adopting an entirely new process. The findings from the study in Bangladesh confirm that psychology plays an important role in saving

behavior. In particular, researchers have studied how limited attention influences the savings behavior of the underbanked in emerging markets. Karlan, McConnell, Mullainathan, & Zinman (2016) performed field experiments in three developing countries where they showed that sending monthly SMS reminders to customers at three different banks helped them meet their savings goals, compared to a control group. Therefore, tapping into the consumers' psychology via mobile devices can be an effective tool to encourage them to save and meet their goals.

Digital Insurance

Mobile phones have become an essential distribution channel for providing microinsurance to the poor, delivering significant benefits over traditional insurance products. Essentially, insurance providers partner with MNOs to offer microinsurance products – the mobile phone is used to enroll clients, collect premiums, communicate with clients and insurance staff as well as capture data on clients. By using the mobile phone infrastructure, the process becomes more efficient thereby lowering costs and reducing turnaround times for enrollment, claims processing and collection of premiums. What makes mobile microinsurance (as it is commonly referred) so attractive is the ability to reach significant scale at lower costs when compared to traditional methods. By lowering operational costs and reducing inefficiencies, mobile-phone-based processes make it possible for insurers to carry out low value, high-volume transactions in a financially viable way (Microinsurance Network, 2016). The mobile microinsurance market has expanded significantly over the last 5 years. At the end of 2015, there were 120 mobile insurance live services available in 33 emerging markets, with a total of 31 million policies issued

representing a 68% increase from 2014 (GSMA, 2016a). The GSMA report describes three main business models that are used in mobile microinsurance: (i) Loyalty, which encourages the customer to spend a certain amount of airtime or keep a certain balance in their mobile money account to qualify for insurance; (ii) Premium, where customers pay a premium for coverage; and (iii) Freemium, which is a combination of Loyalty and Premium. An innovative feature that makes the mobile microinsurance product easy to adopt is the ability to pay for the insurance premiums using mobile airtime, in addition to mobile money. This feature provides convenience to the customers, since they can easily allocate airtime without any significant hassle. In addition to providing significant benefits to the customers, mobile microinsurance has had a positive impact on the MNOs. Specifically, mobile customers who are subscribed to a mobile microinsurance product tend to have greater average revenue per user (ARPU), a key performance metric for MNOs, over time when compared to average mobile customers (GSMA, 2016a). The MNOs also benefit by reducing churn, which is the number of customers that leave the MNO to a competitor, as well as differentiate themselves from other MNOs by offering microinsurance as a value-added service. In terms of mobile microinsurance products offered, the top 3 products are life insurance, combined life and health insurance, and health or hospital insurance. Currently, there are more than 8 mobile microinsurance providers which have issued more than 1 million policies in developing countries (GSMA, 2016a). In general, the mobile microinsurance value chain consists of the following players:

- Insurance company – these firms underwrite the microinsurance products, and pay any claims
- Mobile Network Operator (MNO) – serves as the main distribution channel to the customers
- Technology Service Provider (TSP) – technology firms that partner with both the insurance companies and MNOs to develop and design microinsurance products that meet the exact needs of customers. These firms manage the client relationship, the collection of premiums, and the claims management process. Effectively, these firms bridge the gap between the MNOs and the insurance providers, since they have a good understanding of the insurance industry (which MNOs lack) and the low-income customers (which insurance firms lack). The two largest TSPs globally are BIMA and MicroEnsure, and they serve more than one third of all of the customers currently signed up for mobile microinsurance. BIMA and MicroEnsure have become essential players in the value chain, by developing customized software platforms that simplify the entire process and get involved in the education of customers as well as the training of the agents
- Agents – individuals who actually sell the microinsurance products to potential customers. The agents may be a part of the MNO, the TSP or the insurer

Prashad, Saunders, & Dalal (2013) evaluated the mobile microinsurance sector through a selection of 13 schemes that are using mobile phones in emerging markets. The authors offer some interesting insights and key lessons for insurers.

For instance, the authors advise the insurers and MNOs to gauge the maturity of their insurance market and assess the customers' perceptions in order to determine which business model to use (freemium, loyalty or premium). Initially, it makes sense to start with loyalty-based business model that includes free insurance embedded within the MNO's core service; as markets mature, then it makes to move to a freemium business model. Although the mobile microinsurance market has been growing very fast, there are a few challenges. One of the biggest barriers is educating the consumer on the benefits of having insurance, especially when explaining it to the poor who may also be illiterate. Therefore, policies need to be very simple to fill out and understand (without the traditional exclusions, terms and conditions that may be irrelevant and confusing), and the communication to customers' needs to be in a language they can comprehend. By spending time to explain the mobile microinsurance products to the customers, it also helps build trust and credibility. Another major challenge is the distribution of mobile microinsurance, since a lot of insurance companies may have inadequate database management systems to cope with high volumes of information, analysis and dissemination. In addition, in the rural areas, it becomes harder to track the receipt of premiums and track claims submitted. TSPs can help overcome these challenges.

Empirical evidence supporting the benefits of mobile microinsurance are limited. Beck (2015) outlines a few studies conducted in India and Ghana, where the use of weather and crop insurance through the use of mobile devices has led farmers to increase the plantation of higher risk, higher yielding crops which result in higher income. Goldboom (2010) reviewed the empirical evidence on the use of

microinsurance by the poor, and although the studies were limited, the author concludes that mobile microinsurance not only helps reduce poverty, but it can also improve social inclusion and partially substitute for deficient public social security schemes. In summary, more work needs to be done to empirically demonstrate how technology is improving the lives of the poor through the use of microinsurance.

Blockchain Technology – Latest Innovation for Financial Inclusion

In the previous sections, I have addressed how technology innovations such as mobile phone and big data analytics, as well as new business models such as P2P lending and microinsurance, are accelerating financial inclusion in emerging markets. The effects of these technology innovations and new business models pales in comparison to the potential of blockchain technology to completely transform almost every aspect of our lives. Blockchain technology is being viewed by many as one of the most innovative technologies that has emerged over the last 10 years; some argue that within 20 years, blockchain will disrupt society more profoundly than the internet disrupted communication and media (Hernandez, 2017). Academics and researchers claim that blockchain will disrupt the financial services system with a cheap and secure form of banking, which does not have to rely on financial intermediaries. Certainly, blockchain has caught the attention of global institutions (banks, corporates), development organizations and regulators. In 2016, IBM surveyed 200 banks in 16 countries around the world, and roughly 65% of the banks expect to have blockchain solutions in production in the next three years.[14] The consequences for

[14] *Leading the Pack in Blockchain Banking*. IBM. September 2016. https://public.dhe.ibm.com/common/ssi/ecm/gb/en/gbp03467usen/GBP03467USEN.PDF

banks and other financial intermediaries can be massive; according to analysts at Santander InnoVentures, they estimate that by 2022, blockchain technology could save banks more than $20 billion in annual costs.[15] In addition, more than $1 billion has been invested in startups that are developing different applications using blockchain technology. Also, the tech giants such as Microsoft, IBM, Google and many others have blockchain projects underway. The potential benefits for financial inclusion are significant, including the lowering of transaction costs for international remittances, providing a digital identity to the poor, and making it possible to track aid funds in near real-time to ensure that is being spent as intended.

Blockchain technology, a form of distributed ledger technology, is a vast, global decentralized database that is cryptographically secure and running on millions of devices – open to anyone. The transactions in the distributed ledger are immutable and verifiable, therefore, making it transparent and easy to track. Like the internet, blockchain is effectively a protocol upon which applications can be built. One of the most powerful features of blockchain technology is the fact that it does not require traditional intermediaries when doing a transaction between two parties, thereby significantly lowering or even potentially eliminating transaction costs. Dahan & Casey (2016) discuss the issue of trust in mediating financial transactions, and how it has evolved over time. Since the early days of mankind, centralized trust protocols have evolved to keep track of exchanges of value between individuals and companies. However, these centralized trust mechanisms have caused problems periodically –

[15] *Blockchain: what it is, how it really can change the world.* World Economic Forum Blog. June 2016. https://www.weforum.org/agenda/2016/06/the-blockchain/

most recent example is the global financial crisis of 2008/2009. Blockchain technology represents a new paradigm - decentralized trust - since the validation of transactions is no longer done by a centralized trust body, but by a network of autonomous computers which confirm and validate the content by following a unique algorithm that compels them to act in the common interest (Dahan & Casey, 2016). Another important feature of blockchain technology is smart contracts, which are software programs that automatically execute complex instructions when certain conditions are met. These smart contracts are on the blockchain, and have the potential to significantly lower the costs of enforcing contracts and making payments. Tapscott & Tapscott (2016) discuss this concept further, by describing autonomous agents, which are bundles of smart contracts acting together as an application on the blockchain, as a way to eliminate agency and coordination costs, and could eventually lead to highly distributed enterprises with little or no management.

Multiple use cases have been explored for blockchain technology to accelerate financial inclusion. I will describe three of the most important applications, which have gained significant traction over the last few years, namely: (i) Digital identity; (ii) Remittances and international payments; and (iii) Smart-aid contracts.

Blockchain technology can be used to create a digital identity for individuals. As discussed previously, millions of people in developing countries lack a legal identity, which precludes them from receiving social benefits and have access to formal financial products. By developing a digital identity using blockchain technology, a permanent, immutable record can be created, which can serve as the main way to identify an individual. The identity data remains the ownership of the

individual and individuals can give permissions on who can see what data for what purpose and for how long. A wide variety of companies, both startups and large technology firms, are looking at ways to develop digital identity systems based on blockchain technology. An example is BanQu, a Fintech startup led by Ashish Gadnis and Hamse Warfa, which is providing an economic identity through blockchain technology to the unbanked and refugees in order to drive social and financial inclusion. The company first creates an identity for the individuals through distributed ledger technology, and then allows them to connect to others to perform transactions and effectively build their economic identity. Another example is the partnership announced by Microsoft, Consensys, and Blockstack Labs in June 2016 to create a blockchain-based, open-source digital identity system.[16]

One of the earliest use cases of blockchain technology is for cross-border payments and remittances. Initially, Bitcoin has been used as the vehicle currency, and so far has demonstrated tremendous growth over the last 3 years, more than doubling from $68 million in 2014 to $212 million in the first two months of 2017 (Gallo, Jumamil, & Aranyawat, 2017). The advantage of blockchain technology for international remittances is the fact that it can significantly lower transaction costs. The global average cost of remittance as of June 2017 is 7.32%, according to the World Bank. However, by using blockchain technology, transaction costs can be lowered to approximately 1 to 3 cents! Another advantage of using blockchain is that the remittance process is almost instantaneous, whereas the traditional methods

[16] https://cointelegraph.com/news/id2020-how-blockchain-could-be-used-to-solve-global-identity-crisis.

typically take between 2 to 5 days. Coins.ph, a Fintech startup based out of the Philippines, is a good example of a company that is offering a mobile, blockchain-based platform to allow Filipinos to send money at a faster and more affordable rate. Blockchain technology gives Coins.ph the ability to facilitate remittances between individuals around the world without relying on existing bank infrastructures.

The use of smart contracts enabled by blockchain technology can be applied for donor funds to help people during a natural disaster, emergency relief or development programs. The smart contracts can automatically disburse funds once predetermined conditions are met, such as objectives and milestones. Moreover, the smart contract eliminates the need of middlemen and leakage along the way, which can make the process more transparent and efficient. Due to blockchain technology, the aid delivery can be easily tracked, showing the location in the supply chain and its ultimate delivery. An example of using blockchain for the disbursement of donor funds is Disberse, a startup which enables donors, governments and NGOs to transfer and trace funds through the whole chain, from donor to beneficiaries, by using smart contracts.

While blockchain technology can be a big enabler to accelerate financial inclusion, there are risks and challenges that need to be addressed. At the moment, scalability of blockchain technology in some use cases has been difficult. For instance, using bitcoin for the payment of goods and services can take approximately 10 minutes, which does not work when traditional payments can happen in real time. Moreover, some of the use cases require users to be connected to the internet, which can be problematic in developing economies where most users do not have access to

the internet. Finally, regulators around the world have taken different approaches on how to regulate blockchain and virtual currencies, with no consistent approach. Some countries such as Bolivia have banned bitcoin, one of the earliest forms of blockchain, while others such as Russia and Thailand have become more open (Gallo et al., 2017). Many countries, such as India, China, South Africa, Singapore and others have taken a neutral stance on the issue. While these countries do not ban the technology, they have not yet set regulations and are experimenting with ways to see how it can help. Philippines has taken the approach of understanding blockchain technology first, educate the public and then align the regulatory requirements with the needs of the unbanked and underbanked. Overall, blockchain technology will continue to expand and it is expected to affect every aspect of our lives in the future.

This section has provided a comprehensive review of how digital financial services is helping drive financial inclusion through innovative solutions. Empirical evidence confirms the significant benefits that technology brings to help the unbanked and underbanked in emerging markets. New technology ventures are taking the lead in this effort, and while the literature highlights case studies of successful companies such as M-PESA, bKash, M-Shwari, no one has empirically investigated the key factors that these new ventures need to have in order to drive higher financial inclusion, while at the same time delivering higher financial performance. My research study attempts to address this gap in the literature.

2.3 Social Entrepreneurship and Entrepreneurship

2.3.1 Social Entrepreneurship

Social entrepreneurship is the first stream of research that I review in this section, specifically on how a social enterprise is defined, how the field of social entrepreneurship has evolved and some of the key shortcomings and limitations. **This field is relevant to my research study since I view the small subset of Fintech startups that I am evaluating as social enterprises using technology to drive the social impact objective of higher financial inclusion.** The field of social entrepreneurship is an emerging field in academia, and the literature is still at an embryonic stage; therefore, my research study can provide important contributions to the field, specifically as it relates to empirical studies. Even though researchers in the field of entrepreneurship have extensively studied the key characteristics of entrepreneurs and what makes their new ventures a success or failure, there have only been a limited amount of empirical work published. I will review the entrepreneurship literature and how academic researchers have connected strategic management theories such as Resource Based View (RBV), Network and Social Capital and Industrial Organization Economics to define key success factors for new ventures. In addition, I will examine how different characteristics of a startup's business model can impact the performance of new ventures. More importantly, my research study will aim to cover the gap in empirical studies conducted in the entrepreneurship literature.

The young field of social entrepreneurship has garnered significant interest within the academic research community over the last 25 years. Short et al. (2009) conducted a review of the existing literature in this area and showed there was a 750% increase in the number of academic publications related to social entrepreneurship from 1991 to 2009. Although there has been a lot of interest in this field, there are a few basic challenges that need to be addressed, which demonstrate its nascent stage. Given the wide variety of views of what is considered social entrepreneurship from the public sector, non-profit and for-profit organizations, there is currently no unified/consensus on its definition (Weerawardena & Mort, 2006). This lack of common definition has made it difficult to establish a theoretical framework which would further help legitimize this field of study within academia.

Various authors have offered different views on the definition of social entrepreneurship. Initially, social entrepreneurship was equated with non-profit organizations, which help solve a social problem that the government or other social institutions have failed to address efficiently. Over the last 15 years, the definition has evolved to recognize that social entrepreneurship is more than just meeting a social goal. There has been a debate on whether social entrepreneurship is considered part of entrepreneurship, or it is defined as its own separate category. Dees (1998) argued that social entrepreneurs are a subset of the general classification of entrepreneurs, therefore alluding that social entrepreneurs are very closely related to entrepreneurs. Peredo & McLean (2006) agreed with Dees, offering a definition of social entrepreneurs that is very similar to commercial entrepreneurs, but the only difference is that social entrepreneurs pursue goals almost independently of resources.

Battilana & Lee (2012) offered a slightly different but somewhat similar perspective, describing the social enterprise as a hybrid between commercial ventures and social sector organizations. However, Santos (2012) argued that, rather than being closely interrelated to commercial entrepreneurship, social entrepreneurship is a separate category, and social enterprises are organizations that play both a societal and economic role which is distinct from other organizations.

To define social entrepreneurship, it is logical to compare it to entrepreneurship, and then try to identify the areas of similarities and differences. Abu-Saifan (2012) took this approach by performing a detailed comparison of the definitions and characteristics of entrepreneurs with those of social entrepreneurs based on what different authors have outlined in their past research. From this detailed comparison, the author developed the following definition of the social entrepreneur: "The social entrepreneur is a mission-driven individual who uses a set of entrepreneurial behaviors to deliver a social value to the less privileged, all through an entrepreneurially oriented entity that is financially independent, self-sufficient or sustainable" (p. 25). The author goes a step further by delineating boundaries for what encompasses social entrepreneurship. He maintains that social entrepreneurs operate within two business strategies:

- Non-profit with earned income strategies - refers to organizations that are set up as non-profit in structure and mainly provide social impact. Profits generated are secondary priority, and are used to provide more social impact
- For-profit with mission-driven strategies - refers to organizations that are for-profit in structure, but also provide a social impact. This dual goal makes the

> organization financially independent (i.e., does not rely on grants or charitable donations), and the founders/shareholders benefit from a return on their investment

Seelos & Mair (2005) concur with Abu-Saifan's definition, and they provide their own view of social entrepreneurship: "combining the resources of traditional entrepreneurship with a mission to change society" (p. 241). The authors view social entrepreneurship as essential because it serves the unmet needs for people who are poor and cannot afford different services, or the services that the government provides are inefficient/lacking. Social entrepreneurs create novel business models, organizational structures and strategies for brokering between very limited and disparate resources to create social value. Effectively, social entrepreneurs have a priority to create social value, but it is tightly coupled with economic value creation. ***My research study views Fintech startups that are serving the unbanked and underbanked as social enterprises, having the same characteristics as outlined above by Seelos & Mair and Abu-Saifan – specifically, they are for-profit ventures with mission-driven strategies, which have a dual goal of creating social and economic value.*** This definition of social entrepreneurship has received the most attention over the last few years and has become widely accepted by investors and shareholders, since it offers a social value without sacrificing economic benefits.

The wide variety of definitions of social entrepreneurship has made it challenging to develop theoretical frameworks that can help determine the antecedents and consequences that impact this field, which results in a lack of empirical research. In fact, most studies that have been conducted over the last 25

years have been qualitative in nature, using case studies and interviews. In their review of the social entrepreneurship literature published from 1989 to 2009, Short et al. (2009) found that 72 out of 152 articles published were empirical in nature. However, out of the 72 empirical articles, only two of them had operational hypotheses that could be rigorously tested. The limited number of studies with operational hypotheses makes it very difficult to determine the potential antecedents of social entrepreneurship, as well as the factors that may impact the performance of social enterprises. A recent study published by Martinez & Krauss (2015) is one of the few papers that addresses the dearth of empirical research with operational hypotheses in the social entrepreneurship area, and is highly relevant to my research study. The authors attempt to develop causal drivers for financial inclusion at the BoP by analyzing microfinance data for 109 countries from 2003 to 2012. The authors equate microfinance penetration rate with financial inclusion and develop a quantile regression model using measurable variables. Some of the key findings from this study are that the drivers of financial inclusion vary across different stages of market development, and technology can help overcome entry barriers and enable higher financial inclusion. Similar to Martinez and Krauss' study, my research study will develop a model using regression analysis that can help quantify the factors impacting financial inclusion, where financial inclusion is a key measure of success. However, my study will only focus on technology-based ventures given the critical role that technology is playing to expand financial inclusion. More empirical research in social entrepreneurship is needed, and my research study aims to close this gap by developing an empirical, data-driven model to help understand the main

factors that impact the financial performance and social impact of new technology ventures which are targeting the financial inclusion area. Specifically, I plan to operationalize different factors, develop formal hypotheses and test them using regression analysis to determine which factors have the largest impact on new venture performance and financial inclusion. **My research expands on the limited empirical work on social entrepreneurship, but does not necessarily address any social factors that these new ventures need to have in order to drive higher financial inclusion.**

2.3.2 Entrepreneurship

Understanding what drives the success of new ventures is an important part of the academic research published in the field of entrepreneurship. The reason is straight forward: most new ventures fail, so it is essential to identify what factors lead to their success since it has important implications for entrepreneurs, as well as their advisors and investors. The research on the success factors of new ventures has evolved over the last 40 years, with initial studies laying out theoretical frameworks for the factors that impact new venture performance (Gartner, 1985; Sandberg & Hofer, 1987; W. Gartner, Starr, & Bhat, 1999; and Chrisman, Bauerschmidt, & Hofer, 1998) to empirical studies that develop formal hypotheses and detailed models to try to predict the performance of new ventures (C. Lee, Lee, & Pennings, 2001; Adcroft, Lasch, Le Roy, & Yami, 2007; Jian, Jun, Yuan, & Shude, 2010; and Miloud, Aspelund, & Cabrol, 2012). Given the extensive number of publications on success factors for new ventures, a number of issues have become apparent, which can undermine the validity of some of the studies. Cooper (1993) outlined some of these

challenges, such as the great variation of study designs, different measurements and methodologies used, variety of performance measures used to measure success, and the lack of well-developed theoretical frameworks to try to explain causality. These issues make it difficult to compare and interpret prior research publications, leading to inconsistent and contradictory results. Frese, Bausch, Schmidt, Rauch, & Kabst (2012) introduced the concept of evidence-based entrepreneurship, which encourages the use of meta-analyses, as a way to solve some of these issues. A data-driven, empirical approach, evidence-based entrepreneurship uses meta-analyses in entrepreneurship research to establish relationships which can then be summarized in objective theories that can be applied to practice. Song et al. (2008) is an example of a recent meta-analysis which evaluated 31 empirical studies on success factors in new ventures. Out of 24 factors that appeared in the different studies, 8 of them were found to significantly impact new venture performance. Moreover, the authors were able to develop a theoretical framework of new entrepreneurial firm performance based on their findings. Another meta-analysis on success factors for new ventures was conducted by Unger, Rauch, Frese, & Rosenbusch (2011), where the authors reviewed 70 empirical studies on the effects of human capital on new venture performance. The research showed that the outcomes of human capital (knowledge, skills) had a more significant effect on new venture performance than the investments in human capital (education, experience). The concept of evidence-based entrepreneurship makes sense, however, the limited number of empirical studies on success factors for startups still remains an issue. Although my research study will not use a meta-analysis, I will extend the limited entrepreneurship literature on

empirical studies by using a data-driven approach in my research design to minimize some of the challenges presented above. Specifically, I plan to operationalize the factors that lead to the success of new ventures with variables that can be measured objectively, as well as use secondary data sources to collect and verify data on the new ventures.

A wide variety of factors that can impact the success of new technology ventures have been evaluated in the entrepreneurship literature. In most cases, authors have organized the factors into different categories. The categorization provides a multi-level conceptual framework for describing new venture creation, which integrates the major perspectives in entrepreneurship research (W. B. Gartner, 1985). Applying one or more of these academic theoretical frameworks to explain the factors that lead to the success of new technology ventures, using different groupings/categories, has been popular among the entrepreneurship literature (Roure & Keeley, 1990; Herron & Robinson, 1993; Chrisman, Bauerschmidt, & Hofer, 1998; C. Lee et al., 2001; and Miloud, Aspelund, & Cabrol, 2012). The multi-level frameworks are based on different firm-level theories such as the resource-based view of the firm, social capital and network theory and industry organization economics (Miloud et al., 2012). My research study adopts the approach of a multi-level framework for the factors that impact the success of new technology ventures in financial inclusion, which is then used to develop the theoretical model and operational hypotheses.

My research study defines 4 major categories of factors that impact the success of Fintech startups serving the unbanked and underbanked: (1) Resources /

Capabilities, (2) Business Models, (3) Networks & Strategic Partnerships, and (4) Market / Environment. These categories have been studied in prior academic research and are supported by the Resource Based View (RBV) theory, Social Capital and Network theory and Industry Organization (IO) economics. This approach is similar to the research study from Miloud et al. (2012), where the authors show these three theories look at firm performance from different perspectives. Specifically, RBV views the firm as having unique resources which can lead to a competitive advantage and thus drive higher value. On the other hand, industry organization economics focuses on the external factors such as the market and industry, and how these factors impact business performance. Finally, network theory serves as glue between these two bookends, since it evaluates how external relationships contribute to a firm's strategy and ultimately its business performance.

The Resource Based View (RBV) theory of strategy management has been applied to new ventures by numerous academic researchers. RBV theory views the firm as a collection of resources, and those resources that are inimitable, scarce and imperfectly tradeable provide a competitive advantage when the firm is able to exploit them in the external environment (Barney, 1991). According to C. Lee, Lee, & Pennings (2001), RBV suggests that startups pursue entrepreneurial strategies that focus on the accumulation of intangible resources in order to grow and survive. Some of the firm specific resources refer to the attributes of the founder and founding team, which assume that the new venture is an extension of the founder. However, other studies cover characteristics of the startup as a whole, such as entrepreneurial orientation, technological capabilities and financial resources. Out of the different

resources mentioned above, most entrepreneurship researchers agree that the characteristics of the founder and the venture team play a critical role in the success of new technology ventures. In fact, within the field of entrepreneurship research, more empirical studies involving characteristics of the entrepreneur have been conducted than have almost any other kind (Churchill & Lewis, 1983). Macmillan, Zemann, & Subbanarasimha, 1987 famously quoted: "There is no question that irrespective of the horse (product), horse race (market), or odds (financial criteria), it is the jockey (entrepreneur) who fundamentally determines whether the venture capitalist will place a bet at all." (pg. 119)

Some of the main factors related to the founder and founding team include:

- Psychological and behavioral characteristics of the founders (Kakati, 2003;Timmons & Spinelli, 1999; Groenewegen & de Langen, 2012; and Schwarzkopf, 2016)
- Relevant industry and prior startup experience (A. Zacharakis & Shepherd, 2005; Song, Podoynitsyna, Van Der Bij, & Halman, 2008; Unger, Rauch, Frese, & Rosenbusch, 2011; and Miloud, Aspelund, & Cabrol, 2012)
- Founding team size (Song, Podoynitsyna, Van Der Bij, & Halman, 2008; and Schwarzkopf, 2016)

Although the psychological and behavioral characteristics of founders have been shown to be important in determining new venture success, one limitation of my research study will be the fact that I do not study these factors. Similar to Adcroft, Lasch, Le Roy, & Yami (2007), I argue that these behavioral characteristics are

already embedded in the different entrepreneurs when they start up new technology ventures, therefore, it is unlikely that there will be significant differences observed between new ventures, resulting in minimal or no impact on new venture performance.

Social capital and network theory suggests that a firm's networks and partnerships are a large contributor to its performance (Leenders & Gabbay, 1999). According to Dubini & Aldrich (1991), the entrepreneur's network will influence the start, growth and expansion of new ventures. Essentially, the more developed the network, the easier it will be for the entrepreneur to start and grow their business. In addition, the network is important since it allows the entrepreneur to search for new opportunities and gain access to new resources at potentially lower prices than if they were to pursue them on their own. T. E. Stuart, Hoang, & Hybels (1999) highlight that the entrepreneur's network can also add legitimacy to the new venture, which is essential for companies that are starting and have limited track record. Additional benefits from networks include management know-how, trust, and connections to more resources (i.e. financial and technological). In a study of biotechnology startups, Zheng, Liu, & George (2010) demonstrate that a firm's network influences its performance, and ultimately impacts its valuation. Essentially, the quantity and quality of network connections for a startup are important factors that are used by VC firms to value them. Network size plays an important role in new venture performance and valuation; Deeds & Hill (1996) found that the larger the size of the network, the more benefits accrue to the new venture. Miloud, Aspelund, & Cabrol

(2012) confirm these results in their empirical study by showing that network size of a new venture is positively related to its valuation by VC firms.

Industry organization economics theory brings an external perspective by looking at the industry conditions in which a new venture competes. Specifically, academic studies focus on the market structure and key exogenous factors, which may be outside of the company's control, and may influence the startups' performance. In their study, Miloud et al. (2012) showed how the industry growth rate and degree of product differentiation in the market positively impact the valuation of new ventures. In addition to these two factors, other academic researchers have demonstrated that additional factors have a significant impact on new venture success:

- Market growth rate: MacMillan et al. (1986); W. Gartner et al. (1999); Song et al. (2008)
- Industry structure: Sandberg & Hofer (1987); Miloud et al. (2012)
- Competition intensity: Roure & Keeley (1990); Zahra & Bogner (2000)
- Technology Infrastructure: Martinez & Krauss (2015)

While I have discussed the extensive literature that is related to success factors for new ventures, I have not covered the research on the factors that can lead to the failure of startups, since the academic literature in this area is limited to non-existent. One potential explanation is that most authors believe that if any or some of the factors of success they have outlined are not met, this implicitly means that the new

venture may not succeed. A recent study published in Harvard Business Review (Onyemah, Pesquera, & Ali, 2013) highlights the key mistakes that entrepreneurs often make, which may lead to the demise of their startups. Another interesting study looked at the different perspectives between VC firms and founders on what leads new ventures to fail (A. L. Zacharakis, Meyer, & DeCastro, 1999). The authors found that the perceptions of the entrepreneur regarding the factors of failure were quite different than the perceptions of VC firms. While my research study will try to incorporate failed new ventures as part of the research design in order to determine whether the lack of a success factor is truly leading to failures, it is important to note that there is a survivorship bias in the data for new ventures. Therefore, this will be a limitation which can be addressed in subsequent research studies.

Chapter 3: Research Hypotheses and Model

This chapter elaborates on the theoretical framework for the empirical model and presents the different hypotheses that I plan to test.

3.1 Definition of Success in Research Study

Before I present the theoretical framework for the empirical model, I first define the concept of success for Fintech startups in financial inclusion that I use in my research study. Success is a vague term, which is hard to define and can take many different meanings. Although some authors have developed subjective assessments of success, such as likelihood of success (A. Zacharakis & Shepherd, 2005; Chrisman et al., 1998), employee satisfaction (R. Stuart & Abetti, 1987), or likelihood of VC investment (Hall & Hofer, 1993), **many academic researchers in entrepreneurship have equated success to a new venture's performance, and have used a wide variety of objective measures to quantify it**. The advantage of objective measures is that they are easily identifiable and leave less room for misinterpretation. Predominantly, the academic literature has measured new venture performance, and hence success, by looking at financial, return and growth measures. However, survival has also been viewed as a measure of success for technology startups by some academic papers (W. Gartner et al., 1999). Other authors (Cooper, 1993) argue that using survival as a measure of success is misleading, since a firm may be able to marginally survive, but without delivering any performance. Given that there are numerous performance measures that have been used to equate to success, it is difficult to determine which one may be the most effective. To

overcome the deficiency in relying in just one performance measure, many authors have used a combination of different measures in their models. For instance, Kakati (2003) used 7 performance measures in their analysis: 5 financial measures and 2 return measures. My research study will follow the approach of a combination of different factors in measuring the success of Fintech startups.

As discussed in the Literature Review chapter, I view Fintech startups that are serving the unbanked and underbanked as enterprises founded by social entrepreneurs which have a dual objective: (1) Financial Performance and (2) Social Impact. Specifically, I follow the definition of social entrepreneurs developed by Abu-Saifan (2012): "The social entrepreneur is a mission-driven individual who uses a set of entrepreneurial behaviors to deliver a social value to the less privileged, all through an entrepreneurially oriented entity that is financially independent, self-sufficient, or sustainable" (p. 25). ***Hence, I propose that the Fintech startups in my research study are for-profit new ventures that have a mission-driven strategy to provide social impact/value by driving higher financial inclusion to the poor, marginalized and underbanked***. Please refer to the Data Collection area of the Research Methodology chapter for more details on the different ways that the new technology ventures in my research study are considered social enterprises.

Based on the definition above, the success of Fintech startups in my research study is measured by using two key criteria:

(A) Financial Performance = the following objective metrics have been studied in prior academic research:

- Revenue

- Growth – both revenue and transaction growth
- Profitability – gross margin and cost measures such as burn rate
- Valuation and Funding – post-money valuation and funding from VCs and other sources

(B) Social Impact = the main measure of social impact that I will study is financial inclusion.

I define financial inclusion in my research study by using three key factors: (1) providing **access** to financial services and products through digital methods to all people irrespective of their economic status; (2) products / services which are **affordable** and convenient to all, and (3) are **actively** used by customers. My research study measures these 3 factors; however, I select active usage as the main way to measure financial inclusion. The Research Methodology chapter will expand on the reasons for selecting active usage and how I operationalize it in my empirical model.

Assuming specific values for the two criteria above to represent "success" can be challenging, since I am studying Fintech startups in many different sub-segments of the market which are at different stages of development; thus, there will be significant variation in the results and difficult to determine one value that represents success. To address this issue, success will be measured on a relative basis in my research study. Specifically, I will evaluate the startups' success based on their financial performance and social impact/value, and then rank the startups so that those companies that demonstrate the highest financial performance and highest

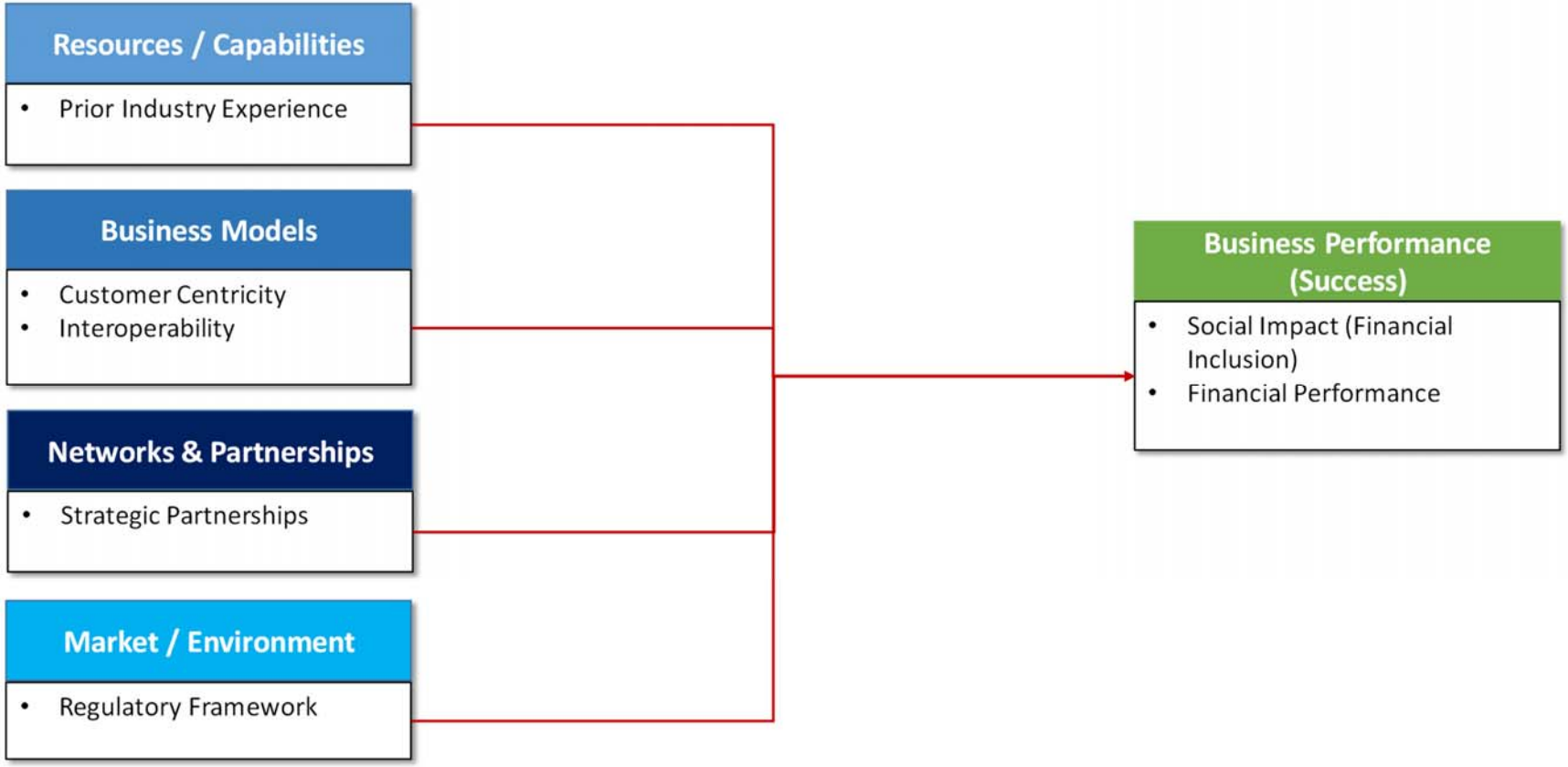
financial inclusion figures will be considered to be more successful than the ones with lower values.

3.2 Theoretical Framework

Figure 1 presents the theoretical model based on a multi-level framework consisting of four main categories: (1) Resources/Capabilities, (2) Business Models, (3) Networks & Partnerships, and (4) Market/Environment. Within each category, I define the most important factors that I consider will drive higher financial performance and higher financial inclusion. I draw on three key strategy management theories to support my model: RBV theory, Social Capital and Network theory and Industry Organization Economics theory. This approach is similar to the research study from Miloud et al. (2012), where the authors show how these theories look at firm performance from different perspectives. In this case, I also focus on the different characteristics of a startup's business model to execute its strategy, which is central to strategic management, and investigate how these characteristics directly impact the company's performance.

In the following pages, I will draw from these theories to review the main factors on each category and hypothesize how they impact financial performance and financial inclusion for new technology ventures.

Figure 1. Theoretical Model of Key Factors that Impact Financial Performance and Financial Inclusion in New Fintech Ventures



3.3 Hypotheses

Resources / Capabilities

The characteristics of the founder and founding team have been extensively studied by entrepreneurship researchers, and many have found that these characteristics play an essential role in the success of new technology ventures. In my research study, I focus on prior industry experience of the founder / founding team as a key factor that new technology ventures need in order to drive higher financial performance and higher financial inclusion.

Having prior industry experience and expertise is important for the success of new technology ventures in the financial services sector. In my research study, I define prior industry experience as having prior work experience in the financial services sector. Given the complexities and the highly-regulated nature of the financial services industry, it is essential for the founding team to have an in-depth knowledge of the industry so that they can effectively develop new products/services that meets the customers' needs and fill the gap that is currently not covered by existing financial institutions, as well as able to more easily navigate through the intricacies of the regulatory process. Therefore, I expect that these prior work experiences should help drive higher financial inclusion and higher financial performance. Support from prior academic research (Miloud et al., 2012) shows that a new venture is valued higher if its founder has prior industry experience before founding the new venture. From a VC perspective, a key criterion that they look at when evaluating funding decisions is the entrepreneur's experience, which is a

combination of industry, technical and startup experience. This experience is important since it provides a "track record", and gives comfort to the VC firm that the founding team has proven experience and a good understanding of the sector. Based on these arguments, I propose two hypotheses linked to prior financial services industry experience:

> ***H1a: A new technology venture will have higher financial inclusion if its founder / founding team have prior financial services industry experience.***
>
> ***H1b: A new technology venture will have higher financial performance if its founder / founding team have prior financial services industry experience.***

Business Models

The academic literature on entrepreneurship has evaluated a wide variety of business models and strategies and their impact on the success of new ventures. Sandberg & Hofer (1987) were one of the first to develop a model for new venture success which used Strategy as a main factor. The authors argued that the performance of startups is a function of the Entrepreneur, Industry Structure and their Business Strategy. Regarding business strategy, the authors applied Porter's (2008) classification schemes of strategy as it relates to his Five Forces Model, and Abell's (1980) classification of business strategy into focused, differentiated and undifferentiated, to describe the strategic framework used by new ventures. The results of their study showed that the interactive effect of strategy, the entrepreneur and industry structure had a greater impact on new venture performance than any of

the variables independently. Zahra & Bogner (2000) also consider strategy as a key success factor for new ventures. The authors evaluated the technology strategy of new ventures and demonstrated that a technology strategy with radical new products and intensive product upgrades has a significant effect on startup success, especially when moderated by the environment. Ultimately, to develop a sustainable competitive advantage, it is essential to implement a business strategy that allows the company to leverage its resources/capabilities. In this research study, I focus on the operationalization of the Fintech startups' strategies by looking at different characteristics of their business models and how they impact the new venture's financial performance and social impact.

Customer centricity and interoperability are two key characteristics of a startup's business model that I suggest are main predictors of financial performance and financial inclusion for new technology ventures which are serving the unbanked and underbanked. Below I address each one in more detail.

Customer Centricity

Providing access to affordable financial services and products to the unbanked and underbanked is the first step towards achieving financial inclusion. However, equally as important, is making sure that customers actively use these products and services. Conde, Bykere, Cheston, & Rhyne (2016) discuss the challenges that Fintech startups face with customers at the BoP, such as high levels of account dormancy (more than 67%), customer dropouts and limited service usage. Customers have negative experiences because in many cases they do not understand the products/services that are being offered to them, do not see the value that the

products/services provide and/or the products/services do not really meet their needs. In addition, Demirguc-Kunt & Klapper (2012) cite in the World Bank Findex report that unbanked consumers have an inherent lack of trust in financial institutions, which is a major reason to avoid their usage. Adopting a customer-centric business model is the main solution to solve these issues. Customer centricity is a business model that companies follow where the customer experience is its main product. Burritt & Coetzee (2014) describe customer centricity in the following manner: "At the center of customer centricity is the customer experience, and a fundamental value proposition or solution that solves a customer problem" (p. 1). The concept of customer centricity is not new; it has been discussed for more than 50 years, and numerous marketing academic papers have attempted to define the construct and operational antecedents (Lamberti, 2013); how it positively impacts financial performance (Kumar & Petersen, 2005; Lenskold, 2004) and the challenges of implementing customer centricity in an organization (Gummesson, 2008; Shah, Rust, Parasuraman, Staelin, & Day, 2006). Large corporations such as Southwest Airlines, Procter & Gamble, Jet Blue and many others have adopted "customer first" strategies which have resulted in higher growth and profitability; however, the concept is now being applied to new technology ventures. Widely used in many different sectors, customer-centricity becomes an essential business model in financial inclusion, since the behavior of BOP customers is unique and quite different from other customers at higher levels of the financial pyramid. Specifically, BoP customers have informal, irregular incomes, tend to spend a relatively high proportion of their income on basic needs, and their financial needs differ by life stage and/or gender. Kilara & Rhyne

(2014) provide guidelines for financial institutions on the main building blocks required to successfully implement a customer-centric business model. Specifically, the building blocks include: conducting detailed market research on customer behaviors; reorienting the company's operations and culture around customers; and shifting towards measuring total customer profitability.

By adopting a customer-centric business model, Fintech startups gain an in-depth understanding of the unbanked and underbanked customers and design products/services that solves their problems, meets their needs and delivers value above and beyond the existing products/services they used. Offering the right products builds customer loyalty and trust, which leads to higher active usage of financial products and thereby increasing financial inclusion, driving higher customer growth. Moreover, as mentioned above from the marketing academic literature, by having a customer-centric focus, Fintech new ventures can develop more value-added products for customers which ultimately drive higher financial performance through higher revenue and/or lower customer acquisition costs. Therefore, I propose two hypotheses linked to customer centricity:

> ***H2a: Financial inclusion, as measured by active customers, of new technology ventures is positively related to the degree of customer-centricity in the new venture's business model.***
>
> ***H2b: The financial performance of new technology ventures is positively related to the degree of customer-centricity in the new venture's business model.***

Interoperability

Interoperability refers to the ability of different systems to be interconnected, so that all participants are able to operate across all systems. Fintech startups that adopt an interoperable business model can potentially lead to higher financial inclusion and profitability since it introduces economies of scale and scope, creates network effects, and allows customers to more easily perform desired transactions (Arebehety, Chen, Cook, & McKay, 2016).

To expand on the benefits of interoperability, by having a business model where the startup establishes interconnections with other companies in the value chain, it allows customers to use the startup's product/service across different operators and competitors, making it easier to use and potentially cheaper from a transaction perspective. More importantly, it can also lead to positive network externalities for all. Adopting an interoperable business model means that the Fintech startup may partner with its competitors and different aspects of the value chain, and together they can realize the mutual benefits they can achieve by reaching out to more customers, crystallizing higher financial performance and driving higher financial inclusion. According to Bourreau & Valletti (2015), three different interoperable business models can be implemented by Fintech startups in financial inclusion:

(1) Agent-level interoperability – in this business model, interconnections happen at the agent level. Specifically, customers of one mobile money provider are able to use the agent network of another mobile money provider for cash-in/cash-out services. This business model is the most common for interoperability, since it is easiest one to adopt.

(2) Mobile network level interoperability – here, the Fintech startup providing the product/service has established interconnections with all of the different mobile network operators (MNOs), so that the customer can access their mobile money account through any SIM card / MNO. This business model is more complex than the agent-level model, since it requires connections and negotiated agreements with all of the different MNOs.

(3) Platform level interoperability – in this business model, interconnections are established between mobile money platforms. Specifically, a customer with an account from one Fintech startup offering mobile money can send or receive money to another customer which may have a different mobile money platform. This model is the most difficult and complex to achieve.

Overall, by adopting an interoperable business model, it can result in higher network effects and thus lead to increased access to more customers, resulting in higher financial inclusion. In addition, an interoperable business model can lead to economies of scope and scale, which will enhance financial performance. Therefore, I propose two hypotheses linked to interoperability:

H3a: There is a positive relationship between new technology ventures that adopt an interoperable business model and financial inclusion; namely, new ventures with an interoperable business model will have higher financial inclusion.

H3b: There is a positive relationship between new technology ventures that adopt an interoperable business model and their financial performance;

namely, new ventures with an interoperable business model will have higher financial performance.

Networks & Strategic Partnerships

Prior research has evaluated and distinguished between different types of networks that the entrepreneur may have. For instance, Ostgaard & Birley (1996) studied the effects of social networks, which are made up of family and friends, and professional networks, which consists of business acquaintances and other professional services, on new venture performance. In my research study, I will focus on professional networks, and in particular, the strategic partnerships that the Fintech new ventures have developed.

Strategic partnerships are defined as alliances, both formal and informal, that the new technology ventures have set up with other enterprises which are typically larger and more established corporations. The alliances could be with suppliers, customers and other firms with complementary resources. Moreover, these alliances are viewed as strategic because they can potentially influence the startup's financial performance. Strategic alliances can lead to higher new venture performance by assisting startups in the following manner:

- Sharing of information and knowledge
- Providing essential resources – such as managerial, technical and financial
- Providing enhanced legitimacy

As discussed in the Literature Review chapter, numerous academic papers have demonstrated that the size of the network and the number of alliance partners play an

important role in new venture performance and valuation (Deeds & Hill, 1996; Miloud et al., 2012; Zheng et al., 2010).

In the financial inclusion sector, I argue that strategic partnerships are essential for the success of Fintech startups. George et al. (2012) discuss the importance of collaboration between startups and large corporations in social entrepreneurship. The authors highlight the paradox of size and scale: the social entrepreneur typically will have the innovativeness and motivation to work in the financial inclusion area, but will have limited resources. On the other hand, the banks do not have the innovativeness or the motivation to go after the unbanked and underbanked, but they are flush with resources. Therefore, setting up strategic alliances between the banks and Fintech startups will be able to connect both sides together and create synergies to drive more customers, serve the unbanked and underbanked more efficiently, and ultimately increase financial performance.

Similarly, strategic partnerships between Fintech startups and MNOs are also helpful, since it opens the access to the MNOs' massive and highly valued distribution networks. More recently, strategic partnerships with E-commerce companies have also emerged, since these alliances provide access to more customers through a new distribution channel. Realini (2015) echoes these points in her book, *Financial Inclusion at the Bottom of the Pyramid*, and reaffirms that in order to succeed in driving higher financial inclusion, collaboration among the different players and stakeholders is needed. According to Ms. Realini: "What we are witnessing today is a new synergy among industries that used to operate in their own silos: banks, phone companies, credit bureaus, NGOs, retailers, online players, and

governments. These sectors are working together to re-write the rules of engagement in ways that generate profits for them…while creating opportunity for billions of people who could not previously afford the price of admission to the financial game." (p. 218)

Based on these arguments, I propose two hypotheses linked to strategic partnerships:

> ***H4a: The number of the strategic partnerships (with Financial Institutions, MNOs and E-Commerce companies) is positively related to financial inclusion of new technology ventures serving the unbanked and underbanked.***
>
> ***H4b: The number of the strategic partnerships (with Financial Institutions, MNOs and E-Commerce companies) is positively related to the financial performance of new technology ventures serving the unbanked and underbanked.***

Market / Environment

The market / environment is the second most widely studied area in entrepreneurship research after the founder / venture team characteristics, as it relates to the success of new ventures. Industrial organization economics provides the theoretical framework to support these studies. As highlighted in the previous section, many market/environment factors have been analyzed to show their effect on new venture performance. While I agree that there are numerous market/environment factors that could have an impact on new venture success, I argue that there is one key factor that has a significant influence on the success of Fintech startups in

financial inclusion: Regulatory Framework of a country. Below I describe it in more detail.

The regulatory framework refers to the rules and regulations that have been established by country's government for a particular industry sector. Rules and regulations consists of requirements that a government may impose on corporations and individuals to achieve the government's purposes, which may include: protection from unfair competition and fraud and provision of better and cheaper services (Library of Economics and Liberty; http://www.econlib.org/library/Enc/Regulation.html). In the financial services industry, the regulatory framework is designed to provide consumer protection and also help regulate and identify fraudulent activities. However, over the last 50 years, it has become highly complex, extensive, and in some cases, highly restrictive. It is important to note that the financial regulatory framework varies based on the country; there are countries that have more restrictive frameworks in place, while others are more open and/or less regulated. D. K. C. Lee & Teo (2015) recognize that the regulatory framework is a key characteristic that drives the success of Fintech companies in financial inclusion. In fact, it represents one of the 5 characteristics of their LASIC principle, which they label as "Ease of Compliance". The authors explain that Fintech companies which operate in countries that are not highly regulated will tend to be more innovative and have lower capital requirements. In essence, by operating in a lightly regulated environment, these companies do not have to spend as much resources on compliance activities. The authors are not advocating for having no regulations, since they view the regulatory framework in the financial

industry as essential to provide financial stability, consumer protection and allow the financial markets to function properly; however, the authors argue that a regulatory framework that is too restrictive can negatively impact the success of Fintech companies that are focused on serving the unbanked and underbanked. Realini (2015) echoes this concern, and believes that the level of regulations in the financial services industry will impact financial inclusion: "Government regulations can either propel an effort forward or hold it back. If the regulators get the rules governing financial services right, there will be a tsunami of new services in the area, and the best ones will be adopted and scale" (p. 211).

As Donovan (2012) points out, mobile digital financial services, which represents the best solution to drive higher financial inclusion, faces regulation from both the finance and telecommunications industries. The author believes that regulations should encourage financial inclusion, while at the same time minimize fraud and risk; in order to achieve this, the regulations should be incremental and proportional, and the regulators should collaborate with the Fintech startups and industry players. In their 2015 Annual Letter, the Bill & Melinda Gates Foundation discuss that innovations and startups are essential in pursuing digital financial inclusion, but regulation is one of the major barriers to achieve this objective. A perfect example of the role that regulations play in financial inclusion is M-PESA, a Kenya-based Fintech startup which offers a mobile wallet and mobile money transfers in Africa. The company has become one of the most successful Fintech startups in financial inclusion, and its success can be partially attributed to an open

regulatory body (Central Bank of Kenya), which worked together with the company and allowed it to scale up and grow quickly without imposing restrictions.

Financial inclusion is a key priority and enabler to meeting the United Nations' Sustainable Development Goals (SDG). In particular, the first SDG – ending extreme poverty – is highly dependent on providing access to financial services to the BoP. Given the high priority to achieve financial inclusion in emerging markets, governments and policymakers in many countries are working to update the regulatory framework to be more open and encouraging in driving higher financial inclusion. Therefore, a having supportive regulatory framework will lead to higher usage of mobile financial services for the unbanked and underbanked, resulting in higher financial inclusion and ultimately higher financial performance. Based on the arguments presented above, I propose the following two hypotheses linked to the regulatory framework:

> ***H5a: An enabling and open regulatory framework that encourages financial inclusion is positively related to higher financial inclusion of new technology ventures serving the unbanked and underbanked.***
>
> ***H5b: An enabling and open regulatory framework that encourages financial inclusion is positively related to the financial performance of new technology ventures serving the unbanked and underbanked.***

Chapter 4: Research Methodology

The main objective of this research study is to develop an empirical model that evaluates the main factors that impact the success of Fintech startups in financial inclusion. Therefore, a quantitative research approach will be the primary method used to develop the empirical model. The quantitative approach will be complemented by illustrative case studies to highlight and discuss the impact of the different factors on the success of these startups.

This chapter discusses the research methodology that I followed, and is divided into three parts:

A. Data Sample Selection and Data Collection Methods
B. Measurements
C. Analytical Methods

4.1 Data Sample Selection and Data Collection Methods

4.1.1 Data Sample

The following criteria were used to select the new technology ventures, or Fintech startups, to include in my model:

- New technology ventures that are either serving the unbanked and/or underbanked as their main customers in emerging markets. If the company is mainly serving banked customers, then it was not considered to be part of the research study

- Similar to the first criteria, technology ventures that are considered to be social enterprises, given that they are serving individuals that never had access to formal financial products/services before, and/or have a social mission or goal
- Fintech startups based and/or doing business in Africa, South Asia (India and Bangladesh) and Southeast Asia (countries in the ASEAN region such as Singapore, Indonesia, Malaysia, Myanmar, Philippines, Cambodia, Laos, Vietnam, and Thailand). These regions were selected since they have the largest concentration of unbanked and underbanked populations in the world
- Technology ventures that were founded in 2004 or later. Based on Song, Podoynitsyna, Van Der Bij, & Halman, (2008) meta-analysis of empirical studies of success factors of new technology ventures, the authors found that most studies set the maximum age for new technology ventures at 15 years, which is in line with the criteria that I have selected
- Fintech startups that are participating in one or all of the different sub-segments of the financial services sector. Specifically, I am interested in startups that cover the credit scoring / data analytics, crowdfunding, payments, money transfer (remittances), lending, savings and insurance sub-segments

I used various sources such as Internet searches on financial inclusion, meetings with industry experts and development organizations (World Bank, Omidyar Network, Gates Foundation), as well as meetings with VC firms which have

invested in financial inclusion and digital financial services, to identify the different Fintech startups that met the criteria defined above. Some of the VC firms that I met include Quona Capital, Village Capital, Aspada Investments, Leapfrog Ventures, Golden Gate Ventures and 500 Startups. Based on these sources and the criteria above, I was able to identify 172 Fintech startups in financial inclusion. Table 1 provides a summary breakdown of the Fintech startups that I have identified by region, customer segment, product segment and year founded. Please note that this list is not exhaustive, and there may be more startups that I was not able to identify, as well as new ones that may have been founded since the time I started the research study. However, based on the comprehensive analysis of Fintech startups in financial inclusion, this list covers more than 85% of the startups in these regions and meet the criteria that I defined.

The goal was to include as many startups as possible from this list into my research study. After spending more than 2 months contacting Fintech startups, I was able to meet in person and/or speak on the phone with 105 startups, or approximately 60% of the total list of 172 companies. Out of the 105 Fintech startups that I spoke to, 63 startups agreed to participate in my research study, which is about 37% of the total startups identified. Table 2 provides a summary breakdown of the Fintech startups that have agreed to participate in my research study by region, sub-segment of the market, type of customer, access method of product/service and year founded. Out of the 63 Fintech startups that participated in my study, approximately half of them are in Southeast Asia, and more than 80% of all of the startups are in the payments, money transfer (remittance) and lending (includes P2P lending) sub-

segments of the financial services sector. Specifically, about 40% of the startups are in the lending sub-segment, which follows very closely to the overall universe of startups that I had identified. In addition, more than 80% of the startups are fairly young in their development stage, since they have been founded on or after 2012. The mobile phone remains the main way for customers to access the financial products/services that these startups offer; Table 2 shows that more than 85% of the way these products/services are accessed is through a mobile phone (feature/SMS phone and smartphone). The data sample also shows that approximately 35% of the startups offer their financial products/services through all modes, making it easier for customers to access. Finally, smartphone adoption continues to increase at a fast pace, with more than 35% of the startups offering their financial products/services only through a smartphone (and/or combination with Internet).

The universe of Fintech startups in emerging markets is sizeable; although there is no official estimate of the number of new technology ventures in the financial services sector, based on the number of startups that received VC funding within the last year, it is estimated that there are more than 2,000 ventures in this sector, and the number is continuously growing. ***However, it is important to highlight that the universe of Fintech startups for my research study is curated to only those technology ventures that meet the criteria defined above***. As mentioned in the Literature Review chapter, I consider these startups as social enterprises since they are serving the unbanked and underbanked – offering financial products and services to customers which did not have access to them before at an affordable price.

Ultimately, these startups are helping solve the financial inclusion problem in emerging markets.

To gain comfort that the startups in my research study are truly social enterprises, Table 3 provides a summary of the data sample based on three key characteristics to support my claim: (1) The startup solves a problem specifically for the poor or underbanked in an affordable way; (2) The startup has a clear social mission/objective; and (3) The product/service offered by the startup helps improve the economic livelihood of their customers. These characteristics were determined through interviews with the Fintech startup founders / founding team, as well as reviewing secondary data from case studies, news articles and paid subscription databases (where available). **However, these characteristics were not verified with actual customers, which represents a limitation in my study (please refer to Chapter 8 for a detailed discussion of limitations/weaknesses of the research study)**. All of the startups in my data sample are achieving a social good, while at the same time they are for-profit ventures, and thus meeting the definition of a social enterprise as proposed by Seelos & Mair, (2005) and Abu-Saifan, (2012), where these ventures have a dual goal of creating social and economic value. Based on the data presented in Table 3, we can observe that most startups in the data sample (except for one) have one or more of the three characteristics defined above, and approximately 95% of all of the startups in the sample meet all three of the characteristics.

Table 1. Distribution of Fintech Startups Identified for PhD Research Study

		Sample	%
By Region	Africa	41	23.8%
	South Asia (India, Bangladesh)	51	29.7%
	Southeast Asia	80	46.5%
	Total	**172**	**100.0%**
By Sub-Segment	Credit Scoring	19	11.1%
	Insurance	4	2.3%
	Lending	25	14.5%
	Money Transfer	31	18.0%
	P2P Lending	47	27.3%
	Payments	38	22.1%
	Other	8	4.7%
	Total	**172**	**100.0%**
By Customer Type	B2B	104	60.5%
	B2C	68	39.5%
	Total	**172**	**100.0%**
By Year Founded	2004	6	3.5%
	2005	2	1.2%
	2006	1	0.6%
	2007	5	2.9%
	2008	3	1.7%
	2009	10	5.8%
	2010	12	7.0%
	2011	11	6.4%
	2012	14	8.1%
	2013	9	5.2%
	2014	36	20.9%
	2015	44	25.6%
	2016	19	11.1%
	Total	**172**	**100.0%**

Notes: Other product segment refers to Core Banking Solutions, Savings and Data Analytics. B2B refers to companies serving other businesses; B2C refers to companies serving end users.

Table 2. Distribution of Fintech Startups Participating in my PhD Research Study

		Sample	%
By Region	Africa	13	20.6%
	South Asia (India, Bangladesh)	16	25.4%
	Southeast Asia	34	54.0%
	Total	**63**	**100.0%**
By Sub-Segment	Credit Scoring	5	7.9%
	Insurance	2	3.2%
	Lending	11	17.5%
	Money Transfer	14	22.2%
	P2P Lending	16	25.4%
	Payments	10	15.9%
	Other	5	7.9%
	Total	**63**	**100.0%**
By Customer Type	B2B	46	73.0%
	B2C	17	27.0%
	Total	**63**	**100.0%**
By Access Mode[1]	Feature/SMS phone	9	14.3%
	Smartphone	14	22.2%
	Internet	9	14.3%
	Smartphone, Internet	9	14.3%
	All modes	22	34.9%
	Total	**63**	**100.0%**
By Year Founded	2004	1	1.6%
	2005	0	0.0%
	2006	0	0.0%
	2007	1	1.6%
	2008	2	3.2%
	2009	2	3.2%
	2010	1	1.6%
	2011	3	4.8%
	2012	4	6.4%
	2013	7	11.1%
	2014	6	9.5%
	2015	18	28.6%
	2016	16	25.4%
	2017	2	3.2%
	Total	**63**	**100.0%**

Notes: Other product segment refers to Core Banking Solutions, Savings and Data Analytics. B2B refers to companies serving other businesses; B2C refers to companies serving end users.

[1] Access mode refers to the way customers access the financial product/service. The main options are: Feature/SMS mobile phone, Smartphone, Internet or All of the options.

Table 3. Distribution of Fintech Startups in Research Study – Key Characteristics of a Social Enterprise

ID#	SOLVES A PROBLEM FOR THE POOR OR UNDERBANKED IN AN AFFORDABLE WAY	SOCIAL MISSION/OBJECTIVE	HELPS IMPROVE ECONOMIC LIVELIHOOD OF CUSTOMERS
1	✓	✓	✓
2	✓	✓	✓
3	✓	✓	✓
4	✓	✓	✓
5	✓	✓	✓
6	✓	✓	✓
7	✓	✓	✓
8	✓	✓	✓
9	✓		✓
10	✓	✓	✓
11	✓	✓	✓
12	✓	✓	✓
13	✓	✓	✓
14	✓	✓	✓
15	✓	✓	✓
16	✓	✓	✓
17	✓	✓	✓
18	✓	✓	✓
19	✓	✓	✓
20	✓	✓	✓
21	✓	✓	✓
22	✓		✓
23	✓	✓	✓
24	✓	✓	✓
25	✓	✓	✓
26	✓	✓	✓
27	✓		✓
28	✓		✓
29	✓	✓	✓
30	✓	✓	✓
31	✓	✓	✓
32			✓
33	✓	✓	✓
34	✓	✓	✓
35	✓	✓	✓
36			
37		✓	✓
38	✓	✓	✓
39	✓	✓	✓
40	✓	✓	✓

Table 3. Distribution of Fintech Startups in Research Study – Key Characteristics of a Social Enterprise (cont'd)

ID#	SOLVES A PROBLEM FOR THE POOR OR UNDERBANKED IN AN AFFORDABLE WAY	SOCIAL MISSION/OBJECTIVE	HELPS IMPROVE ECONOMIC LIVELIHOOD OF CUSTOMERS
41	✓		
42	✓	✓	✓
43	✓	✓	✓
44	✓	✓	✓
45	✓	✓	
46	✓	✓	✓
47	✓	✓	✓
48	✓	✓	✓
49	✓		✓
50	✓	✓	✓
51	✓		✓
52	✓	✓	✓
53	✓	✓	✓
54	✓	✓	✓
55	✓	✓	✓
56	✓		✓
57	✓	✓	✓
58	✓	✓	✓
59	✓		✓
60	✓		✓
61	✓	✓	
62	✓	✓	✓
63	✓	✓	✓

4.1.2 Data Collection Methods

The primary data collection method has been interviews with Fintech new venture founders. In the event that the venture founders were not available to do the interviews, data was collected by sending a survey electronically to each company and they were asked to fill it out and return it via email. More than 80% of the data was collected through interviews with the company founders. The questions in the survey were the same ones used in the interviews. To create the survey/interview questions, I conducted personal interviews with CEOs of different Fintech startups, partners at VC firms, and also carefully examined the entrepreneurship literature. Once the questions were drafted, I conducted pretest interviews with several VC firms and CEOs of Fintech startups to identify any problems with question wording, length of survey and questionnaire layout.

The interview / survey consisted of 117 questions, and mainly collected objective data from the different Fintech startups, such as information related to the founders, main resources/capabilities, the companies' business models, as well as operational and financial metrics. The questions in the interview and survey were designed to collect information in the form of ranges, instead of actual figures; this way, the founders felt more comfortable in sharing potentially sensitive and confidential information. Due to this design, a lot of the answers used in the empirical model are midpoint estimates based on the ranges supplied. In some cases, multiple questions in the survey were used to measure certain factors, such as customer centricity. Thus, 117 different data points were collected from each Fintech startup that participated in the research study, or a total of approximately 7,370 data

points. Please refer to Appendix 1 for the list of interview / survey questions that I used in this research study. Even though I collected a lot of information from the different Fintech startups, only a partial amount of the data was used to conduct the research study. Therefore, more information is available to do a follow-up study which may examine additional factors. The interview / survey data was entered by a research assistant into an Access database, and checked by me to make sure it was properly entered. The information was then downloaded to Excel and E-Views to analyze it.

To check the validity and reliability of the data provided by the Fintech founders, secondary data sources such as paid/subscription databases, news articles and published case studies were used. Specifically, online databases such as Crunchbase and Funderbeam were used wherever possible. If there was a discrepancy compared to what the Fintech startup founder provided, then I approached the company to understand the differences and figure out which one was correct.

Since most of the data provided by startups is confidential in nature, the research study has been conducted anonymously - no names of startups have been displayed in the results, and all data presented is at an aggregate basis (i.e., by region, country, product segment, customer segment) so that the identity of the startups will not be revealed. Given the confidential nature of the information, NDAs were executed with about 20% of the startups which felt necessary to do so to protect their information. However, the results of my research study will be supported by illustrative case studies of different Fintech startups which have agreed

to do so to corroborate the empirical results as well as highlight new insights not captured in the quantitative analysis.

4.2 Measurements

The proposed model outlined in the Research Hypotheses and Model chapter identifies different factors that impact the financial performance and financial inclusion of Fintech startups serving the unbanked and underbanked. To operationalize the different factors, I follow the methods used in prior academic research, third party sources in financial inclusion as well as methods that I have developed to take into account potential constraints on the availability of the data. Given the dynamic nature of the data (i.e., the Fintech startups are running their businesses as we speak, and thus the numbers are continuously changing), all of the information collected from the Fintech startups is as of August 2017, when I finalized the data collection process.

4.2.1 Dependent Variables

Success is defined in terms of the business performance of the Fintech startup, and two key measurements are used: (1) Financial performance and (2) Social impact. Please refer to the previous chapter (Research Hypotheses and Model), which provides more details on how I define success in this research study. To be successful, the Fintech startup needs to achieve the highest relative value for these two measures within the startups that are being evaluated. Given that it is a relative measure of success, we can mainly say that the startups with the highest values have a

higher potential to succeed than those that have lower values of financial performance and social impact within the sample of startups that participated in the study.

The financial performance of the Fintech startup can be measured by using 4 types of dimensions, which have been commonly studied in entrepreneurship research:

- Absolute and Growth measures: Revenue and revenue growth; transaction growth (Stuart & Abetti, 1987; C. Lee, Lee, & Pennings, 2001; Ostgaard & Birley, 1996)
- Cost and Profitability measures: Burn Rate and Gross Margin (Roure & Maidique, 1986; Dubini, 1989; Kakati, 2003)
- Valuation measures: Post-Money Valuation (Miloud et al., 2012)
- VC funding measures: Amount of VC funding raised (Adcroft et al., 2007; Groenewegen & de Langen, 2012)

I selected Annual Revenue as the main Financial Performance measure for my research study, since this information is readily available from all companies. Annual Revenue refers to the latest annual revenue figure available from the Fintech startup. In case the company has been operating for less than 1 year, an annual run-rate revenue is used. Since most startups may not have, or have negative, profitability, gross profit was not selected. Growth measures for revenue and other financial variables were also not selected since the growth patterns for startups tend to follow an asymptotic path. Specifically, startups will have extremely high growth rates in the early stages of development, and as the startup matures, the growth rate declines

to more normal levels. The negative relationship between growth and the startup's development stage makes it hard to interpret the results, so growth measures were not used. Post-Money Valuation could also be another financial performance measure to use, however, I did not select it since the numbers tend to be subjective and lacking accuracy at the early stages of a startup's development.

Financial inclusion represents the main measure of Social Impact that I evaluate in my research study. To operationalize financial inclusion, I selected Total Active Customers, which refers to the total number of unique customers that are actively using the startups' products or services. Active usage refers to performing at least one transaction using the startup's product/service within a 90-day period. Most development organizations, such as the World Bank, Accion and GSMA use this time frame as the standard way to measure active users. ***Active Customers is an important figure to track financial inclusion since there are many instances of users that are registered for digital financial services and products, but never use their accounts, or are dormant for a long period of time***. According to GSMA, as of 2015 more than two-thirds of mobile money accounts that have been registered worldwide are inactive – this represents an active ratio of 32.6% (*2015 State of the Industry Report on Mobile Money*, 2015). Financial inclusion is not just about providing access to affordable financial products or services to the unbanked and underbanked, but also making sure that these products/services are actually used by individuals.

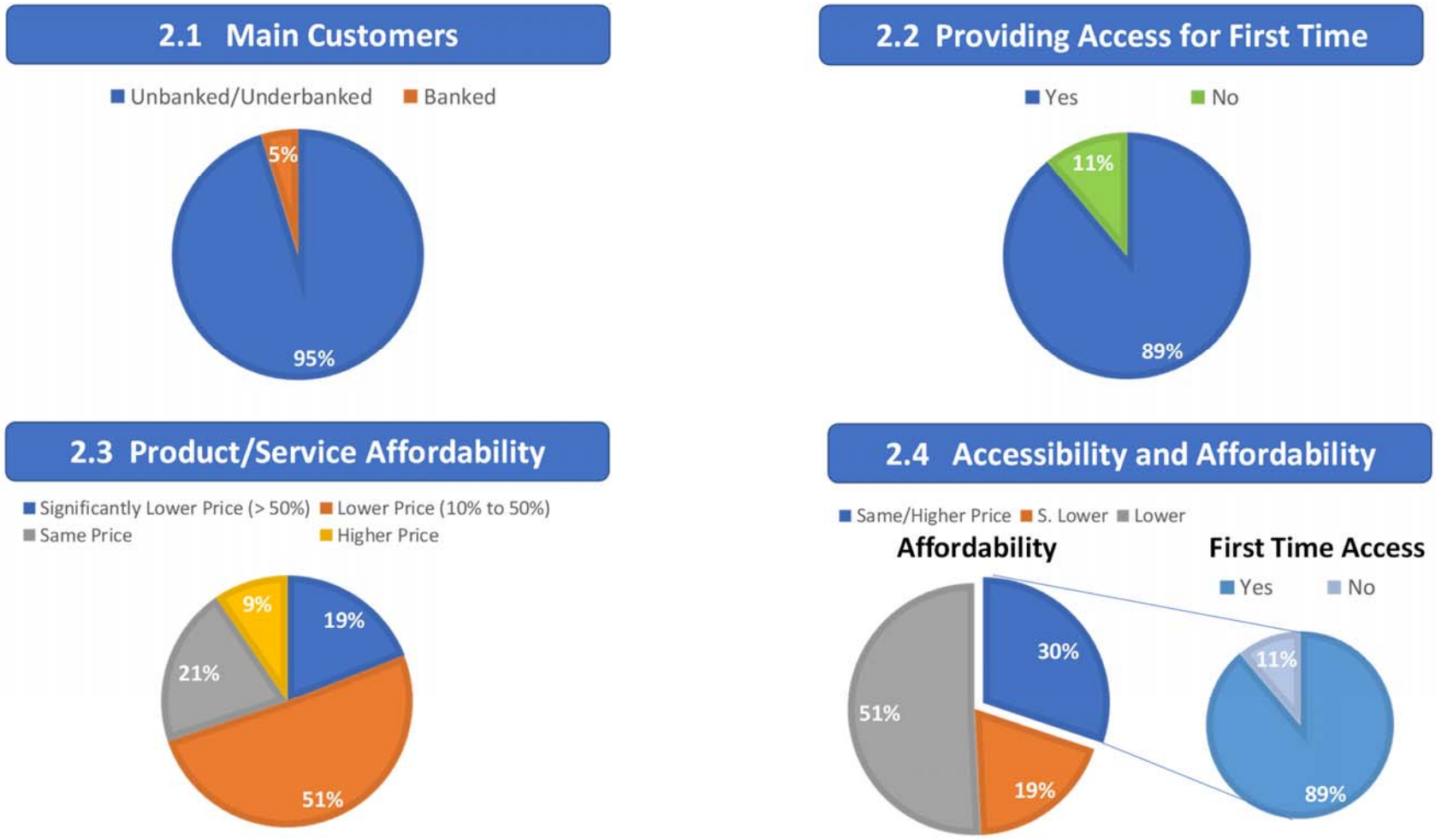
As discussed in the Literature Review chapter, I define financial inclusion as a multi-dimensional concept consisting of three main characteristics: ease of access, affordability to all, and active usage of financial products and services by all members

of society. Although active usage (in the form of Active Customers) was selected as the main way to operationalize financial inclusion in my research study, I also measured affordability and accessibility of financial products / services for each startup; please refer to Figure 2 below for a summary of the information. Specifically, Figure 2.1 shows that 95% of the startups in the data sample are serving unbanked/underbanked individuals as their main customers, a key measure of accessibility. Figure 2.2 provides further support to the claim of accessibility, since it demonstrates that 89% of the startups in the data sample are providing access to financial products/services to individuals for the first time. From an affordability perspective, Figure 2.3 shows that 70% of the startups in the data sample are offering financial products/services that are lower (10% to 50%) and significantly lower (>50%) in price than traditional financial products/services, therefore making it very affordable for individuals. However, about 30% of the startups are offering financial products/services that are either the same or higher price than traditional financial products. Figure 2.4 demonstrates that even though these startups are offering financial products/services at the same or higher prices, the most important factor for individuals is that it provides access to these products for the first time in their lives. Therefore, while affordability is important, individuals may be willing to pay similar or higher prices if they are given access when they did not have it before. Clearly, the 3 different characteristics of financial inclusion (accessibility, affordability and active usage) are inter-related. Accessibility is an important criterion and it is aided by affordability, since it can open the landscape to the poor and marginalized. However, having accessibility does not necessarily mean that it has to be affordable, as

demonstrated above. ***Active usage is an outcome of having accessibility, and to a certain extent, is complemented by affordability***. Nevertheless, other factors may affect active usage, which is one of the objectives that my empirical model will try to address. ***Given the inter-relationships of the different characteristics of financial inclusion, active usage, and in particular, active customers, was chosen as the main way to operationalize financial inclusion since it is the result of the other two characteristics, and it can be objectively measured***.

For startups which target end consumers as their main customers (B2C), the measurement of active customers is fairly straightforward. On the other hand, for startups which target other businesses the main customer is another business (B2B), these companies sell products/services to other companies which in turn then serve end users. Therefore, measuring active customers is more challenging. As much as possible, I obtained the number of end users that a B2B Fintech startup in my data sample will ultimately impact, and used this figure as Active Customers. This way, you can easily compare between B2C and B2B startups.

Figure 2. Summary of Financial Inclusion Characteristics of Fintech Startups in Data Sample



4.2.2 Independent Variables

Resources / Capabilities

Founding Team Prior Financial Services Industry Experience: As Miloud, Aspelund, & Cabrol (2012) correctly point out, any industry experience involves both qualitative and quantitative dimensions, but there is no perfect way to capture both of these dimensions. While a lot of academic researchers capture the number of years that a founder has worked in a particular industry prior to founding the startup, there are a few challenges with this approach. First, if there are multiple founders for the startup, do you use the sum of the total years of financial services industry experience for all of the founders, or do you take an average? Second, it is possible that you only have the information available on one of the founders, but not all of them. To address these potential issues, I operationalize the Founding Team Prior Financial Services Industry Experience by using a dummy variable, which is coded '1' if any of the founders has worked in the financial services industry before the founding of the startup, '0' otherwise.

Business Models

Customer Centricity: To measure and operationalize customer centricity, a composite score has been developed which is based on the answers to 20 different objective interview/survey questions related to this factor. The interview/survey questions highlight a few key features which are essential for any company to be customer centric:

- Simplicity and ease of use of the product / service – here, a design thinking approach when developing a product/service is essential so that the product is able to solve the customers' pain points in a very easy, intuitive manner
- In-depth understanding of the customers – in order to do so, companies perform detailed market research on customer behavior and derive insights to better target their customers. Also, how much does the customers' input influence the innovations that the startup has becomes an important feature in the role that customers play to define the company's products / services
- Focus on performance and profitability metrics around customers – how well the startup tracks profitability and other operational metrics at the customer level, such as Customer Lifetime Value (CLV), Customer Acquisition Cost (CAC), and any other customer-related metrics is an essential aspect of being customer centric. It is important to note that a company which demonstrates CLV growth will be more customer-centric since it is able to add more value to its customers
- How much customers believe in your product / service – can be defined in two ways:
    - Percentage of repeat customers – this metric highlights how much customers believe in the company's products/services; higher percentage of repeat customers indicates that the customers really believe in the product/service and thus the company is more customer-centric

- Customer referrals – by doing referrals to others, the customer shows that he/she strongly likes and believes in the product/service so much that they are willing to recommend it to others

The composite score is based on the sum of the answers to each question. The questions have been derived from Kilara & Rhyne (2014) CGAP Brief on Customer-Centricity for Financial Inclusion article, as well as information from different marketing sources on how to best measure customer centricity. The score represents the degree of customer-centricity that a Fintech startup has been able to achieve. Given the fact that the answers to three of the questions were all the same for each startup, I decided to eliminate these questions from the calculation of the customer centricity score. Appendix 1 provides the list of 20 questions that were used to develop the customer centricity score for each startup (please refer to Questions #9, #11 through #30). Since most of the questions have yes/no answers, with a score of 0 (no) or 1 (yes), the overall customer centricity score is a value between 0 and 17. A score closer to 17 represents a higher degree of customer-centricity, while a score closer to zero represents lower or no customer centricity. **It is essential to highlight that the answers to the customer centricity interview/survey questions were not verified with actual customers, which may be a limitation to this research study**. Please refer to Chapter 8 for a detailed discussion of limitations and weaknesses in my research study.

Interoperability: This factor refers to whether a Fintech startup's business model is interoperable or not. Specifically, a dummy variable has been created which will assume the value of one if the business model is interoperable, or zero if it is not

interoperable. As discussed in the Hypotheses and Model chapter, interoperability refers to the ability of different systems to be interconnected. In this research study, I evaluate whether the startup has an interoperable business model by asking the companies whether they share the same agent network with other companies, have their product/service work across different MNOs, or have their product/service accessible across different and sometimes competing platforms. If the Fintech startups answer yes to any or all of these conditions, then the interoperability dummy variable takes the value of one; else, it is assumed that the startup's business model is not interoperable and the dummy variable has a value of zero.

Networks & Strategic Partnerships

Following the conventional practice in network literature and other empirical academic research (Miloud et al., 2012), strategic partnership is measured as the number of alliances, or strategic partners, that the startups currently have formally (or informally) set up with the following types of institutions, which are key players in the digital financial services ecosystem:

- Financial institutions – refers to banks, MFIs, cooperatives and insurance providers. In addition, it includes both local and regional/multinational companies
- Mobile Network Operators (MNOs)
- E-Commerce companies

Data on strategic partnerships was collected by directly asking the startup founders to provide an estimate of the number of partnerships they have with each type of institution, and the length of the relationship.

Market / Environment Factors

Although many factors related to the market and environment could have an impact on the business performance of new technology ventures, it has been widely documented by development organizations that one of the most important ones in financial inclusion is related to the Regulatory Infrastructure. It is important to note that, unlike the factors above, the measurement of the market / environment factor is performed at a country level, and I rely on well-established, secondary data sources to obtain it value.

Regulatory Infrastructure. Index on the Openness of the Regulatory Environment to Drive Financial Inclusion: The Economist Intelligence Unit publishes an annual index called "Global Microscope", which provides a score on the openness of the regulatory environment to drive financial inclusion in a particular country. The index consists of a score on 11 indicators, which are qualitative in nature, and based on interviews with more than 200 industry experts, practitioners and regulators, as well as using secondary data sources such as: texts of laws, regulations, and other legal documents, websites of government authorities and international organizations, and other scholarly studies. The index is calculated for 55 emerging market countries globally, and has been conducted for the last 3 years (2014 through 2016). The different indicators that form the index includes the following areas:

i. Government Support for financial inclusion

ii. Regulatory and supervisory capacity for financial inclusion

iii. Prudential regulation

iv. Regulation and supervision of credit portfolios

v. Regulation and supervision of deposit-taking activities

vi. Regulation of insurance targeting low-income populations

vii. Regulation and supervision of branches and agents

viii. Requirements for non-regulated lenders

ix. Available infrastructure for electronic payments

x. Credit reporting systems

xi. Existence of a framework to protect the financial consumer

Given that some of the startups in my model operate in multiple countries, a weighted average score was calculated for the index based on the different countries where the startup operates. Moreover, I measured the percent change in the Regulatory Environment Index over the last 3 years, since an improvement in the openness of the regulatory environment to financial inclusion should provide a better correlation to whether the Fintech startup can succeed in driving higher financial inclusion.

4.2.3 Control Variables

There is a myriad of factors that may affect the performance of a Fintech startup serving the unbanked and underbanked; some of these factors are beyond the scope of my theoretical framework. To avoid making spurious conclusions about the factors that I have identified, I need to control for the effects of other factors, and include control variables in my model.

A startup's age has a direct effect on the dependent variables in my model and thus an important control variable. As the startup matures, the number of active customers and total revenue should increase – therefore, a positive linear relationship between the startup's age and the dependent variables should be observed. I use a measure of the startup's age using the number of months since the launch of the company's first product/service until August 2017.

Other control variables in my model include macroeconomic and industry factors such as GDP average growth rate and mobile phone penetration rate (as measured by number of mobile subscriptions per 100 individuals). C. Lee, Lee, & Pennings (2001) look at the average growth rate of the market, as a control variable in their study, since the authors believe that it is highly correlated to the performance of new ventures. In my research study, I assume that GDP growth rate and advancements in mobile infrastructure (as measured by mobile phone penetration rate) to represent the average growth rate of the market.

Similar to the market/environment factor, the control variables are measured at a country level and the figures are available by year. For each startup, I calculated the

weighted average values of GDP growth rate and mobile penetration rate based on the different countries that the startups operate and the years they have been operating. The reason for weighting by country and year is that each of these variables may impact the startup differently depending on the country they are operating and the number of years since their founding.

A key control variable included in my model is related to the customer segment that the startup is serving – whether it is serving other businesses (B2B), or directly serving consumers (B2C). The distinction is important since it will impact the startup's business model and its financial performance. In general, B2B startups may have fewer customers, but tend to generate higher revenue and profitability than B2C startups. Moreover, the cost of acquiring customers is significantly higher in B2C startups than B2B startups, due to the fact that consumers tend to be fickle and not as sticky as compared to serving other businesses. Therefore, I expect that B2B startups will demonstrate higher annual revenue, but maybe not as high active customers when compared to B2C startups. A dummy variable has been incorporated in the model to test this effect; the variable will assume the value of 1 if the startup is B2B, or 0 if the startup is B2C.

Table 4 provides a summary of all of the variables that are part of my research model. The table also provides the measurements and sources of data for each variable.

Table 4. Summary of Variables, Measurements and Sources

Variable	Sign	Measurement	Source
Dependent Variables			
Annual Revenue		Average Annual Revenue (US$ millions)	Interview/survey questions; secondary sources
Active Customers		Number of Active Customers, which is defined as unique customers who have performed at least one transaction in the last 90 days	Interview/survey questions
Independent Variables			
Prior Financial Services Industry Experience	+	Dummy variable to represent whether any member of the startup's founding team had financial services industry experience prior to founding the startup. Variable equals to '1' if any member of the founding team has prior financial services industry experience, and '0' otherwise.	Interview/survey questions; secondary sources
Customer Centricity	+	Composite score from interview questions, which measures the degree of customer centricity.	Interview/survey questions
Interoperability	+	Dummy variable to represent whether the startup's business model is interoperable or not. A startup's business model is considered interoperable if: its products can be used across multiple MNOs, shares agent network or can work across different platforms. If interoperable, the variable equals to '1'; otherwise, if not interoperable then the variable equals to '0'	Interview/survey questions; secondary sources
Strategic Partnerships	+	Number of alliance partners with three types of institutions: • Financial institutions • MNOs • E-commerce companies	Interview/survey questions
Regulatory Framework	+	Percent change in the Index on the Openness of Regulatory Environment to drive financial inclusion. The variable is a weighted average based on the countries that the startup operates in. and captures the change in the index value for the years that the startup has been in operations	The Economist Intelligence Unit's Global Microscope
Control Variables			
Number of Months since Launch	+	Number of months from the time the startup launched its first product/service and August 2017	Interview/survey questions; secondary sources
Customer Segment		Dummy variable to represent whether the startup's customers are other businesses (B2B) or consumers (B2C). If B2B, then variable equals to '1', else it equals to '0'	Interview/survey questions; secondary sources
GDP Avg. Growth Rate	+	Weighted average GDP growth rate of the countries that the startup operates and for the number of years that the startup has been in operations	World Bank's World Development Database
Mobile Phone Penetration Rate	+	Weighted average number of mobile phone subscriptions per 100 individuals of the countries that the startup operates in and for the number of years that the startup has been in operations	World Bank's World Development Database

4.3 Analytical Methods

An empirical model can be estimated based on the different independent variables defined in the previous section:

$$\boldsymbol{Business\ Performance} = \alpha + \beta_1(Customer\ Centricity) + \beta_2(Interoperability) + \beta_3(Strategic\ Partnerships\ with\ FIs) + \beta_4(Strategic\ Partnerships\ with\ MNOs) + \beta_5(Strategic\ Partnerships\ with\ E-Commerce) + \beta_6(Prior\ Financial\ Svcs\ Exp.) + \beta_7(Regulatory\ Framework) + \beta_{1-k}(Vector\ of\ Controls)$$

where Business Performance represents the two different dependent variables defined in Table 2, namely Annual Revenue and Active Customers. The intercept in the equation is α, $\beta_{1\text{-}7}$ are the coefficients of the theoretical variables to be estimated, and $\beta_{1\text{-}k}$ represent the coefficients of the control variables to be estimated, where k equals to 4.

Multivariate linear regression is used to analyze the data, since it is line with my theoretical framework that the business performance of a Fintech startup in financial inclusion is the additive result of key important factors. Specifically, two types of regression models are used:

- Multivariate linear regression models to test the effects that each independent variable has on the two dependent variables

- Binomial logit regression model to determine how the different independent variables affect the probability of overall success of the Fintech startups

The key difference between the two types of models is that the multivariate linear regression will be able to show how changes in the independent variables lead to higher or lower business performance, as measured by Annual Revenue and Active Customers of the startup, which are continuous variables. On the other hand, the binomial logit regression model replaces the two continuous dependent variables with a dummy variable representing overall success, which has two values: '1' if the Fintech startup is successful, or '0' if the startup is not successful. The binomial logit model provides an alternative method to define the success of a Fintech startup in financial inclusion, in a more deterministic fashion. A more detailed discussion of the two types of models used to analyze the data is provided below.

4.3.1 Multivariate Linear Regression Models

Ordinary least squares (OLS) is utilized for the multivariate regression models to analyze the data. Since there are two different measures of business performance (Active Customers and Annual Revenue), two separate linear regression models are evaluated using the same independent variables. Ideally, the models would demonstrate that the same independent variables are statistically significant in both models. To confirm whether the dependent variables were normally distributed, I reviewed a histogram of the observations for Active Customers and Annual Revenue.

Please refer to Figure 3 and Figure 4. The results show that the Jarque-Bera probability is less than 0.05, demonstrating that the data is not normally distributed.

Figure 3. Active Customers – Histogram

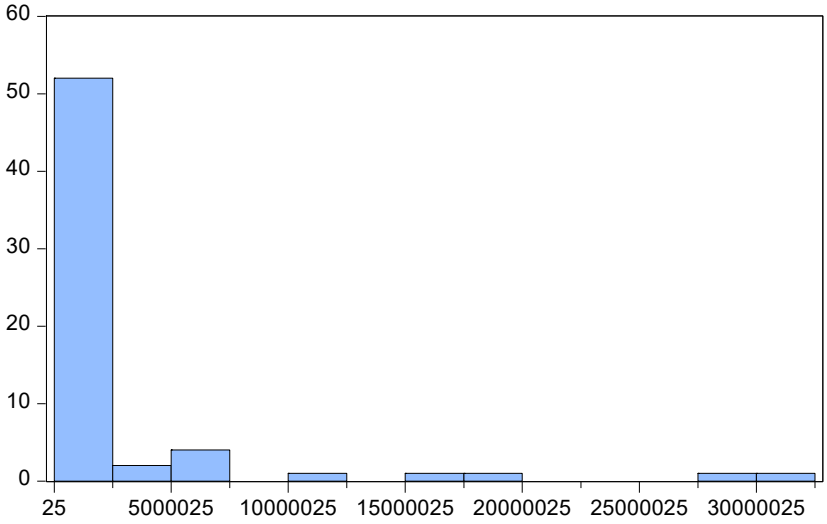
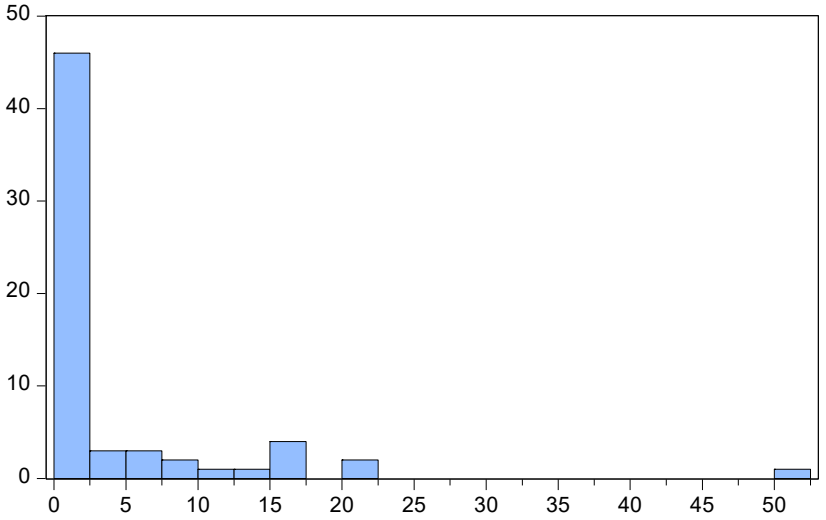


Figure 4. Annual Revenue – Histogram



Following Miloud, Aspelund, & Cabrol, (2012) and Gompers (1995), I performed a log transformation of the raw data for Active Customers and Annual Revenue, and used these transformed variables as the dependent variables in my

regression models. After the transformation, the Active Customer dependent variable becomes more normally distributed (p-value of Jarqe-Bera is greater than 0.05), but the Annual Revenue variable remains not normally distributed. Please refer to Figure 5 and Figure 6 below.

Figure 5. Log Transformation of Active Customer – Histogram

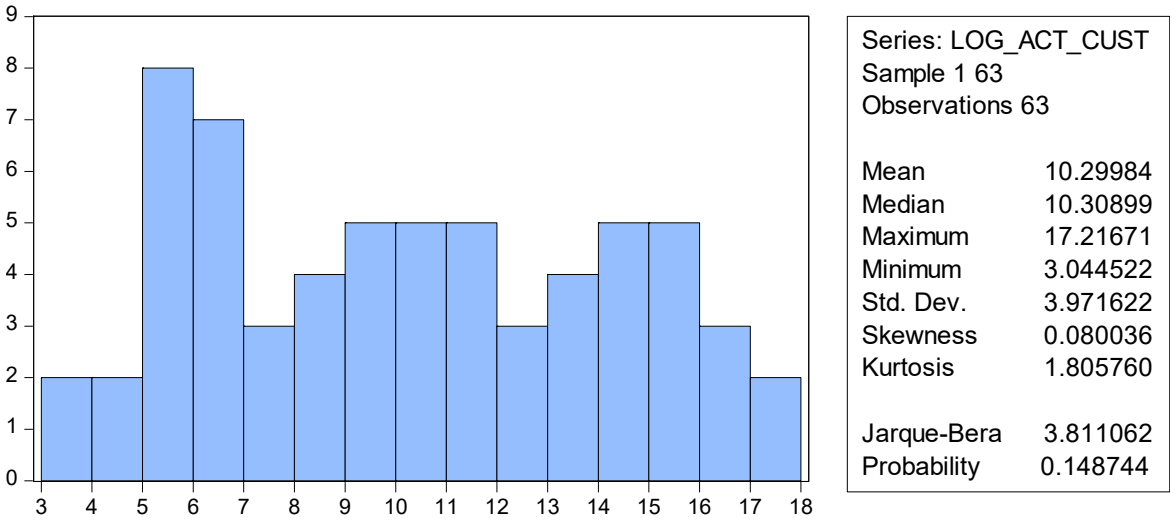
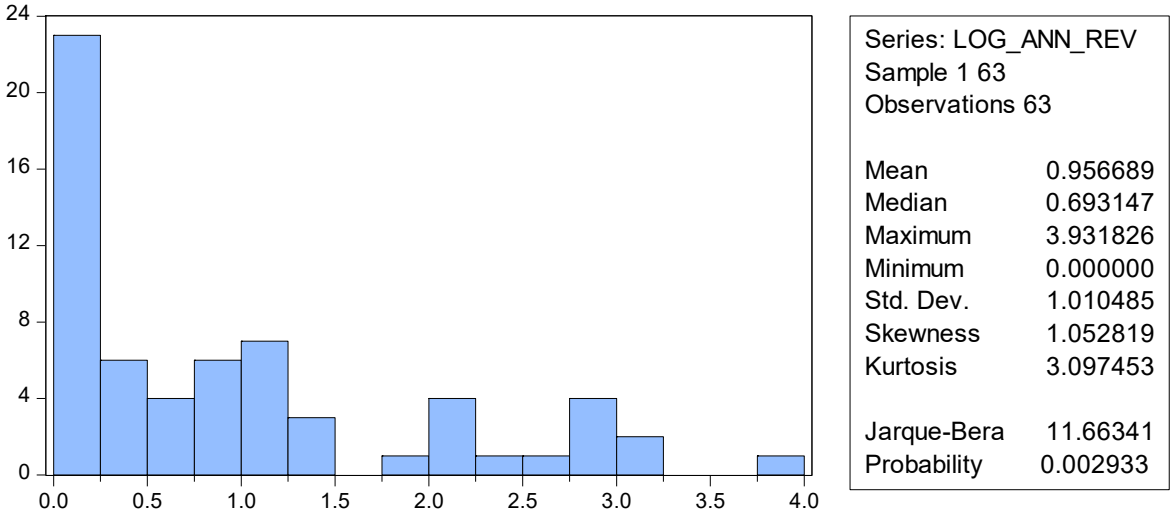


Figure 6. Log Transformation of Annual Revenue – Histogram



A similar exercise is performed for each of the independent variables, and based on the histograms, a log transformation of the Strategic Partnership independent variables is also implemented.

Based on the log transformations, the multivariate linear regression models are as follows:

1) $\boldsymbol{Ln(Active\ Customers)} = \alpha + \beta_1(Customer\ Centricity) + \beta_2(Interoperability) + \beta_3\big(Ln(Strategic\ Partnerships\ with\ FIs)\big) + \beta_4\big(Ln(Strategic\ Partnerships\ with\ MNOs)\big) + \beta_5\big(Ln(Strategic\ Partnerships\ with\ E-Commerce)\big) + \beta_6(Prior\ Financial\ Svcs\ Exp.) + \beta_7(Regulatory\ Framework) + \beta_{1-k}(Vector\ of\ Controls)$

2) $\boldsymbol{Ln(Annual\ Revenue)} = \alpha + \beta_1(Customer\ Centricity) + \beta_2(Interoperability) + \beta_3\big(Ln(Strategic\ Partnerships\ with\ FIs)\big) + \beta_4\big(Ln(Strategic\ Partnerships\ with\ MNOs)\big) + \beta_5\big(Ln(Strategic\ Partnerships\ with\ E-Commerce)\big) + \beta_6(Prior\ Financial\ Svcs\ Exp.) + \beta_7(Regulatory\ Framework) + \beta_{1-k}(Vector\ of\ Controls)$

4.3.2 Binomial Logit Regression Model

The binomial logit regression model is an estimation technique where the dependent variable has only two values, or most commonly referred to as a dummy variable. The binomial logit model is an extension of the linear probability model that avoids the issue of unboundedness of the predicted values of the dependent variable by using a variant of the cumulative logistic function:

$$D_i = \frac{1}{1 + e^{-[\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \epsilon_i]}}$$

where D_i is the dummy dependent variable.

Since binomial logit models cannot be estimated using OLS, the Maximum Likelihood (ML) technique is used, which is an iterative estimation method that selects coefficient estimates that maximize the log of the probability, or likelihood, of observing the particular set of values of the dependent variable in the sample for a given set of independent variables. In my research study, I define a dummy dependent variable called "Overall Success" which will assume the value of 1 if the startup is considered to be successful relative to the other startups evaluated, or 0 if the startup is considered not to be successful. The model will be estimating what is the probability of overall success of a Fintech startup in financial inclusion when there are changes in the different independent variables. Ideally, the definition of a "successful" startup would be a new venture which demonstrates equal to or higher financial performance (as measured by Annual Revenue) AND equal to or higher financial inclusion (as measured by Active Customers) when compared to an index, or benchmark, of successful startups in the same sub-segment. Regrettably, there is very limited public data available from comparable successful startups to create a benchmark. Moreover, the Fintech startups in my research study are serving many different sub-segments, so a benchmark would need to be developed for each product sub-segment in order to be accurate; this data is not available. ***To solve this issue, I compared the startup's Active Customers and Annual Revenue figures against the median values of the other startups in the research study; thus, defining success relative to other startups in the study.*** To be successful, the startup's Active Customers AND Annual Revenue figures have to be equal to or higher than the

median values. Following this methodology, out of the 63 startups in my research study, there are 24 startups that are currently considered to be “overall successful”, while there are 39 startups that are currently considered not to be successful.

Below is an estimate of the binomial logit model that I evaluate in my research study:

$$L: \Pr(D_i = 1) = \ln\left(\frac{D_i}{[1 - D_i]}\right)$$

$$= \alpha + \beta_1(Customer\ Centricity) + \beta_2(Interoperability)$$

$$+ \beta_3\big(Ln(Strategic\ Partnerships\ with\ FIs)\big)$$

$$+ \beta_4\big(Ln(Strategic\ Partnerships\ with\ MNOs)\big)$$

$$+ \beta_5\big(Ln(Strategic\ Partnerships\ with\ E-Commerce)\big)$$

$$+ \beta_6(Prior\ Financial\ Svcs\ Exp.)$$

$$+ \beta_7(Regulatory\ Framework)$$

$$+ \beta_{1-k}(Vector\ of\ Controls)$$

Chapter 5: Analysis of Results

Table 5 reports the means, standard deviations and minimum and maximum of all variables used in the different models. Table 6 provides similar information, but it includes the log transformation of the dependent variables Active Customers and Annual Revenue, as well as the log transformation of the independent variables related to Strategic Partnerships.

Table 5. Descriptive Statistics of Variables without Log Transformations

Variable	Mean	SD	Min	Max
Active Customers	2,313,603	5,976,633	20	30,000,000
Annual Revenue ($m)	$3.94	$7.86	$0.00	$50.00
Number of Months Since Launch	42.98	32.19	5.00	163.00
Overall Success (dummy)	0.381	0.490	0.000	1.000
Avg. GDP Growth Rate (%)	5.79%	1.26%	2.00%	7.44%
Avg. Mobile Subscriptions per 100	101.07	26.15	53.80	146.14
Customer Segment (dummy)	0.730	0.447	0.000	1.000
Prior Financial Svcs. Industry Experience	0.841	0.368	0.000	1.000
Customer Centricity Score	11.241	2.291	5.300	15.920
Interoperability (dummy)	0.571	0.499	0.000	1.000
Strategic Partnerships with FIs	15.000	23.760	0.000	160.000
Strategic Partnerships with MNOs	3.492	16.407	0.000	130.000
Strategic Partnerships with E-Commerce	1.984	3.066	0.000	14.000
Regulatory Environment Score	63.757	12.679	40.000	78.000
Percent Change in Reg Env. Score	9.10%	11.70%	-6.70%	27.90%

Table 6. Descriptive Statistics of Variables with Log Transformations

Variable	Mean	SD	Min	Max
Ln (Active Customers)	10.300	3.972	3.045	17.217
Ln (Annual Revenue)	0.957	1.010	0.000	3.932
Overall Success (dummy)	0.381	0.490	0.000	1.000
Number of Months Since Launch	42.98	32.19	5.00	163.00
Avg. GDP Growth Rate (%)	5.79%	1.26%	2.00%	7.44%
Avg. Mobile Subscriptions per 100	101.07	26.15	53.80	146.14
Customer Segment (dummy)	0.730	0.447	0.000	1.000
Prior Financial Svcs Industry Experience	0.841	0.368	0.000	1.000
Customer Centricity Score	11.241	2.291	5.300	15.920
Interoperability (dummy)	0.571	0.499	0.000	1.000
Ln (Strategic Partnerships with FIs)	2.170	1.083	0.000	5.081
Ln (Strategic Partnerships with MNOs)	0.605	0.939	0.000	4.875
Ln (Strategic Partnerships with E-Commerce)	0.694	0.851	0.000	2.708
Regulatory Environment Score	63.757	12.679	40.000	78.000
Percent Change in Reg Env. Score	9.10%	11.70%	-6.70%	27.90%

The tables show the large variability in the data collected from the different Fintech startups in financial inclusion. For instance, the dependent variable Active Customers varies from a minimum of 20 to a maximum of 30,000,000. Similarly, Annual Revenue varies from a minimum of $0 million to a maximum of $50 million. These figures are supported by the fact that the age of the startups, as measured by the number of months since launch, ranges from the very early stage ventures with a minimum of 5 months to more mature companies that have a maximum of 163

months, or 13 years and 7 months. Given the large variations in the dependent variables, it is clear to see that a log transformation is necessary to analyze the data. Log transformations are also performed on the strategic partnerships variables, due to the large variability in the data.

Table 7 displays the correlation matrix of all of the variables used in the different regression models. A few important points can be highlighted from this table. First, the correlation of Number of Months Since Launch with the three dependent variables is fairly high at above 0.5; therefore, as expected, this variable should have a significant effect in all of the regression models. Second, the log transformation of Strategic Partnerships, specifically Strategic Partnerships with FIs, has a significant positive correlation with Active Customers, Annual Revenue and Overall Success, which would suggest that this variable can help explain the changes in the different dependent variables. Third, the Interoperability dummy variable shows a high correlation with Active Customers at 0.4912, but a lower correlation with Annual Revenue at 0.2755, suggesting it is highly likely that the regression model for Active Customers may have different independent variables that are statistically significant when compared to the regression model for Annual Revenue. A similar pattern can be observed with the Customer Centricity Score variable, which shows a moderately high correlation with Active Customers and Overall Success dependent variables, but significantly lower correlation with Annual Revenue. Finally, there are fairly large negative correlations (below -0.6) between the control variables Avg. GDP Growth and Avg. Mobile Subscriptions per 100, which would suggest that these variables would move against each other in the regression models.

The Percent Change in Regulatory Environment Score is an additional independent variable where there are negative correlations with the dependent variables as well as some of the independent variables. The negative correlation with the dependent variables is somewhat concerning since I expected the effects to be positively related to the dependent variables.

Table 7. Correlation Matrix of Dependent and Independent Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) LOG_ACT_CUST	1.0000													
(2) LOG_ANN_REV	0.6228	1.0000												
(3) OVERALL_SUCCESS	0.7599	0.7150	1.0000											
(4) NUM_MTHS_LAUNCH	0.6372	0.6797	0.5244	1.0000										
(5) CUST_SGM	-0.0855	0.0280	-0.1122	0.1094	1.0000									
(6) GDP_AVG_GRWTH	0.0876	-0.0143	0.1415	0.1590	0.0008	1.0000								
(7) AVG_MOB_SUBS	-0.2793	-0.2317	-0.2867	-0.4354	-0.0341	-0.5899	1.0000							
(8) CC_SCORE_NEW	0.2994	0.2588	0.3619	0.1691	-0.0617	-0.0009	-0.0778	1.0000						
(9) INTEROP	0.4912	0.2755	0.3491	0.2366	-0.2374	-0.0106	-0.2605	0.1335	1.0000					
(10) LOG_STRAT_PART_FI	0.4373	0.5165	0.4413	0.3460	-0.0095	0.0229	-0.0652	0.1373	0.1923	1.0000				
(11) LOG_STRAT_PART_MNO	0.4059	0.3203	0.2802	0.3729	-0.0948	-0.1707	-0.0913	0.1214	0.3365	0.3847	1.0000			
(12) LOG_STRAT_PART_ECOM	-0.0031	0.0519	0.1513	-0.1467	-0.0804	0.0501	0.0647	0.0385	0.0175	-0.0769	0.0277	1.0000		
(13) FIN_EXP	-0.0162	-0.0828	-0.0170	-0.1852	0.0295	0.1593	-0.0874	-0.2565	0.2382	-0.1963	-0.1069	-0.2460	1.0000	
(14) P_CHG_REG_ENV_SCORE	-0.1205	-0.0947	0.0816	0.0215	0.1477	0.5715	-0.6437	0.0193	-0.0518	0.0819	-0.1767	-0.0750	0.0417	1.0000

When running the regression models, I test for two key effects which may distort the results: (1) Multicollinearity and (2) Heteroskedasticity. To test for multicollinearity, I looked at the Variance Inflation Factors (VIF) in each regression model; the average VIF for each independent variable in the regression models was below 3.00, which is far lower than the conventional threshold of 20. Therefore, according to Nachtsheim, Neter, Li, & Kutner (2004), there is no multicollinearity problem in the data. To test for the presence of heteroskedasticity, I ran the Breusch-Pagan-Godfrey Test (Breusch & Pagan, 1979) on all regression models and the results show that there is no heteroskedasticity in the regression models where the dependent variable is Active Customers, but marginal heteroskedasticity (Prob. Chi Square between 0.04 to 0.10) in the regression models where the dependent variable is Annual Revenue. To confirm the marginal effect of heteroskedasticity, I ran the Harvey-Godfrey Test, which is another test method to measure heteroskedasticity and regresses the log of squared residuals from the original regression against the original regressors, for the models where Annual Revenue was the dependent variable. The results of the Harvey-Godfrey Test show no presence of heteroskedasticity, which leads to my conclusion that the effect of heteroskedasticity is small; therefore, no corrections were made to the regression models to account for this marginal effect.

5.1 Results of the Multivariate Linear Regression Models

I follow a similar analytical methodology as C. Lee, Lee, & Pennings (2001) and Miloud, Aspelund, & Cabrol (2012) to develop the linear regression models. I test the additive effects of the different independent variables by running various

models for each set of dependent variables. Please refer to Table 8 and Table 9 for a summary of the results of the regression models. The first model is run with only the control variables (Model 1), and serves as a benchmark against which to test the effects of the independent variables on Active Customers and Annual Revenue. Then, five additional regression models, one for each of the different independent variables together with the control variables (Models 2 - 6), have been run to examine the relative influence of the different independent variables on the two dependent variables. Model 2 tests the Customer Centricity effects, Model 3 tests the Interoperability effects, Model 4 tests the Strategic Partnership effects, Model 5 tests the Prior Financial Services Industry Experience effects, and Model 6 is the full model (which also tests the effects of the Regulatory Environment Framework), comprising all of the variables. Model 7 is a variation to Model 6, where I remove any variables that are considered redundant based on the redundant coefficient diagnostic test, and also test for any omitted variables. The redundant coefficient diagnostic test results show that the Customer Segment dummy variable is redundant, and thus it is removed from the regression model. After removing Customer Segment, Adjusted R-Squared slightly increases from 0.55 to 0.56 in the Active Customers regression model, and slightly increases from 0.59 to 0.60 in the Annual Revenue regression model. Therefore, Model 7 provides the best representation to explain the behavior of the dependent variables in my research study.

The regression results of Model 1 for both dependent variables show that the only control variable that is statistically significant is Number of Months Since Launch. In fact, this control variable is highly significant ($p < 0.01$) across all of the

regression models. The addition of the different independent variables demonstrates an improvement in Adjusted R-Squared across the different models, increasing from 0.392 and 0.444 in Model 1 for Active Customers and Annual Revenue, respectively, to 0.56 and 0.60 in Model 7 for Active Customers and Annual Revenue, respectively. However, as predicted earlier from the correlation matrix, there are differences on which independent variables are statistically significant in the regression models. In the following pages I provide a more detailed explanation reviewing the effects of the main independent variables on the dependent variables.

Table 8. Log Transformation of Active Customers – OLS Regression Models

(N=63)

Independent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Business Models							
Customer Centricity Score		0.3209*†	0.2803*	0.2509	0.304575*†	0.3100**	0.3110**
		(0.1713)	(0.1563)	(0.1551)	(0.1595)	(0.1566)	(0.1552)
Interoperability (dummy)			2.8051***	2.5080***	2.0490**	1.8776**	1.9460***
			(0.7835)	(0.7973)	(0.8662)	(0.8561)	(0.8504)
Partnerships							
Ln (Strategic Partnerships - FIs)				0.6499*	0.7462**	0.9128***	0.9139***
				(0.3630)	(0.3680)	(0.3741)	(0.3708)
Ln (Strategic Partnerships - MNOs)				0.1604	0.1476	0.0410	0.0491
				(0.4488)	(0.4459)	(0.4421)	(0.4376)
Ln (Strategic Partnerships - E-Commerce)				0.2834	0.4842	0.3845	0.3784
				0.4189	(0.4435)	(0.4393)	(0.4350)
Resources / Capabilities							
Prior Financial Svcs Experience (dummy)					1.5184	1.2704	1.2117
					(1.1604)	(1.1482)	(1.1236)
Market / Environment							
Percent Change in Score of Regulatory Env. Openness to Financial Inclusion						-8.1039*	-8.3994*
						(4.7135)	(4.5816)
Control Variables							
Number of Mths Since Launch	0.0804***	0.0765***	0.0703***	0.0616***	0.0662***	0.0554***	0.0542***
	(0.0138)	(0.0136)	(0.0125)	(0.0137)	(0.0140)	(0.0151)	(0.0145)
Customer Segment (dummy)	-1.3968	-1.2628	-0.4486	-0.3896	-0.5388	-0.2619	
	(0.8848)	(0.8692)	(0.8231)	(0.8166)	(0.8192)	(0.8201)	
Avg. GDP Growth	-0.0792	-0.0510	0.2072	0.1700	0.0547	0.2173	0.2360
	(0.3888)	(0.3809)	(0.3541)	(0.3635)	(0.3717)	(0.3770)	(0.3692)
Avg. Mobile Subs per 100	-0.0024	-0.0014	0.0167	0.0111	0.0099	-0.0152	-0.0157
	(0.0206)	(0.0202)	(0.0191)	(0.0191)	(0.0190)	(0.0237)	(0.0234)
Constant	8.5686**	4.7669	-0.7227	-0.1298	-1.3906	1.2218	1.0433
	(4.1459)	(4.5382)	(4.3428)	(4.3153)	(4.3935)	(4.5730)	(4.4993)
Adjusted R-Squared	0.3915	0.4168	0.5169	0.5288	0.5351	0.5519	0.5597
F-Statistic	10.9741	9.8607	12.0573	8.7314	8.1351	7.9425	8.8799
Prob (F-Statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

Standard errors are in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed test).

† p-value at 0.0675, therefore marginal statistical significance at 0.05.

Table 9. Log Transformation of Annual Revenue – OLS Regression Models

(N=63)

Independent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Business Models							
Customer Centricity Score		0.0624	0.0593	0.0456	0.0694*	0.0702*	0.0704*†
		(0.0421)	(0.0422)	(0.0385)	(0.0381)	(0.0381)	(0.0377)
Interoperability (dummy)			0.2174	0.1491	-0.0545	-0.0800	-0.0683
			(0.2116)	(0.1977)	(0.2069)	(0.2081)	(0.1996)
Partnerships							
Ln (Strategic Partnerships - FIs)				0.3131***	0.3558***	0.3806***	0.3808***
				(0.0900)	(0.0879)	(0.0909)	(0.0901)
Ln (Strategic Partnerships - MNOs)				-0.1184	-0.1241	-0.1400	-0.1386
				(0.1113)	(0.1065)	(0.1075)	(0.1063)
Ln (Strategic Partnerships - E-Commerce)				0.2075**	0.2966***	0.2818***	0.2807***
				(0.1039)	(0.1059)	(0.1068)	(0.1063)
Resources / Capabilities							
Prior Financial Svcs Experience (dummy)					0.6736***	0.6367***	0.6266***
					(0.2772)	(0.2791)	(0.2730)
Market / Environment							
Percent Change in Score of Regulatory Env. Openness to Financial Inclusion						-1.2065	-1.2572
						(1.1456)	(1.1130)
Control Variables							
Number of Mths Since Launch	0.0221***	0.0214***	0.0209***	0.0190***	0.0211***	0.0194***	0.0192***
	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0033)	(0.0037)	(0.0035)
Customer Segment (dummy)	-0.1107	-0.0847	-0.0216	-0.0200	-0.0862	-0.0449	
	(0.2152)	(0.2138)	(0.2223)	(0.2025)	(0.1957)	(0.1993)	
Avg. GDP Growth	-0.1016	-0.0961	-0.0761	-0.1346	-0.1857	-0.1615*	-0.1583*
	(0.0946)	(0.0937)	(0.0956)	(0.0902)	(0.0888)	(0.0916)	(0.0897)
Avg. Mobile Subs per 100	-0.0001	0.0001	0.0015	-0.0015	-0.0021	-0.0058	-0.0059
	(0.0050)	(0.0050)	(0.0052)	(0.0047)	(0.0045)	(0.0058)	(0.0057)
Constant	0.6823	-0.0574	-0.4298	-0.2597	-0.8190	-0.4301	-0.4607
	(1.0084)	(1.1160)	(1.1729)	(1.0702)	(1.0494)	(1.1114)	(1.0930)
Adjusted R-Squared	0.4439	0.4551	0.4556	0.5523	0.5902	0.5911	0.5986
F-Statistic	13.3713	11.3570	9.6492	9.4985	9.9308	9.1478	10.2445
Prob (F-Statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes:

Standard errors are in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed test).

† p-value at 0.0675, therefore marginal statistical significance at 0.05.

Prior Financial Services Industry Experience Effects

Hypotheses 1a and 1b test the effects of the founding team's prior financial services industry experience on the financial inclusion and financial performance of new technology ventures serving the unbanked and underbanked. The regression models show that ***prior financial services industry experience is not statistically significant in the Active Customer regression model, providing no evidence to support Hypothesis 1a***. The relationship between founder prior industry experience and number of customers has not been studied before, and based on the results of the regression model, it seems that having prior financial services industry experience does not lead to higher number of active customers.

Prior financial services industry experience has a strong statistical significance in the Annual Revenue regression model, providing support for Hypothesis 1b. The results indicate that the founders' prior financial services industry experience can help the company drive higher financial performance due to the fact that the founder/founding team has a better understanding of the intricacies and complexities of the financial services industry, and thus is able to figure out how to achieve profitability in a faster manner when compared to a founder that does not have the prior financial services experience. Prior research studies (Song et al., 2008) have confirmed the positive relationship between new venture financial performance (as it relates to revenue and profitability) and founder prior industry experience, which is in line with the results above.

Customer Centricity Effects

Hypotheses 2a and 2b suggest that Customer Centricity is positively associated with a Fintech startup's ability to drive higher financial inclusion, as measured by Active Customers, and financial performance, as measured by Annual Revenue. Customer Centricity has a positive and statistically significant effect on Active Customers in Models 6 and 7, while Model 5 has a marginal statistical significance, with p-value of 0.065. ***Therefore, for Active Customers, the regression results provide good support for Hypothesis 2a***. The effect of Customer Centricity on Active Customers can be interpreted as follows (based on Model 7): All else being equal, a 1-unit increase in Customer Centricity Score leads to a 31% increase in Active Customers. Given the size of the coefficient, Customer Centricity has a large effect on the percent change in Active Customers.

The results are slightly different for Annual Revenue; although the coefficients are positive (which was the expected direction), they are marginally statistically significant, with a p-value of 0.0675. Therefore, the ***regression model for Annual Revenue modestly supports Hypothesis 2b***. The effect of Customer Centricity on Annual Revenue can be interpreted as follows (based on Model 7): All else being equal, a 1-unit increase in Customer Centricity Score leads to a 7% increase in Annual Revenue.

Overall, ***Customer Centricity is statistically significant across both regression models, with higher significance in the Active Customer model, and only modest significance in the Annual Revenue model***. The strong effect of Customer Centricity on Active Customers is expected, since the goal of a customer-centric

business model is to focus on the customer and help solve their problems, which would result in higher customer adoption rate. On the other hand, Customer Centricity has a lower effect on Annual Revenue due to the fact that there is a weak relationship between customers and revenue as it relates to financial inclusion in emerging markets. Typically, revenue has a direct relationship with the number of customers because the more customers you have usually translates into more product/services sold and thus higher revenue. However, when dealing with the unbanked and underbanked in emerging markets, this relationship is lower because a lot of times the financial products/services are offered for free initially, or at an extremely low price, in order to quickly gain customer adoption and scale up. Therefore, while the number of customers may increase significantly, revenue will grow at a slower rate since the product price is very low.

Interoperability Effects

Hypotheses 3a and 3b propose that a Fintech startup with an interoperable business model will have higher financial inclusion, as measured by Active Customers and higher financial performance, as measured by Annual Revenue, than a startup that does not have an interoperable business model. For the regression models where ***Active Customers is the dependent variable, Interoperability is highly significant at a 1% confidence level, providing strong support for Hypothesis 3a***. By having an interoperable business model, a startup can now access more customers since it allows the company to be able to operate across different channels, resulting in higher Active Customers. The effect of Interoperability on Active Customers can be interpreted as follows (using Model 7): All else being equal, if the startup's

business model moves from not being interoperable to becoming interoperable, then its Active Customers will increase by 195%. Similar to Customer Centricity, the coefficient for Interoperability is large, resulting in a large effect on the dependent variable.

For the regression models where Annual Revenue is the dependent variable, Interoperability is not statistically significant, and ***thus the results do not provide enough evidence to support Hypothesis 3b for Annual Revenue***. Similar to the argument for Customer Centricity, by having access to more customers does not necessarily translate to higher Annual Revenue.

Strategic Partnerships Effects

Hypotheses 4a and 4b propose that strategic partnerships are positively associated with the Fintech startup's financial inclusion, as measured by Active Customers and financial performance, as measured by Annual Revenue. I tested these hypotheses on three types of alliances, or partnerships: financial institutions (FIs), mobile network operators (MNOs) and e-commerce companies. Based on the results, Strategic Partnerships with FIs is statistically significant for both Active Customers and Annual Revenue dependent variables. ***These results render strong support for Hypothesis 4a and 4b – namely, that Strategic Partnerships are positively correlated to financial inclusion and financial performance.*** To interpret the results using Model 7 for the dependent variables, we can say the following: All else being equal, a 50% increase in Strategic Partnerships with FIs will result in a 46% increase in Active Customers, and a 19% increase in Annual Revenue. Based on the results, the effect on Active Customers is very high, while the effect on Annual Revenue is more modest.

When looking at the regression results for ***Strategic Partnerships with MNOs, the coefficients are not statistically significant for Active Customers and Annual Revenue, providing not enough evidence to support Hypotheses 4a and 4b***. These results are somewhat surprising because the mobile phone is the main method to provide access to financial products and services to the unbanked and underbanked, and thus MNOs represent a very important distribution channel. It is possible that due to the market dynamics of mobile operators in emerging markets, the number of partnerships with MNOs is not significant. In a lot of emerging market countries, one

MNO dominates the mobile phone market (i.e., with more than 60% market share), and thus it makes sense to mainly partner with the dominant MNO and not seek partnerships with the rest.

Equally, Strategic Partnerships with E-Commerce companies does not appear to be statistically significant for Active Customers, but it is statistically significant for Annual Revenue. Therefore, ***Strategic Partnerships with E-Commerce companies provides support for Hypothesis 4b, when looking at Annual Revenue as the dependent variable.*** To interpret the effect of Strategic Partnerships with E-Commerce on Annual Revenue, we can say the following (based on Model 7): All else being equal, a 50% increase in partnerships with E-Commerce firms will result in a 14% increase in Annual Revenue. Interestingly, the effect that Strategic Partnerships with E-Commerce has on Annual Revenue is very similar in magnitude as the effect that Strategic Partnerships with FIs has on Annual Revenue.

Based on these results, it is clear to see that the type of strategic partnerships that the Fintech startup selects will be essential to determine its potential to generate higher number of customers and higher revenue, and thus have higher chances to succeed. One potential reason why Strategic Partnerships with E-Commerce is not statistically significant for the Active Customers regression model is due to the fact that most unbanked and underbanked customers access these new financial products/services through a mobile phone, rather than the internet, which is the most common method used by e-commerce platforms. However, customers that are using e-commerce platforms tend to be more established and technologically savvy, so they

would be fine paying the different fees for e-commerce transactions, which in turn can lead to higher Annual Revenue figures.

Regulatory Framework Effects

Prior studies from development organizations have shown that the regulatory environment, and specifically the regulatory framework in a country, will have an influence in the way that Fintech startups are able to operate. As a country becomes more open to financial inclusion and digital financial services, it will help enable the Fintech startups in financial inclusion to have a higher potential to succeed. Therefore, Hypotheses 5a and 5b propose that positive changes in the regulatory framework of a country towards financial inclusion, as measured by the Percent Change in the Regulatory Environment Score, should lead to higher business performance for Fintech startups, as measured by Active Customers and Annual Revenue. The results of the regression models show that the ***Percent Change in the Regulatory Environment Score is not statistically significant for Active Customers or Annual Revenue, thereby providing not enough evidence to support Hypotheses 5a and 5b.*** Although I expected to see a statistically significant positive relationship given prior research studies from development organizations, it is possible that the measurement chosen to represent the regulatory framework may not be the most relevant. In addition, the measurement chosen may not show enough variation across the countries, which may result in the factor not being statistically significant.

Effects of the Control Variables

Number of Months Since Launch is the only control variable that is statistically significant across all models, with a p-value < 0.01 and a positive coefficient. To interpret the effect of this variable (Model 7): All else being equal, a 1-monh increase in the Number of Months Since Launch will result in a 5.4% increase in Active Customers and a 1.9% increase in Annual Revenue. The statistical significance of this variable confirms the results that Song, Podoynitsyna, Van Der Bij, & Halman, (2008) found in their meta-analysis of empirical studies of success factors of new technology ventures. In their research study, the authors demonstrate that Firm Age, which is another way of representing Number of Months Since Launch, is statistically significant across all of the 31 different studies they evaluated.

5.2 Results of the Binomial Logit Model

Table 10 shows the binomial regression models that were run for the dummy dependent variable Overall Success. As you can see, the table only displays two models, which correspond to the same numbering system as the linear regression models above:

- Model 6 – the full model with all of the independent variables that I am evaluating, together with the 4 control variables
- Model 7 – optimized version of Model 6, which removes Customer Segment dummy variable, since it is found to be redundant after running a redundant diagnostic analysis

As discussed in the previous section, the binomial logit regression model measures the effect that the different independent variables have on the probability of success of Fintech startups in financial inclusion. Essentially, the logistic regression models are fitted using the method of maximum likelihood – i.e., the parameter estimates are those values which maximize the likelihood of the data which have been observed. A different measure from Adjusted R-Squared is used, which is sometimes referred to as a "pseudo R-squared", or McFadden's R-Squared. This measure is calculated as follows:

$$R^2_{McFadden} = 1 - \frac{\log(L_c)}{\log(L_{null})}$$

where L_c denotes the (maximized) likelihood value from the current fitted model, and L_{null} denotes the corresponding value for the null model – the model with an intercept and no independent variables. Based on this equation, if the model has no predictive ability, then the likelihood value of the current model will be close to equal to the likelihood value of the null model, which results in the ratio being close to 1, and the $R^2_{McFadden}$ will be close to, or equal to zero, as expected. Therefore, the higher the value of $R^2_{McFadden}$, the higher is the maximum likelihood (or probability) that the independent variables are able to predict the dependent variable. Models 6 and 7 in Table 10 show that the McFadden's R-Squared are 0.60 and 0.57, respectively, which demonstrate the strong predictive power of the independent variables in these models. Finally, to interpret the effect of the independent variable coefficients on the dependent variable, the concept of Odds Ratio (OR) is used in binomial regression models. OR is calculated as the exp (coefficient of independent

variable), or another way to show it is that the coefficient of the independent variable is equal to log(OR). Therefore, for every increase of 1 unit in the independent variable, the odds of the dependent variable being equal to 1 increases by exp (coefficient of independent variable).

The binomial regression models show that ***Prior Financial Services Industry Experience is marginally statistically significant (p = 0.0675), providing modest support for Hypotheses 1a and 1b.***

Conversely, the binomial regression models show that the ***Customer Centricity independent variable has a high statistical significance (p < 0.05), providing strong support for Hypotheses 2a and 2b***. The coefficient of Customer Centricity can be interpreted in the following manner: All else equal, for every increase of 1 unit in the startup's Customer Centricity score, the odds of overall success for the Fintech startup increase by exp(b), or 1.87 times, where b is the value of the independent variable coefficient – in this case, b is equal to 0.6242. Therefore, the model is highly sensitive to increases in the Customer Centricity score.

The results show ***no evidence to support Hypotheses 3a and 3b, and Hypotheses 5a and 5b, since the coefficients for Interoperability and Percent Change in Regulatory Environment score are not statistically significant***. These results are similar to the linear regression models for Annual Revenue for Hypothesis 3 (Annual Revenue) and for Active Customers and Annual Revenue for Hypothesis 5.

The ***coefficients for the Strategic Partnerships variables show high statistical significance for alliances with FIs as well as alliances with E-Commerce***

companies (p < 0.01), supporting Hypotheses 4a and 4b. These results are consistent with the linear regression models, specifically as it relates to Strategic Partnerships with FIs. Moreover, it provides additional support to the statistical significance of alliances with E-Commerce companies, which was significant in the Annual Revenue linear regression model. To interpret these variables:

- All else being equal, the odds of overall success for a Fintech startup increase by 4.5 times for every additional Financial Institution strategic partner that the startup is able to add
- All else being equal, the odds of overall success for a Fintech startup increase by 6.1 times for every additional E-Commerce company strategic partner that the startup is able to add

Finally, as observed in the regression models, Number of Months Since Launch is the only control variable that demonstrates statistical significance in the binomial logit model. Having a p-value < 0.01, this variable is highly significant and has a positive coefficient, which is expected. To interpret the effect of this variable (Model 7): All else being equal, the odds of overall success increase by 1.1 times for every additional month increase in the Number of Months Since Launch.

Table 10. Overall Success – Binomial Logit Regression Models (N=63)

Independent Variable	Model 6	Model 7
Business Models		
Customer Centricity Score	0.6216***	0.6242***
	(0.2874)	(0.2831)
Interoperability	0.9108	1.2566
	(1.2468)	(1.2004)
Partnerships		
Ln(Strategic Partnerships - FIs)	1.4071***	1.4944***
	(0.6209)	(0.6164)
Ln(Strategic Partnerships - MNOs)	-0.9357	-0.6265
	(0.8444)	(0.7968)
Ln(Strategic Partnerships - E-Commerce)	1.8633***	1.8089***
	(0.7661)	(0.7986)
Resources / Capabilities		
Prior Financial Svcs Experience (dummy)	4.8891**	4.0711*†
	(2.4983)	(2.2125)
Market / Environment		
Percent Change in Score of Regulatory Env. Openness to Financial Inclusion	4.6588	2.6026
	(5.9697)	(5.3651)
Control Variables		
Number of Mths Since Launch	0.0967***	0.0758***
	(0.0359)	(0.0278)
Customer Segment (dummy)	-1.7769	
	(1.2684)	
Avg. GDP Growth	-0.5947	-0.5664
	(0.5877)	(0.5820)
Avg. Mobile Subs per 100	-0.0040	-0.0140
	(0.0313)	(0.0293)
Constant	-16.0308***	-15.2118***
	(6.7978)	(6.3500)
McFadden R-Squared	0.5953	0.5698
LR statistic	49.85	47.71
Prob(LR statistic)	0.0000	0.0000

Notes:

Standard errors are in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$ (two-tailed test).

† p-value at 0.0675, therefore marginal statistical significance at 0.05.

Table 11. Summary Statistics for Overall Success – Binomial Logit Regression Model

	Overall Success		
	Yes	**No**	**Total**
Number of Samples	24	39	63
Median Active Customers	1,725,000	1,955	30,000
Median Annual Revenue ($m)	$6.00	$0.14	$1.00
Avg. Number of Months since Launch	63	30	42
Avg. Customer Centricity Score	12.29	10.60	11.24
Avg. Num of Strategic Partnerships with FIs	26	8	15
Avg. Num of Strategic Partnerships with MNOs	7.67	0.92	3.45
Avg. Num of Strategic Partnerships with E-Commerce	2.71	1.54	2.02
Number of Startups			
B2B	16	30	46
B2C	8	9	17
Interoperable	19	17	36
Not Interoperable	5	22	27
Prior Financial Svcs Experience	13	16	29
No Prior Financial Svcs Experience	11	23	34
By Product Segment:			
Credit Scoring	4	1	5
Insurance	2	0	2
Lending	1	10	11
Money Transfer	10	5	15
P2P Lending	1	15	16
Payments	3	6	9
Other	3	2	5

Note: Total column displays average and median values of all samples for the average and median measures; for all other measures, it is the sum of Successful and Not Successful columns.

To corroborate the results of the hypotheses testing for the binomial logit regression model, Table 11 displays average values for the different independent variables as it relates to the dependent variable Overall Success. As discussed earlier, a startup has been categorized as Successful if its Annual Revenue and Active Customers were equal to or above the median values of all of the startups evaluated in

my study. The table indicates that the Successful startups have significantly higher median Active Customers and Annual Revenue, as well as higher Avg. Number of Months since Launch, which is in line with what I had expected. Additionally, Successful startups have a higher Avg. Customer Centricity Score at 12.29 vs.10.60 for the startups that are classified as Not Successful. A similar pattern can be observed for Avg. Strategic Partnerships (with FIs, MNOs and E-Commerce) – Successful startups tend to have significantly higher average values for all of these variables when compared to Not Successful startups.

The lower part of Table 11 also provides some interesting insights on the number of startups that are classified as Successful vs. Not Successful based on different categories, such as Customer Segment (B2B vs. B2C), Interoperability, Prior Financial Services Experience and Product Segment. From a Customer Segment viewpoint, the results show that the number of B2B startups in my study is 2.7 times larger than the number of B2C startups. Due to this large difference, it is expected that most of the Successful startups would be B2B. However, there are almost an equal number of B2C startups that are classified as Successful and Not Successful, whereas in the case of B2B startups, the number of Not Successful is almost twice as large as the number of Successful startups. This discrepancy leads me to believe that the Customer Segment does not impact the Success of Fintech startups, confirming the lack of statistical significance for this variable in the regression and binomial logit models. For Interoperability, there is an almost equal split between startups that have an interoperable business model and those that do not have an interoperable model. The results are comparable to the mixed results for Customer Segment, where there is

an almost equal number of startups that are Successful with an Interoperable business model, and startups that are Not Successful with an Interoperable business model. Consequently, the variable Interoperability is not statistically significant in the binomial logit model. Lastly, the breakdown of Successful vs. Not Successful startups by Product Segment reveals that the Successful startups are mainly in 3 product areas: Credit Scoring, Money Transfer, and Insurance. There are Successful startups from other product segments such as P2P Lending, Lending, and Payments in my research study, however, the number of startups in these segments classified as Not Successful is significantly higher than those classified as Successful.

Table 12 provides more details by product segment on the startups that were classified as Successful in the binomial logit model. The table demonstrates that the average Customer Centricity Score is fairly similar for all Successful startups, irrespective of the product segment. Credit Scoring, Payments and Insurance startups tend to have higher average Customer Centricity Scores, while Other, Lending and P2P Lending startups tend to be on the lower end. In addition, the data shows that average number of Strategic Partnerships with FIs is fairly similar across the 3 main product segments: Credit Scoring, Payments, and Money Transfer. Startups in the Insurance and Other product segments have unusually high average number of Strategic Partnerships with FIs, but the number of successful startups in these two areas is fairly limited, and thus the numbers are not reliable. On the other hand, startups in the Lending and P2P Lending product segments have the lowest average number of Strategic Partnerships with FIs. Regarding Average number of Strategic Partnerships with E-Commerce and MNOs, it seems that the numbers are also highly

dependent on the product segment. Thus, Successful startups in Money Transfer and P2P Lending product segments tend to have more Strategic Partnerships with E-Commerce, while startups in Money Transfer and Insurance tend to have higher Strategic Partnerships with MNOs. ***In summary, the table highlights the fact that the number of Strategic Partnerships that Successful startups develop will be highly dependent on the product segment that they serve. The number of Strategic Partnerships with FIs tends to be highest with startups in Credit Scoring, Money Transfer and Payments, while it is the lowest in Lending and P2P Lending startups.*** One reason could be the fact that financial institutions are essential to facilitate the money transfer, credit scoring and payments processes for the customers of these startups since most of them require a connection with a bank to carry out these transactions. Conversely, the Lending and P2P Lending startups may not see a lot value to partner with financial institutions because their business model is effectively competing with banks. Partnerships with MNOs are greatest in the Money Transfer and Insurance startups, mainly due to the fact that the mobile phone is the main distribution channel for these products, and thus it makes sense to partner with MNOs. Finally, Partnerships with E-Commerce companies are highest in Money Transfer and P2P Lending startups since it serves as a new source of customers for the startups. E-Commerce firms provide access to potential small businesses that are selling through the e-commerce platform, which allows the P2P Lending startups to offer loans to them. For Money Transfer startups, partnerships with E-Commerce firms is also important because it allows the users of the E-Commerce platform to

have an alternative way to pay for the goods and services through mobile wallets offered by the Money Transfer startups.

Table 12. Successful Startups from Binomial Logit Model – Summary of Key Factors by Product Segment

	Average Values of Factors			
Product Segment	Strategic Partnerships w/FI	Strategic Partnerships w/E-Comm	Strategic Partnerships w/MNO	Customer Centricity Score
Credit Scoring	16	1	3	13.08
Money Transfer	18	5	14	12.33
Payments	16	2	0	12.89
Lending	11	0	4	10.00
P2P Lending	3	3	0	10.70
Insurance	110	0	12	13.07
Other	35	1	2	11.26
Overall Median	**16**	**1**	**3**	**12.29**

5.3 Overall Summary of Results

Table 13 provides a high-level summary result of the hypotheses testing for the different models in my research study. The table is organized in the following manner. For each hypothesis, there are 3 columns representing the 3 different regression models that were run: (1) Active Customers; (2) Annual Revenue; and (3) Overall Success. For each independent variable, there were two hypotheses tested, which correspond to the Active Customers and Annual Revenue regression models. For example, prior financial services industry experience has two hypotheses: 1a (Active Customers) and 1b (Annual Revenue), which are displayed in different

columns. The results for each hypothesis are labeled as "Yes" if the independent variable is statistically significant and supports the hypothesis. Alternatively, it is labeled "No" if the independent variable is not statistically significant and does not support the hypothesis.

The results show that Customer Centricity Score and Strategic Partnerships are statistically significant across all of the models, while Prior Financial Services experience is statistically significant in 2 out of the 3 models, making it an important variable to consider. Interoperability is only statistically significant in the Active Customers regression model, while Percent Change in Regulatory Environment Score is not statistically significant in any of the models. Finally, even though it is not highlighted in Table 13, the control variable Number of Months since Launch of a startup is highly statistically significant across all of the models, which was expected. Please refer to Chapter 7 for a more detailed discussion of the results and the main conclusions.

Table 13. Hypotheses Testing Summary for All Models – Statistical Significance

		Linear Regression Models		Binomial Logit
Hypotheses	**Independent Variables Tested**	**Active Customers**	**Annual Revenue**	**Overall Success**
Hypothesis 1	Prior Financial Svcs Experience	No	Yes	Yes (modest)
Hypothesis 2	Customer Centricity Score	Yes	Yes (modest)	Yes
Hypothesis 3	Interoperability (dummy)	Yes	No	No
Hypothesis 4	Strategic Partnerships	Yes (Strat. Part. with FIs)	Yes (Strat. Part. With FIs, E-Comm)	Yes (Strat. Part. With FIs, E-Comm)
Hypothesis 5	Percent Change in Regulatory Env. Score	No	No	No

Notes: "Yes" means that the independent variable tested for the corresponding regression model is statistically significant and provides support for the hypothesis. On the other hand, "No" means that the independent variable tested is not statistically significant and does not provide support for the hypothesis.

Chapter 6: Illustrative Case Studies

To support the quantitative results of my research study, illustrative case studies of 4 Fintech startups **that are classified as Successful in the binomial logit regression model** are presented below. The case studies provide qualitative perspectives and key insights which complement the empirical results. Table 14 summarizes some of the key characteristics of the startups that are showcased in the case studies. Two startups were chosen from each customer segment (B2C and B2B), and each company serves a different product segment. To tie it back to the regression models, I show qualitatively how the values of the main factors compare to the average values of all of the startups classified as Successful in the binomial logit regression model, using the following categories: Equal to Average, Above Average and Below Average. For instance, Above Average classification refers to the factor having a value above the average value for all of the Successful startups in the data sample. **Therefore, an Equal to Average and/or Above Average classification refer to the factor being statistically significant and supporting the corresponding hypotheses tested**. **A Below Average classification refers to the factor not being statistically significant and thus providing not enough evidence to support the corresponding hypotheses tested.** This classification system is used to protect the confidentiality of the data provided by these companies.

The case studies are structured in the following 4 segments:

- Background / Overview – provides an overview of what the company does, when it was founded and key products/services it offers

- Business Model – discusses the company's business model from two perspectives: (1) social impact and (2) financial performance
- Support for Quantitative Results – provides evidence on how the company supports the quantitative results of the main factors of the empirical models
- New Insights – discusses unique insights that are gained in addition to the quantitative results

Table 14. Overview of Key Variables for Startups Highlighted in Case Studies

		JUMO	**Wave Money**	**Mobisol**	**Micro-Ensure**
Product Segment		Credit Scoring	Money Transfer	Lending	Insurance
Customer Segment		B2B	B2C	B2C	B2B
Region		Africa, South Asia	Southeast Asia	Africa	Africa, South Asia
Number of Months Since Launch		31	10	67	67
Comparison to Avg. Values of Successful Startups	**Corresponding Hypotheses**				
Customer Centricity Score	2a, 2b	++	++	–	++
Strategic Partnerships with FIs	4a, 4b	+	–	–	++
Strategic Partnerships with MNOs		–	–	–	++
Strategic Partnerships with E-Commerce		+	++	–	–
Other Key Factors					
Founder/Founding Team Prior Financial Svcs. Experience	1a, 1b	**Yes**	**Yes**	**No**	**Yes**
Interoperable Business Model	3a, 3b	**Yes**	**Yes**	**Yes**	**Yes**

Notes: "+" refers to equal to the Average value of Successful startups; "++" refers to Above the Average value of Successful startups; and "–" refers to Below the Average value of Successful startups. Number of Months since Launch refers to the number of months from the time the startup launched its first product/service up to August 2017.

JUMO Case Study

Background / Overview

Founded in South Africa in 2015, JUMO is a predictive technology company that uses behavioral data from mobile usage to create financial identities for, and offer financial products to, micro, small and medium sized enterprises (MSMEs) that do not have access to formal financial services before. The company was born out of global financial services company afb; however, within the past year, JUMO sold afb and became an independent entity. JUMO partners with mobile network operators across Africa and South Asia to gain access to customers' data (GSM and mobile money transactional data) – the company analyzes more than 10,000 behavioral signals – to assess creditworthiness and offer real-time, customized loans and savings products to MSMEs over their mobile phones. JUMO's focus is on providing these financial products and services to the unbanked and underbanked in emerging markets.

Business Model

JUMO's business model is a three-sided marketplace where the company sits in between a mobile wallet operator and financial institutions to integrate their technology and offer end-to-end services to microentrepreneurs. On one side of the marketplace, the company partners with mobile wallet operators, which may be run by a financial institution, MNO or a startup, to gain access to the customers as well as their mobile data. Through advanced data analytics, machine learning and other

technology solutions, JUMO has developed its own KYC/identity verification and credit risk models to assess the identity and creditworthiness of microentrepreneurs in order to determine how much they can borrow. On the other side of the marketplace, JUMO partners with financial institutions which provide affordable financial products, such as loans and savings, to the customers. Although JUMO does not assume the credit risk on the loan products, the company takes care of the onboarding, servicing and loan collection processes. Essentially, JUMO provides important benefits to both sides of the marketplace. For the mobile wallet operators, JUMO is able to decrease churn, increase activity and offer additional products/services (loans, savings products) through their distribution channel. For the financial institutions, JUMO provides access to a customer base that the banks have largely ignored in the past. JUMO earns a fee from the financial institutions, and through its credit scoring algorithms and KYC/ID verification systems, is able to qualify the customers and make it easier for the financial institutions to lend to these individuals.

To prove the accuracy of their data analytics and credit risk scoring model to the financial institutions, JUMO initially provided loans to the unbanked and underbanked using its own capital. Now that the model has been proven, JUMO partners with financial institutions to provide the loans and savings products to the unbanked and underbanked. Overall, the default rate for loans offered to the unbanked and underbanked using JUMO is below 2%.

JUMO's mission is to serve the small and microentrepreneurs that do not have access to formal financial products and services before, and provide them with

affordable products to help them grow their businesses and improve their economic livelihood. In fact, for 80% of JUMO's customers, it is the first time that they are interacting with a bank or financial institution.[17] The use of technology makes it possible for JUMO to offer extremely affordable loans to individuals and entrepreneurs, while at the same time being a sustainable, for-profit company. Moreover, the loans that JUMO offers are used by the microentrepreneurs to expand their businesses and ultimately help them get out of poverty.

In the short time frame that JUMO has been operating, the company has scaled up very quickly to become one of the largest fintech companies in Africa helping the unbanked and underbanked. In the first 3 months of operations, JUMO granted 6 million loans to 2.25 million unique customers, and was managing between 30,000 to 50,000 loans a day, with loans as low as US$0.30 in value.[18] Currently, JUMO has 5 million unique customers across 6 countries in Africa, and has disbursed more than 20 million loans since its inception. JUMO is also working to broaden its product offering to include savings and insurance products. The company is actively looking to expand geographically; and recently launched in Pakistan and is exploring additional expansion opportunities in Asia.[19] Finally, the company has grown from 7 employees in 2015 to 380 employees, with development offices in Cape Town and Nairobi.

[17] https://www.jumo.world/about.htm.
[18] https://thenextweb.com/insider/2015/12/16/helping-africans-improve-their-lives-by-tracking-their-smartphone-usage/#.tnw_GDUee9PJ.
[19] http://ventureburn.com/2017/05/jumo-first-african-startup-selected-google-launchpad-accelerator/

Support for Quantitative Results

Helping customers and designing products that truly meets their needs has been at the heart of the company's mission since its inception. According to JUMO's CEO, Andrew Watkins-Ball, traditional banks offer customers standard products that most times do not fit the customer's needs. JUMO is reversing this process, and the way to do it is to use the customer's digital footprint to better understand their needs and develop customized products that solves their credit requirements. Thus, customer centricity is key to JUMO's success. Based on my research study, JUMO has one of the highest Customer Centricity Scores of all of the startups that I evaluated. The company spends a lot of time researching their end customers in order to gain qualitative and quantitative insights on how to best serve them. In fact, the company created a "customer intelligence team" which is dedicated to understanding the customer. Based on this information, the company is able to make modifications on its product offering and the services it provides. Moreover, the company tracks essential metrics such as Customer Lifetime Value (CLV) and Customer Acquisition Cost (CAC), aiming to optimize them (increase CLV while decreasing CAC) with sustainable unit economics. Over the last 2 years, JUMO has seen a healthy growth in CLV, which is proof that they are delivering on what the customers need. Two additional metrics that highlight the company's customer centric model are its strong customer referral rate, and its more than 80% customer repeat rate. Both demonstrate that the customers trust JUMO and highly value their products/services.

Strategic partnerships with financial institutions, MNOs and e-commerce companies/digital ecosystems are critical for JUMO to deliver its products and

services. As mentioned above, MNOs provide access to the customers through mobile wallets, while financial institutions provide the capital for the loans and other financial products offered to the unbanked and underbanked. Based on the results presented in Table 14, the number of partnerships that JUMO has established with financial institutions are equal to the average number of partnerships that other successful startups have forged with financial institutions in my data sample. On the other hand, the number of partnerships with MNOs is below the average of other successful startups. The low number may be due to the fact that MNOs are no longer the only providers of mobile wallets, and given the growing penetration rate of smartphones, accessing the data does not require to set up partnerships with MNOs. Another interesting partnership that also helped JUMO increase its distribution channel is the number of alliances with e-commerce companies, which is equal to the average when compared to other successful startups in my research study. These partnerships allow JUMO to apply its predictive capability to broader segments (beyond MNOs).

From an interoperability perspective, JUMO is agnostic to the data ecosystem – its products and services can be accessed across different MNOs and mobile wallet providers, allowing more flexibility to customers and at the same time increasing the number of potential customers that it can target.

Finally, JUMO's founding team brings significant experience from the financial service industry. The company's CEO and founder, Andrew Watkins-Ball, worked for more than 7 years at Salomon Brothers in London and New York. The other 3 co-founders also bring strong financial services experience in both developed

and emerging markets, resulting in a team that has more than 25 years of combined experience in the financial services industry sector. This experience is invaluable because the company can better understand the problems that need to be solved for customers and how to best navigate in a highly regulated environment.

New Insights

In the LASIC principles developed by Lee & Teo (2015), the authors highlight Scalability as a key factor that Fintech companies need to have in order to drive higher financial inclusion and be successful. Having a scalable business model is vital in order to be able to reach to the large population of unbanked and underbanked, and do it in a quick manner. My research study does not address scalability as a main factor in the empirical model, since it is difficult to measure and quantify; however, it is an important factor that is needed to drive higher financial inclusion and higher financial performance. Clearly, JUMO demonstrates that it has a scalable business model; as mentioned earlier, in the first 3 months of operations, the company served more than 2.25 million unique customers, and managed between 30,000 to 50,000 loans per day. This high growth rate is very similar to the growth demonstrated by M-PESA, one of the most successful new technology ventures in financial inclusion, in its first year of operation. In the 2 years that the company has been in existence, JUMO now serves 5 million unique customers across 6 African countries. In addition to geographic expansion to Asia and other emerging markets, the company is also offering savings products, and plans to introduce insurance products in the near future.

Another interesting insight from my interaction with JUMO is the fact that the founders also bring extensive experience in founding new companies and technology ventures prior to founding JUMO. For instance, the CEO successfully built an event production business in Cape Town that included work for Nelson Mandela. In addition, he also built several successful technology ventures including Gateway Telecommunications, a satellite provider, which was sold to Vodafone for $675 million in 2008. By having this experience, the founders are able to take the learnings from prior ventures and be more effective and efficient with their new ventures, thereby increasing their chances of being able to succeed. More importantly, the prior startup experience also lends significant credibility with VC funds and other sources of funding for the new venture, demonstrating that the founding team has experience doing startups before and should be able to apply what they learned in the new venture.

Overall, JUMO has been able to successfully deliver strong social impact and financial performance by providing access to financial products and services to millions of people that did not have it before. This point is reinforced by the fact that in its largest markets more than 80% of the company's customers were completely unbanked before. The combination of a highly customer-centric and interoperable business model, partnerships with numerous FIs, MNOs and E-Commerce/digital ecosystems, and extensive prior financial services industry experience for the founding team has led the company to perform very well financially and attract a significant amount of funding from VC funds. These factors are complemented by

the highly scalable business model and the prior startup experience for the founders, which are essential for the company to continue to grow and be successful.

Wave Money Case Study

Background / Overview

Founded in 2016, Wave Money is a mobile financial services company that provides a mobile wallet, money transfer services (send/receive money within the country), and the ability to pay bills on your mobile phone at anytime and anywhere for the unbanked and underbanked in Myanmar. The company is a joint venture between Yoma Bank, Telenor (MNO) and First Myanmar Investment. Although the ownership structure consists of two relatively large corporations, Wave Money is run as a startup, with complete independence from Yoma Bank and Telenor.

Business Model

Wave Money's business model is very similar to other successful mobile wallet / mobile money transfer businesses such as M-PESA in Kenya and bKash in Bangladesh. Specifically, the company uses a broad agent network to reach as many target locations and customers as possible. Money transfers either take place over the counter from agent-to-agent or through mobile phones. The company charges a small transaction fee on every transaction and shares the revenue with the agents. Individuals can send as little as 1 MMK ($0.00074) to anywhere in Myanmar who has a mobile phone. Moreover, the money transfer service can be used by anybody

regardless of sender or recipient mobile network, and the service is available long after the banks have closed and during weekends.

The agent network forms a strong backbone for Wave Money's business and allows the company to be able to reach its customers in rural areas. The company leverages on Telenor's network of agents, as well as its own agents to assist with onboarding clients. According to Brad Jones, Wave Money's CEO, one of the biggest challenges in the money transfer business is the distribution network, especially in a country as large as Myanmar, which is mostly rural and with poor infrastructure. Currently, Wave Money has more than 8,500 agents (also known as Wave Shops) in about 70% of townships around the country, and also present in extremely remote places, so that it is easier for people to access the company's products. The company claims that the availability of Wave Shops across Myanmar far outnumbers the number of bank branches and ATMs combined.[20]

Wave Money has a very clear social mission and objective: to provide reliable, simple, affordable, and trustworthy financial services which can be conveniently accessed via mobile phones. The company empowers all people in Myanmar, especially those that have never had a bank account, with the freedom to manage their money the way they most prefer. More than 90% of Wave Money's customers have never had a bank account. Equally important, Wave Money wants to make sure that its customers can transfer money quickly, safely and conveniently throughout Myanmar, freeing customers from the hassles and worries of traditional

[20] https://www.wavemoney.com.mm/wp-content/uploads/2017/08/htd_Wave-Money-new-slab-shwe-Press-Release-Eng.pdf

methods. According to Wave Money's CEO, money transfers in Myanmar usually take place through banks, even when the individual does not have a bank account, which is highly inefficient.[21] Therefore, it makes sense for companies like Wave Money to come in and move customers to a more convenient and efficient channel. Since its founding less than 1 year ago, Wave Money has been able to help a lot of people to be able to conveniently, safely and instantaneously send money to loved ones in remote, rural parts of Myanmar which used to take days and a lot of time and money wasted in the process.

In the short time frame that the company has been in operations, Wave Money's customer base has grown steadily. In the first two months after launch, the company acquired 100,000 customers, and it has an ambitious target to achieve around 1 million customers by end of 2017. According to Vibeke Siljan Krohn, Wave Money's head of sales, marketing and distribution, understanding customers' needs, delivering the right products at affordable prices, easy access and convenience play a decisive role in the company's success.[22] Although money transfer and bill payments are the company's only products at the moment, Wave Money is looking to expand to other financial products such as loans, savings and microinsurance in the future.

Support for Quantitative Results

Wave Money's current success can be partially attributed to its highly customer-centric business model. Based on my research study, Wave Money's

[21] http://sea-globe.com/dethroning-cash-in-myanmar/.
[22] http://www.elevenmyanmar.com/business/6630.

Customer Centricity score is the second highest out of all of the startups that were classified as successful. From its inception, Brad recognized that serving the unbanked requires you to really understand their behavior and needs. Customer centricity becomes more important in Myanmar because there is a big issue of trust in the financial system. Consumers have had a terrible experience, with three demonetizations in the last 60-70 years, as well as a bank failure in 2003.[23] With the help of consultants and development firm CGAP, Wave Money has leveraged the principles of human-centered design to build their mobile application for their customers. Similar to JUMO, Wave Money conducts regular research on their customers to get better insights on how to serve them, and design new products/services that meets their needs. Ultimately, it is all about the customer experience – making it easy and intuitive for the customer to use, and solving their pain points. Recently, the company adopted the use of Facebook to help with the customer registration process, since it is one of the most popular applications accessed by the Burmese in their mobile phones. The customer is at the heart of everything that Wave Money does, including the company's profitability; the company tracks CLV and CAC, making sure that the CLV is significantly higher than the CAC. Moreover, users are increasingly trusting the company with their money transfer and other financial needs, as shown by strong referrals and a repeat customer rate of 25% to 30%, which is very good given that most of the people that Wave

[23] https://consult-myanmar.com/2017/07/01/grab-is-adding-myanmars-wave-money-to-its-mobile-wallet/

Money targets are in rural and remote communities and have never used mobile money services.

From a strategic partnerships' perspective, Wave Money has below average values in the number of partnerships with FIs and MNOs when compared to other startups classified as successful in my research study. At the moment, Wave Money has only one partnership with a financial institution (Yoma Bank) and one partnership with a mobile network operator (Telenor). However, these partnerships are different from other alliances because the two partners are actual equity owners of Wave Money. When Wave Money was founded, Brad Jones knew that having a MNO as a partner was necessary in order to provide the customer base and distribution channel. At the same time, the partnership with a bank was also important, since it makes it easier to obtain the necessary regulatory approvals as well as add more customers. Although Wave Money only has one partnership with a financial institution, the company is open to forging more alliances with other banks. On the other hand, given that Telenor has more than 70% market share of the Myanmar mobile phone market, Wave Money seems to be fine to have only one partnership in this area at the moment.

Strategic partnerships with E-Commerce companies is an interesting area that has helped Wave Money increase its customer base. When compared to other startups classified as successful in my research study, Wave Money has one of the highest number of strategic partnerships with E-Commerce firms. Similar to JUMO, the e-commerce channel opens access to more customers, and in Wave Money's case, it allows users to pay for the goods they purchase online by using their Wave Money

mobile wallet. In addition to E-Commerce companies, Wave Money is also open to other partnerships to increase its customers. For instance, on July 1, 2017, the company announced a partnership with Grab in Myanmar.[24] Drivers will be able to sign up for e-money accounts/mobile wallets that let them cash their earnings at one Wave Money's agents throughout Myanmar.

Wave Money's business model is interoperable in a number of ways. As mentioned earlier, the company has its own agents which are called Wave Shops, and in order to increase access to more customers, it also shares Telenor's agent network. Moreover, although Wave Money is only offered to Telenor customers, anyone with a mobile account can receive money from Wave Money and/or send money to a Wave Money account.

Brad Jones, the founder and CEO of Wave Money, has extensive financial services industry experience, having worked at ANZ and National Australia Bank for more than 10 years, and 2 years at Visa, heading the mobile money and innovation group in Southeast Asia. These experiences are essential to understand the key customer issues and pain points, and thus develop solutions that truly meet the customers' needs.

New Insights

A key insight that Wave Money shares with JUMO is the fact that the founder, Brad Jones, also brings extensive experience in successfully founding prior startups. Prior to founding Wave Money, Brad was one of the founders of Wing, a

[24] Ibid.

successful mobile money transfer business in Cambodia. Brad was able to take the learnings from Wing and apply it to found Wave Money. One key learning was the idea of partnering with both a MNO and a financial institution from inception. At Wing, Brad had only set up a partnership with ANZ, but realized that there were major challenges in the distribution process and access to customers. Therefore, partnering with a MNO and a bank was an important consideration when founding Wave Money. Taking the learnings from prior startups allows Wave Money to avoid potential pitfalls and make processes more efficient, which in turn can lead to higher customers and higher financial performance.

The environment and culture of the country where the Fintech startup operates will affect the company's business model and ultimately how customers adopt the products and services offered. Myanmar is a unique environment; even though more than 80% of the population is unbanked, the smartphone penetration rate is between 70% to 80%, one of the highest in the world, with users accessing data regularly; Telenor data usage is about 3.5GB a month in Myanmar, which is higher than Thailand and Malaysia.[25] Given these characteristics, the opportunities to serve the unbanked are enhanced since data can be more easily obtained and applications can be simplified so that they are easier to understand. For instance, the company adopted the use of Facebook to help with the customer registration process, since it is one of the most popular applications accessed by the Burmese in their mobile phones. On the other hand, the 3 previous demonetizations over the last 60-70 years, as well as a bank failure in 2003, has created a high level of mistrust in the financial service

[25] http://sea-globe.com/dethroning-cash-in-myanmar/.

sector. According to Brad Jones, convincing individuals to use mobile money or a formal financial product has been more challenging in Myanmar that what he experienced with Wing in Cambodia.

In summary, Wave Money's success revolves around its highly customer-centric business model and its strong partnerships, especially with E-Commerce companies, opening new distribution channels. These factors are complemented by an interoperable model that revolves around the agent network, making it easier and providing flexibility for customers to access the company's products and services. As shown with JUMO, having prior startup experience, and specifically founding another mobile money transfer company as Brad Jones did at Wing in Cambodia, is extremely helpful to avoid potential pitfalls, build credibility with funding sources, and take the learnings and improve on them to increase the probability of success in the new venture.

Mobisol Case Study

Background / Overview

Mobisol is a German-based technology venture founded in 2010 that focuses exclusively on solving a vexing social problem in Africa: lack of access to electricity for all citizens. In Sub-Saharan Africa, approximately 590 million people lack access to electricity, including 85% of rural populations.[26] Similar to other African companies such as M-KOPA and Off-Grid Solar, Mobisol combines solar energy,

[26] http://light.lbl.gov/library/LA-Mkt-Synthesis.pdf

mobile payments technology and microcredit by offering large solar home systems (80 watts to 200 watts) on a Pay-As-You-Go (PAYG) basis to rural, remote areas in Sub-Saharan Africa. The solar panels can power a range of household appliances such as TVs, stereos, refrigerators, mobile phone charging stations, sewing machines, water pumps and other tools. Mobisol is present in 3 African countries (Tanzania, Rwanda and Kenya) and has supplied more than 80,000 solar panels directly benefiting more than 400,000 individuals.

Business Model

Mobisol's PAYG business model offers the solar panel to households on a loan basis which they can pay off in 3 years, transferring instalments via mobile wallets in a flexible manner – they can make payments via SMS in daily (as low as $0.50), weekly or monthly rates. The flexibility is useful for farmers and microentrepreneurs which may have seasonal businesses; this way, they are able to pay a larger portion of their loan when they have the money available. The financing scheme only works with mobile wallets/mobile banking, so there is no need for a bank account. Those without a personal bank account can purchase a system, and relatives from other locations can help finance it. Once the payment is transferred via SMS, the system is switched on remotely via mobile connection. When the customer finishes making all of the payments, they become owners of the solar panel. The company also uses innovative remote monitoring technology, tracking technical data regarding the solar panel, battery, energy consumption and payment patterns. The data is critical to solve potential maintenance problems in a fast and efficient manner, and lock systems in case of overdue payment or theft.

Mobisol does not manufacture the solar panels, batteries or the smart meters for remote monitoring, but purchases the components in bulk from various manufacturers and assembles them. The value that Mobisol brings is the technology they have developed to seamlessly connect the different components, the software to track a wide variety of data points on the effectiveness of the solar system, and the connectivity to the mobile wallets for the lease payments.

The company is a true social enterprise since it is delivering an essential social good for the poor: access to electricity for the first time. Specifically, more than 60% of Mobisol's customers have a household income of less than $2/day per household member, and more than 90% are having access to electricity for the first time. Numerous studies have shown that providing electricity to rural communities leads to increased safety from the elimination of accidental fires caused by kerosene lamps and better health due to lower levels of indoor air pollution. Most importantly, having access to electricity increases household productivity and ultimately raises the standard of living. In addition to providing credit to individuals in order to raise their standard of living, Mobisol is also creating socioeconomic opportunities by empowering entrepreneurs to start their own businesses. Based on my conversations with the company's CIO, people who have leased a solar panel are setting up businesses to serve as mobile phone charging stations in villages. Since electricity is scarce in these remote areas, charging a mobile phone would require people to travel for many miles before they can find a place to do so. By having a charging station in their village, it saves the travel time and inconvenience. Other productive uses include the use of sewing machines for making clothing and power tools for

construction. Over the last 5 years, Mobisol has supplied more than 80,000 solar systems directly benefiting more than 400,000 people living in newly electrified households in Rwanda, Tanzania and Kenya. Notably, the company has enabled more than 25,000 new entrepreneurs to start businesses related to solar power and created more than 1,200 new jobs for installation contractors and sales agents.

Another way to provide a social impact is by enabling customers to have future access to expanded financial inclusion. For instance, once a Mobisol customer has fully paid their solar home panel lease, now they have formal credit history which allows them to obtain more loans to finance other ancillary products such as appliances and goods.

Support for Quantitative Results

Based on the information presented on Table 14, Mobisol has below average values for all of the factors when compared to other startups that were classified as Successful in my research study. Thus, it is very likely that there may be other factors that are contributing to the company's success (please refer to New Insights section below for more information). Although customer centricity score is low, the company understands that it is extremely important to educate the sales agents and installation workers so that it makes it easier to sell to customers. A major challenge that the company faces is the lack of skilled workers in Sub-Saharan Africa since the off-grid solar industry is still nascent. To address these issues, Mobisol created the Mobisol Akademie, an in-house training institute that trains employees and contractors on the installation and operation of solar panels and other solar-powered products.

Regarding partnerships with FIs, MNOs and E-Commerce companies, Mobisol sees the value of developing these alliances, especially with financial institutions and MNOs. Since the payment of the leases are done through mobile wallets, partnering with MNOs is important. However, Mobisol currently operates in 3 African countries where the largest MNO in each country controls more than 70% of the market share. Therefore, Mobisol has partnered with the largest MNO, but it is not as critical to partner with all of the other smaller players. Strategic partnerships with financial institutions have been essential for Mobisol's success. Currently, the company has built partnerships and alliances with more than 10 different financial institutions in Africa; the numbers may seem low in comparison to other successful startups in my research study, but they are vital to provide debt capital for the solar panel systems since it is a capital-intensive business. By using debt financing, it allows Mobisol to grow and scale faster than if it were to use equity financing, which is significantly more expensive.

Mobisol's interoperable business model is an important factor contributing to the company's success. The company's mobile payment technology works with all MNOs, giving the flexibility for any customer to use their solar panels. Moreover, Mobisol shares an agent network, so it can efficiently target more customers without having their own dedicated agents. Having interoperability through MNOs and agents provides the opportunity to access more customers and ultimately generate higher financial performance.

New Insights

Similar to JUMO, Mobisol has a highly scalable business model that has allowed the company grow quickly and expand into multiple countries. Although the company is mainly supplying solar panel systems in Tanzania, Kenya and Rwanda, it recently introduced DC-current electrical appliances that it sells and finances to its customers. These appliances are more efficient than traditional AC-current ones, and ultimately are more cost effective since there is no need for an alternator, an expensive component in the solar panel systems. In addition, in March 2017, the company announced a partnership with MTN Rwanda to offer high performance, affordable smart phones to its customers to be purchased through an instalment plan.[27] The company is also exploring expansion opportunities to Uganda and Nigeria in the next two years.

A new insight that Mobisol provides to my research study is how the type of product sold can impact the financial performance and financial inclusion of new technology ventures serving the unbanked and underbanked. In the recent Deloitte report "Reaching Deep into Low-Income Markets", the authors distinguish between "push" vs. "pull" products, and hypothesize that pull products tend to be more valuable than push products since there is ready demand for them and can be used immediately with little risk (*Reaching deep in low-income markets: Enterprises achieving impact, sustainability, and scale at the base of the pyramid*, 2017). Pull products include transportation, electricity and food items, which are necessities that

[27] http://www.biztechafrica.com/article/mobisol-mtn-rwanda-launch-smart-phone-affordable-p/12280/.

people need and use on a daily basis. In contrast, push products are goods and services that have less obvious value or that provide uncertain benefits in the future, such as loans, savings, insurance, etc. Organizations that sell pull products do not have to spend a lot in marketing to convince customers to adopt the products. In Mobisol's case, providing electricity to customers via solar panel systems is effectively a pull product, and thus a key reason why the company has been successful. Due to the high demand of pull products, a highly customer centric business model is not necessary since it is quite easy to show the product's value to potential customers. Therefore, I argue that pull vs. push product preference is an important consideration for new technology ventures that are serving the unbanked and underbanked in emerging markets. To drive higher financial inclusion, it may be necessary to do so by offering a push product (i.e., a loan) through a pull product, such as electricity in the form of solar panels.

Another important insight gained from Mobisol which may contribute to its success is the fact that the company has received funding from well-known and highly recognized development organizations such as IFC, the private arm of the World Bank. In 2016, IFC invested €5.4 million in Mobisol, and Investec Asset Management's African Private Equity Fund invested €9.2 million alongside IFC.[28] While the amount of funding is helpful, the brand name and recognition from these development organizations increases Mobisol's credibility and boosts its brand, resulting in higher customer trust and increased number of customers. Moreover, the

[28] https://techmoran.com/pay-go-solar-firm-mobisol-raises-16-million-deliver-decentralized-solar-energy-east-africa/

development organizations also help open doors to more resources that the firm may need which ultimately boosts its financial performance.

In summary, interoperability and strategic partnerships are clearly some of the most important factors for Mobisol's success. Pull vs. push products becomes a key factor that also needs to be considered when offering financial products/services to the unbanked and underbanked. Similar to JUMO's case study, a scalable business model is highly emphasized in order to drive higher financial inclusion and higher financial performance.

MicroEnsure Case Study

Background / Overview

MicroEnsure is a technology service provider that facilitates microinsurance products to the unbanked in emerging markets. The company is not an insurance underwriter but an intermediary, providing extremely affordable health insurance, or also commonly referred to as microinsurance, for the poor and marginalized; over 85% of customers are new to insurance. MicroEnsure develops and markets a wide range of innovative and customized insurance products such as crop, political violence, health, and life insurance, with premiums as low as $1.50 per month. Based in London, UK, the company was initially set up in 2008 as a non-profit enterprise, receiving grants from a wide variety of development organizations including the Bill & Melinda Gates Foundation. In 2012, MicroEnsure converted to a for-profit social enterprise. The company serves customers in Africa, India and Southeast Asia.

Business Model

MicroEnsure has a unique business model where the company sits between the distributor of the insurance product and the insurance underwriter. Essentially, the company develops insurance products that truly meet the customers' needs and partners with insurance providers that will originate and underwrite the products. The insurance providers are typically large corporations with a strong brand, have the ability to transact in cash and with distribution points that are accessible to the low-income markets. To access the customer base and distribute the products, MicroEnsure partners with the largest MNOs (typically 1 or 2 in a particular country) and bundles the insurance product as part of the MNO's offering to their customers. Payments of insurance premia (and to some extent, claims payments) are done via airtime deductions and/or credits. MicroEnsure provides end-to-end services to customers by using technology for the design of innovative insurance products, enrolment of customers, the collection of insurance premiums and the payment of claims.

MicroEnsure utilizes a "freemium" model, whereby it initially offers its insurance products for free to the MNO and banking customers. Once the customers see the significant value of the insurance product, the company then upsells them by charging a small fee, which may be for adding coverage to an additional family member. According to the CEO, the customer conversion rate is usually above 40%, which is very positive. Once they become paid customers, MicroEnsure can then introduce higher margin products which can lead to direct revenue to their partners.

Based on conversations with the CEO, he claims to generate double-digit profit margins.

MicroEnsure has significantly impacted the lives of the poor in many countries in Africa, as well as in India and Southeast Asia. By offering very low priced, highly valued insurance products to people who have never had insurance before, the company is able to help low-income individuals meet their healthcare costs and other needs when there are financial shocks or emergency, which can have devastating long-term consequences. In the book *Financial Inclusion at the Bottom of the Pyramid*, Realini (2015) devotes an entire chapter to MicroEnsure, and she quotes Richard Leftley saying the company's mantra: "No one wakes up in the morning and says, 'Today I want to buy insurance'. But you do wake up in the morning and wonder what will happen if your spouse dies or your kids get sick" (pg.110).

Since its founding, the company has demonstrated tremendous growth and scale, serving more than more than 28 million active customers and present in 15 countries across Africa, South Asia and Southeast Asia.

Support for Quantitative Results

Statistics indicate that approximately 1% of people in Africa and Asia purchase insurance; clearly, it shows that the insurance companies' product centric approach does not work well in these markets. MicroEnsure has upended the traditional insurance model by focusing on the customer, not the product. Specifically, the company figures out what are the customers' needs and then designs

an insurance product that meets them. MicroEnsure aims to end the big deficiencies in the existing insurance market by offering products that are very easy and simple to understand, with the minimum amount of paperwork and/or verification needed. The payment mechanism is also intuitive – the company uses mobile wallets and essentially deducts airtime minutes as payments for the insurance premiums. The company spends considerable time educating the customers, so they understand the benefits of having insurance and why it is essential for them. Finally, the company prides itself in fast turnaround times, processing and paying claims within 72 hours. All of these points support an above average Customer Centricity score when compared to other successful startups in my research study. Interestingly, the company is able to achieve a high customer-centric business model with a minimal amount of staff on the ground, relying on technology and calling back customers when they have questions or issues.

Strategic partnerships are an essential ingredient for MicroEnsure's success. In particular, partnerships with MNOs is the main way to access customers. The mobile phone infrastructure serves as an ideal distribution channel to access the unbanked and the poor. As stated in the Statement of Research Problem section, out of the 2 billion people who are unbanked, 1.7 billion have a mobile phone. MicroEnsure views MNOs as both partners and customers; currently, the company has partnerships with 12 MNOs in different countries; this number is significantly higher than the average of other startups that were classified as successful in my research study. Similarly, partnerships with financial institutions, in this case insurance providers, is also critical, since these companies underwrite the insurance

products that are developed by MicroEnsure. Currently, MicroEnsure partners with 90 insurance providers globally, which supports the claim that the company has above average number of strategic partnerships with FIs when compared to other successful startups in my model.

Finally, it is worth highlighting that MicroEnsure's CEO and founder, Richard Leftley, has extensive prior experience in the insurance industry, working as a reinsurance broker for more than 6 years, and then introducing insurance products to the Opportunity International Network, a non-profit organization that provides microfinance loans, savings and insurance to over 14.3 million people in 24 countries who are working their way out of poverty. These experiences allowed Richard to have an in-depth understanding of the customer pain points with insurance, and led him to design and develop a unique business model to provide insurance to the poor.

New Insights

MicroEnsure has demonstrated it has a highly scalable business model, which is a big contributor to the company's success. As mentioned above, the company is present in 15 countries in Africa and Asia, including India, and currently serves more than 28 million active customers. Although the company offers one type of product, insurance, it has created more than 200 different insurance products that are tailored for the customers' needs.

Similar to Mobisol, MicroEnsure has also received significant financial support from development organizations – specifically, IFC, Bill & Melinda Gates Foundation and Omidyar Network. The support from these organizations help build

higher brand awareness and credibility for MicroEnsure, which in turn enhances customer trust and leads to higher number of customers and potentially higher financial performance.

To conclude, MicroEnsure has transformed the insurance market, making it available and affordable to everyone. The company is a true innovator in financial inclusion, especially in a financial product which does not get much attention, but is essential for our daily lives. Customer centricity, strategic partnerships and prior financial services experience have been key contributors to the company's success. The case study also confirms that the type of partnership is highly dependent on the company's products and services. As the regression models in my research study demonstrate, strategic partnerships with MNOs were not statistically significant; however, in MicroEnsure's case, they are absolutely necessary.

The following quote from Realini (2015) summarizes best the company's products and how revolutionary it is compared to traditional insurance:

"As opposed to selling insurance in an industrialized economy, what MicroEnsure does for microinsurance is not just taking a standard insurance policy and knocking off some benefits and lowering the premium – they are fundamentally redesigning the product and making it extremely simple. MicroEnsure sells some life insurance products that have absolutely no exclusions. They do not demand to know about pre-existing conditions. They do not consider cause of death, whether it be disease, civil war, or suicide…with microinsurance, if you die, MicroEnsure pays – no questions asked" (pg.111).

The 4 illustrative case studies presented above provide support for the quantitative results of the regression models. Specifically, the Fintech new ventures demonstrate strong support for having a customer centric business model (Hypotheses 2a and 2b) – namely, JUMO, Wave Money and MicroEnsure have above average customer centricity scores when compared to other Fintech startups that were classified as successful in the binomial logit model. In addition, the case studies also provide support for strategic partnerships – in particular, partnerships with Financial Institutions and E-Commerce companies (Hypotheses 4a and 4b). More importantly, the new insights gained from the case studies highlight new factors that should be evaluated in future research. For instance, a scalable business model was a new factor highlighted in JUMO, Mobisol and MicroEnsure, which has been essential for the success of these companies. To achieve higher financial inclusion, it is important to have a business model that can quickly scale up and reach as many customers as possible. Another important factor that has emerged from the case studies (JUMO and Wave Money) is having a founder / founding team with prior startup experience, which complements the prior financial services industry experience. Prior startup experience has been studied extensively in the entrepreneurship literature and has been shown to positively impact business performance (Duchesneau & Gartner, 1990; Miloud et al., 2012; Song et al., 2008; A. Zacharakis & Shepherd, 2005). Mobisol's case study also emphasized the role of the type of product offered to customers – whether it is a "pull" vs. "push" product, and how it can affect the strategy and business model that the Fintech startup adopts. In essence, by using a pull product strategy, the Fintech startup may not need to have a high customer centricity score in

order to be successful. Finally, funding from well-known investment firms and highly recognized development organizations have also contributed to the success of Mobisol and MicroEnsure by adding credibility and access to other sources of capital and potentially new distribution channels. In summary, the case studies provide valuable qualitative insights that complement the quantitative analysis and highlight additional factors that should be analyzed in future research.

Chapter 7: Discussion and Conclusions

Academics and development organizations unanimously agree that digital technologies such as mobile phones, cloud, big data analytics and blockchain are the biggest enablers to financial inclusion – providing access to affordable financial products and services to the 2 billion poor and marginalized adults globally that are excluded from the formal financial sector. Most studies have focused on policy issues and performed experiments to demonstrate how digital financial services aid the financially excluded by making it economically possible to serve them. My research study takes a different approach by addressing this topic from the perspective of new technology ventures, or Fintech startups, that are introducing innovative ways to drive financial inclusion. A small subset of Fintech startups, which are serving the unbanked and underbanked, play a vital role in solving this important global issue, and my research study is one of the first empirical studies that investigates the most important factors that these new ventures need to have in order to succeed in their social mission, while at the same time driving higher financial performance.

This research study develops a multi-level framework based on established strategic management theories and examines how factors related to different aspects of a company's business model, resources/capabilities, networks & strategic partnerships and market/environment affect the success of new ventures, as measured by financial performance and financial inclusion. Research from academics, consulting firms and development organizations have qualitatively studied the factors in my empirical model, but none have performed a quantitative study with actual,

objective data from startups to verify and quantify the effects of these factors – this is the main goal of my research study.

Multivariate linear regression and binomial logit regression models were run to study the effects of these factors from different perspectives of defining success. The multivariate linear regression models analyzed two separate dependent variables that represent the dual goal of these Fintech startups: (1) Financial inclusion, as measured by Active Customers; and (2) Financial performance, as measured by Annual Revenue. Using Annual Revenue as a dependent variable addresses the issue that is frequently observed in large firms and new ventures related to Price and Quantity, where Quantity may be directly related to number of customers. The general equation for Revenue is equal to Price multiplied by Quantity, and in a lot of cases, it can be observed that firms seek to maximize Revenue by increasing Price, while keeping Quantity constant. However, in the case of Fintech new ventures that are serving the unbanked and underbanked, these firms are aspiring a social goal and may keep Price at a low level, while increasing the Quantity, or customer base, over a period of time. Therefore, these new ventures are effectively addressing the dual goal of financial inclusion and financial performance.

The second type of analysis performed, the binomial logit regression model, used an Overall Success binary dependent variable, defined as having Active Customers and Annual Revenue values above the median values relative to the startups in my data sample. This measure is more deterministic, and looks at how the changes in the independent variables affect the probability of success of these Fintech new ventures. Due to the limitations in the data, the Overall Success variable had to

be defined as a relative measure, as opposed to using a benchmark value of success, which is not ideal.

The results demonstrate that the factors that I analyzed significantly explain the variation in financial performance, financial inclusion and overall success in the sample of Fintech startups that I studied. The Adjusted R-Squared for the linear regression models were 0.56 and 0.60 for the Active Customers and Annual Revenue models, respectively, while the "pseudo" R-Squared, or McFadden's R-Squared, for the binomial logit model was 0.57. In particular, founders/founding team with prior financial services experience, customer centricity, and strategic partnerships with financial institutions and e-commerce firms, significantly affect the performance of these firms in the different regression models.

Prior financial services industry experience by the founder/founding team is positively related and statistically significant to Annual Revenue in the regression model, and to Overall Success in the binomial logit model. The results partially support my hypothesis, showing that this factor will impact the financial performance of a new technology venture, and confirms the findings from prior empirical entrepreneurship studies (Song, Podoynitsyna, Van Der Bij, & Halman, 2008; Miloud, Aspelund, & Cabrol, 2012) Having a founder/founding team with prior industry experience gives them an upper hand to better understand the key issues and problems that need to be solved, and thus develop products that customers really need. However, this factor was not statistically significant in the Active Customer linear regression model, which means that it may not lead to higher number of customers, and hence higher financial inclusion. As discussed previously, the weak

relationship between Revenue and Customers could potentially explain why this factor did not have a significant effect on the Active Customer linear regression model.

Customer centricity has a positive and statistically significant effect on Active Customers, the main measure used for financial inclusion in the linear regression model, and only modest statistical significance on Annual Revenue, the main measure for financial performance in the linear regression model. In addition, customer centricity has a highly significant effect on Overall Success in the binomial logit regression model. Since customer centricity focuses on the customer, it is obvious to see that it would have a higher impact on the Active Customer dependent variable than on the Annual Revenue dependent variable. As discussed in the Analysis of Results chapter, the weak relationship between customers and revenue when offering financial products to the poor and marginalized confirms the results from the regression models. The positive effects of having a customer centric business model have been studied extensively in the marketing field, as well as for large corporations. Furthermore, CGAP, IFC, Accion and other development organizations have established that adopting a customer-centric business model is important in driving higher financial inclusion, since there is a large disconnect between poor people who have registered for formal bank accounts and those who actively use them. In fact, CGAP recently launched the Customer Centric Guide, a web-based collection of toolkits and experiments to help financial service providers deliver products and services that better meet the needs of low-income customers.[29] My research study

[29] http://customersguide.cgap.org/why-go-customer-centric/customer-centricity.

expands on the work that CGAP has done by developing an objective measure of customer centricity that startups and other financial service organizations can use, and empirically demonstrating its impact on financial inclusion.

Given the exploratory nature of this research study, it is challenging to address the likely motivation of these Fintech new ventures, specifically whether they want to "Do well by doing good" or "Doing good by doing well". Customer centricity may provide a signal to the strategy of these Fintech startups – by focusing on solving the customers' problems and needs, these startups acquire a larger customer base and achieve financial sustainability in the future. As opposed to traditional marketing strategies used by commercial enterprises, the Fintech startups serving the unbanked and underbanked may not resort to a "bait and switch" strategy to maximize profit.

This research study provides empirical support for the importance of strategic partnerships on the performance of new ventures. Partnerships with financial institutions had the strongest impact across all of the models, while partnerships with e-commerce firms was significant in the Annual Revenue and Overall Success models, and partnerships with MNOs was not significant at all. Since mobile phones are the main tool to help drive financial inclusion for the poor, and given the success of M-PESA through its ownership by Safaricom, I expected to see that alliances with MNOs would significantly impact the startup's financial performance and drive higher financial inclusion; however, this was not the case. An explanation for this result may be due to the significant growth in smartphone adoption rate in most emerging markets, de-emphasizing the importance of partnering with the network operator, and instead focusing on the data generated through apps and mobile internet

connection. Another way to explain this result is based on the size of the MNO; if the MNO has a significant, controlling market share (more than 60%) in a country, partnerships with multiple MNOs may not be necessary.

The partnerships between Fintech startups and financial institutions is a topic that has received a lot of attention recently, with the announcement that the Monetary Authority of Singapore (MAS) and IFC have set up the ASEAN Financial Innovation Network (AFIN) to help build collaboration between Fintech startups and financial institutions which are focused on driving higher financial inclusion in the region.[30] Strategic partnerships with financial institutions and MNOs are dependent on the product segment that the Fintech startup serves; the results of my model show that the average number of partnerships with financial institutions and MNOs is different depending on the product segments for successful startups.

An interesting outcome of the research study is that strategic partnerships with e-commerce firms is statistically significant, highlighting a new distribution channel that Fintech startups should exploit to access more customers and drive higher financial performance.

The results of the regression models show mixed support for Interoperability. This factor was highly statistically significant in the Active customers linear regression model, but not significant in the Annual Revenue linear regression or the binomial logit model. The reason for the mixed results may be that this factor may act as a mediator, rather than as a main effect in the models, which I was unable to

[30] http://www.mas.gov.sg/News-and-Publications/Media-Releases/2017/IFC-and-Monetary-Authority-of-Singapore-Collaborate-to-Advance-FinTech-Innovation-in-Asia.aspx

test due to the limited sample size. Please refer to Chapter 9 for more details on areas of future research.

Numerous studies have shown that the regulatory environment plays an important role in financial inclusion. On the other hand, the results of my research study demonstrate that the measure of openness of the regulatory environment to financial inclusion is not statistically significant in any of the models, which contradicts prior research. In my view, it is likely that the measurement I selected to measure how enabling the regulatory environment is to financial inclusion is not the correct one, making the results not relevant. Moreover, it is highly likely that the regulatory environment is a mediator / moderator, not a main effects variable. Finally, while a proactive and enabling regulatory environment may lead to higher financial inclusion and higher financial performance, a reactive regulatory framework might actually be detrimental to financial performance – for instance, the introduction of Sarbanes-Oxley in the U.S. (Cao, Ghosh, Goh, & Tschang, 2016)

Illustrative case studies of four Fintech startups classified as successful from my data sample were presented to support and complement the results of the empirical models. The case studies also highlighted interesting and new insights that the regression models did not capture. Specifically, additional factors such as scalability, funding from well-known investment firms and development organizations and prior startup experience could also contribute to driving higher financial inclusion and higher financial performance for Fintech startups serving the unbanked and underbanked. Pull vs. Push products also can influence the customer adoption rate and ultimately impact the company's financial performance.

This research study significantly contributes to expanding the limited empirical work done in the entrepreneurship and social entrepreneurship academic literatures, and offers quantitative support to new factors such as customer centricity, which plays a key role in financial inclusion. The research study also provides strong confirmation on the importance of other factors such as strategic partnerships. The binomial logit model of overall success is a useful contribution to VC firms and investors; unlike the linear regression models for Annual Revenue and Active Customers, this model provides an empirical, deterministic, easy to understand, independent assessment on how to evaluate Fintech startups in financial inclusion that complements their internal methods. Finally, for Fintech founders, it gives them clear guidelines on what factors they should be focusing to increase their chances of success.

Ultimately, this exploratory research study represents the start of more academic research that should be done on startups that are serving the unbanked and underbanked in emerging markets. **The results highlight that a mix of quantitative and qualitative insights is important to move research forward on the vital role that Fintech startups play in driving financial inclusion in emerging markets.** More work is needed to help these social enterprises to continue their dual mission of driving higher financial inclusion and higher financial performance. The next two chapters address the weaknesses and limitations of this research study, and the main areas of future research that I envision.

Chapter 8: Weaknesses and Limitations

My research study has several methodological weaknesses and limitations. First, due to the lack of data on failed new ventures, there is survivorship bias in the data. To partially address this issue, I ran a binomial logit model that classifies startups as successful or not successful based on their relative financial and social impact performance when compared to other startups in the data sample. Given the limited amount of data available on successful startups in financial inclusion, it is not possible to create a benchmark / index of success which I could use to compare a startup's performance to determine whether it is successful or not; hence, success and failure is a relative measure against the startups evaluated in my research study. To expand on this point, the startups that achieve the highest business performance in terms of financial metrics and financial inclusion, when compared to the other new ventures in the dataset, can be considered more successful than those startups that have lower business performance. Therefore, there will be different degrees of 'success', and those startups which have the lowest business performance will be considered 'least successful'.

As noted in the Research Methodology chapter, the research study is static, and only focuses on the effect that the independent variables have on the performance of Fintech startups up until August 2017, the date when I completed the data collection process. Consequently, the study will look at the success of these startups only up to that date, even though the startups are continuously changing.

Another potential weakness is the limited sample size, which can make it challenging in performing different statistical analyses, and more importantly, making sure that I have sound statistical results. Although there are thousands of Fintech startups globally, the number of Fintech startups that are serving the unbanked and underbanked is a small subset of the Fintech startup universe. I identified 172 Fintech startups in Africa, South Asia and Southeast Asia regions to contact for my research study, but as expected, I did not contact all of them (due to limited time), and out of the ones that I contacted, it was expected that some of them would not be interested in participating in the research study. Out of the total identified, I contacted (met in person and/or spoke to over the phone) 105 Fintech startups, or about 60% of the total. Out of the 105 Fintech startups that I met, 63 of them agreed to participate in my research study. It is important to note that only 20 startups declined to participate, while the rest were in progress to provide a decision on whether they would be interested in participating or not. A sample size of 63 companies is relatively small when compared to other empirical studies on new ventures such as C. Lee, Lee, & Pennings (2001), where the authors analyzed 137 Korean technology companies, and Miloud, Aspelund, & Cabrol (2012), where the authors analyzed 102 new ventures. Even though the sample size is relatively small when compared to other empirical studies, the size is considered acceptable to provide sound statistical results. The research study can be expanded by spending more time and resources to collect data on the missing startups in order to increase the statistical validity and predictive power of the empirical model.

Due to the limited sample size, this research study uses an exploratory approach to understand the main effects of the most important variables that I hypothesized would have the largest impact on financial performance and financial inclusion. However, there are other variables that should be considered to extend the model developed in this research study, such as the factors discussed in the New Insights section of the illustrative case studies. Other consequences of the limited sample size are that interaction effects could not be studied in this research, and I did not have enough data points to test the predictive power of my empirical model.

A common weakness that is present in my study is self-reporting bias, since I am conducting interviews/surveys as the primary method to collect data. To mitigate this issue, I checked the reliability and validity of the data supplied by the Fintech founders by looking at secondary data sources on a random set of samples, to confirm that the data supplied by the Fintech startups are correct; this approach is consistent with prior academic research (Miloud, Aspelund, & Cabrol, 2012; Zahra, Ireland, & Hitt, 2000). Some of the data that I was able to verify through paid subscription databases and other secondary sources include revenue, number of countries present, number of different products offered, number of customers served, amount of funding received and post-money valuation. Common method bias is also possible when conducting interviews and surveys to gather data, which can inflate the regression coefficients. My research study addresses this potential issue by collecting objective information and measures from the Fintech startup founders, mostly avoiding subjective type questions. A further issue in the data collection process is related to the quality of data collected. To help startup founders get more comfortable in

sharing sensitive data, most of the data was gathered in the form of ranges, and thus estimates were derived as the midpoint of the ranges. This approach means that I do not have exact figures for some of the different variables which may compromise some of the data quality.

Given the challenges and limitations presented above, care must be taken on the interpretation of the results from the different empirical models. It is safe to say that the models provide support on the statistical significance of the different factors that were evaluated. Nevertheless, I was not able to test the predictive power of the models, so it is hard to say that the numerical effects discussed in the Analysis of Results section are completely accurate and reliable. Moreover, certain variables such as Strategic Partnerships may have a two-way causal relationship with financial performance and social impact. In particular, it is possible, although unlikely, that higher financial performance and higher number of active customers could lead to more strategic partnerships for a startup. Therefore, it is important to be aware of these potential issues when reviewing the results of the empirical analysis.

Chapter 9: Areas of Future Research

The exploratory nature of this research study and some of the limitations mentioned in previous chapter offer fertile ground for areas of future research. Increasing the sample size would be an important step, since it opens the possibility to expand the empirical model and evaluate other key areas that were not studied. By having a larger sample size, the predictive power of the model can be tested and also may help increase the model's statistical validity.

There are potential strong interaction effects between the different variables in the model which would be an essential area to evaluate by having a larger sample size. Specifically, there are 3 interaction effects that can be readily identified: (1) Regulatory environment as a moderator between Interoperability and the success (as measured by financial inclusion and financial performance) of Fintech new ventures; (2) Interoperability as a mediator between Strategic Partnerships and success; and (3) Scalability as a mediator between Strategic Partnerships and the success of Fintech new ventures. In my research study, I argue that Fintech startups that adopt an interoperability business model and operate in an enabling regulatory framework that is open to financial inclusion will be able to achieve higher financial performance and drive higher financial inclusion. In addition to having a direct effect on the success of Fintech startups, the regulatory framework may also act as a moderator to the relationship between interoperability and the success of Fintech startups in financial inclusion. Lauer & Tomilova, 2017 discuss how interoperability between the different players in digital financial services can expand the reach of accounts and products/services offered to the people at the BOP and the underbanked.

To achieve full interoperability, it requires bringing together many different players which may include banks, payment providers, Fintech startups and MNOs into the financial system. According to the G20 Program for Financial Inclusion (GPFI), the regulatory framework can influence interoperability by making sure that it is technically feasible among the different players involved (*Global Standard-Setting Bodies and Financial Inclusion: The Evolving Landscape | GPFI*, 2016). Additionally, by having an open approach to allowing different non-bank players to provide digital financial services and establishing regulations that promote financial inclusion, the regulatory framework can enhance the interoperability between the Fintech startups and the other players in the value chain, since it gives them the flexibility to work together in an environment that is approved by the regulators. Another potential interaction effect that could be evaluated is the fact that interoperability could be a mediator to the relationship between strategic partnerships and the success of Fintech startups in financial inclusion. By having more strategic partnerships with Financial Institutions, MNOs, E-Commerce companies and others, it is possible that it may drive higher interoperability between the different players and thus expand the reach of products/services offered to the unbanked and underbanked, resulting in higher financial inclusion and higher financial performance. Interactions effects where scalability serves as the mediator to other factors and the success of Fintech startups should also be analyzed. Rai, Borah, & Ramaprasad (1996) studied the success factors of strategic alliances in the information technology sector, and they alluded to the fact that having strategic alliances may allow companies to further expand their products/services into potentially new markets,

which increases their scalability resulting in higher financial performance. Therefore, scalability acts as a mediator between strategic partnerships and business performance, or success, of a startup.

A larger sample size can also allow the testing of additional factors that may influence the success of Fintech startups in financial inclusion. The Resource Based View (RBV) theory of strategy management has been applied to new ventures by numerous academic researchers (C. Lee, Lee, & Pennings, 2001; Kakati, 2003; Miloud, Aspelund, & Cabrol, 2012). The authors argue that startups pursue entrepreneurial strategies that focus on the accumulation of intangible resources in order to grow and survive. Some of the firm specific resources refer to the founding team's prior startup and relevant industry experience, as well as financial resources and investments from VC firms and other institutions. These factors could also be evaluated to see if they have a significant effect on the performance of Fintech startups in financial inclusion. Additional factors related to the market/environment would also make sense to analyze. The market/environment is the second most widely studied area in entrepreneurship research after the founder / venture team characteristics as it relates to the success of new ventures. While I capture some of these factors as control variables in my empirical model, one factor that could potentially influence the success of Fintech startups in financial inclusion is a National Electronic Identity (ID) Infrastructure. There are approximately 1.5 billion people, mostly in Asia and Africa, which do not have a proof of identity, and essentially are cut off from accessing basic services and rights (*Identification for Development Strategic Framework*, 2016). Without a proof of identity such as an ID

card, the Know Your Customer (KYC) process required to open a bank account becomes more onerous and may lead to the rejection of opening the account. Some emerging market countries have set up national ID systems, but in most of the developing world, there is no national legal proof of identity for all of the people. The electronic national ID system greatly simplifies the KYC process and thus makes it easier to conduct digital financial transactions. In addition, an electronic and/or biometric identification system makes it more difficult to forge and thus can impact the behavior of risky users of financial services. This enhanced system can also allow better monitoring and tracking of borrowers. Moreover, it should enable Fintech startups in financial inclusion to more easily access potential customers and simplify the onboarding process. In turn, this should drive higher customer growth resulting in higher financial performance and higher financial inclusion.

Given that success is an evolutionary process, the key factors that impact the success of Fintech startups should vary depending on the startup's stage in their lifecycle. Due to the limited number of startups in the data sample, it was not possible to analyze this phenomenon in this research study. However, if there is access to enough data on Fintech startups in financial inclusion that are at different stages of development, it would be interesting to develop empirical models to determine the most important factors that impact the success of Fintech startups at each stage of their development cycle. This way, for startups that are at very early stages of development (i.e., just developed its first product/service and started selling to customers), an empirical model will be developed that will show which factors are most significant; a different empirical model will be developed for startups that are

more mature and are scaling up their revenues and customers, which may identify similar or different factors that lead to their success.

Future research on gaining a better understanding of the different factors that explain the variation of financial performance and financial inclusion in my research study would be an indispensable next step. An in-depth study of the dynamics of the strategic partnerships that Fintech startups set up with financial institutions and e-commerce companies will provide a better explanation on the importance of these factors. Specifically, it would be helpful to address the following questions:

- What factors lead to the successful creation of these relationships?
- How does culture, business characteristics (i.e., markets, products, etc.), and other factors affect the dynamics of these partnerships?

Similar in-depth studies should be performed on customer centricity and interoperability, which are statistically significant in my research study, so that we gain a better perspective on how Fintech startups in financial inclusion can best implement these business models.

Financial exclusion is a global issue that affects more than half of the global adult population. My research study focuses on Fintech startups that are trying to solve this issue, but only in select regions of the world which have the highest occurrence of financial exclusion. Extending this research study to cover China, one of the largest economies in the world and which has a significant proportion of its population that are unbanked and underbanked, would be extremely fruitful. A similar empirical study should be conducted on China's Fintech startups that are

serving the unbanked and underbanked, to determine which factors are most important to drive higher financial performance and financial inclusion in the country. The results can then be compared against my research study to see if there are similar factors affecting the success of these startups. More importantly, given the tremendous success of companies such as Alipay and many others driving higher financial inclusion in the country, it would be helpful to understand what key lessons and insights from these success stories can be applied to other regions of the world.

Lastly, future research on the social aspects of Fintech startups in financial inclusion would be helpful in order to understand the effect that social factors may have on driving higher financial inclusion and higher financial performance. For example, do the startup founders need to have a stated social mission and objective in order to be able to develop better products and services that help the unbanked and underbanked? Are the founders who are more focused on the social aspects able to deliver both higher financial inclusion and higher financial performance, or is there a trade-off between social impact and financial performance? Does the amount of funding from VC firms get affected if the startup has a higher focus on the social impacts? The additional research would expand the empirical analysis that I have performed and determine the significance of social factors on the success of the Fintech startups in financial inclusion.

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Appendix: Interview / Survey Questions for Data Collection

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
Business Strategies	**Organizational Structure / Business Model Characteristics**	**Business Model Type**	Business Model Type	1. Regarding the business model type, please classify your business into one of the following (select one): a. Freemium b. Subscription c. Referral fee d. Advertisement fee e. Markup f. Other: _____	
				2. Regarding the customers that you are serving, please classify your business into the following (you can select more than one): a. B2C (Business-to-Consumer) – your business is directly serving consumers b. B2B (Business-to-Business) – your business is providing products/services to other businesses c. B2B2C (Business-to-Business-to-Consumer) d. P2P (Peer-to-Peer) e. Other: _____	
				3. For the customers you are targeting, if you had to choose one of the below, which one would you say is your main target customer base (choose one only)? a. Unbanked b. Underbanked (have a bank account, but only limited usage with no access to credit) c. Banked (have a bank account, and regular users of multiple banking products)	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
		Market Sub-segments served	Market Sub-segments served	4. For the market sub-segments you are serving, what are the main areas of focus for your startup. Please select from the list below (check all that apply) a. Peer-to-Peer lending b. Lending c. Money transfer (remittances) d. Payments e. Credit scoring / data analytics f. Insurance g. Savings h. E-commerce i. Other: _____	
	Mission/Objectives	**Social Mission/Objective**	Social mission/objective	5. Does your startup have a social mission / social objective? a. Yes b. No	
	Scalability	**Scalability**	Geographic expansion	6. Currently, in how many countries are you offering your products / services? a. 1 b. 2 c. 3 to 5 d. 6 to 8 e. Greater than 8	
			Product/Service Expansion	7. Currently, how many types of products/services are you offering in each market you operate? A product/service type refers to "Credit Scoring", "Lending", "Payments", "Money Transfer (Remittance)", "Insurance", "Savings"	
			Technology Scalability	8. Is the technology you are using for your product/service allow you to easily scale up without incurring significant costs or compromise the efficiency of the operations? a. Yes b. No	
	Customer Centricity	**Customer-Centricity**	Simplicity / Ease of Use of Product / Service	9. If your startup is offering loans, payment capabilities or money transfer services, how long (days) does it take to complete a transaction – from the time the customer applies to the time they receive the money?	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				10. If your startup is offering microinsurance, how long (days) does it take to process the insurance claim?	
			Customer Experience	11. Is the customer experience positive (easy, intuitive, understandable, quick and dignified)? a. Yes b. No	
			Understanding Customers	12. Do you currently perform detailed market research on customers and derive insights to better target your customers? a. Yes b. No	
				13. Are there mechanisms for gathering customer insights from front line staff? a. Yes b. No	
			Product Design	14. Do the different operational areas within your startup work together to design products/services based on customer insights? a. Yes b. No	
				15. Do you use design thinking principles when designing the customer interface for your product/service? a. Yes b. No	
				16. Does your startup mine data about customers and use it to design and deliver services? a. Yes b. No	
				17. Do your customers influence your innovations? a. Yes b. No	
			Customer Performance Metrics	18. Do you have customer performance metrics in place that looks at which types of customers you are serving, how they are using your products/services and how satisfied they are? a. Yes b. No	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				19. Is profitability and performance monitored at the customer or customer segment level? a. Yes b. No	
				20. Do you track Customer Lifetime Value (CLV) for your business? a. Yes b. No	
				21. If you track CLV, what has been the average growth rate in CLV since founding your startup? a. 0% to 10% b. 10% to 20% c. 20% to 30% d. Greater than 30% e. NA – I don't track CLV	
				22. Do you track Customer Acquisition Cost (CAC) for your business? a. Yes b. No	
				23. If you track CAC, what is the current CLV/CAC ratio for your business? a. 0x to 1.0x b. 1.0x c. 1.0x to 3.0x d. 3.0x to 5.0x e. 5.0x to 7.0x f. Greater than 7.0x g. NA – I don't track CLV/CAC ratio	
				24. Do you measure customer satisfaction? a. Yes b. No	
			Transparency and Support systems to customers	25. Does your startup have 24/7 Customer Service support – either through mobile, online, or physical phone number? a. Yes b. No	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				26. Does your startup have fraud detection mechanisms currently in place? a. Yes b. No	
				27. Does your startup provide transparency on how the company uses the customers' data, and provide Consumer Privacy Protection policies? a. Yes b. No	
			Trust in Product / Service	28. What percent of your customers are using the products / services that you are offering (fill in a percentage for each; needs to add up to 100%): a. Not Applicable – my startup only offers 1 product / service _____% b. Using only 1 product / service, but not all _____% c. Using 2 or more products / services, but not all _____% d. Using all products / services _____%	
				29. What percent of your customers are repeat customers? Repeat customers are defined as customers that use your product/service at least 3 times within the last year. An estimate value or range would be fine.	
				30. Do your customers regularly refer you to other / new customers? a. Yes b. No	
	Interoperability	**Interoperability**	Percent of all platforms that the product / service works in	31. What % of all of the mobile network operators does your product/service work in for each respective country that you operate? a. Less than 25% b. 25% to 50% c. 51% to 75% d. 76% to 100% e. 100%	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				32. What different **mobile technology platforms** does your product / service work in? Please check all that apply. a. USSD b. Text / SMS c. Android d. iOS (Apple) e. Windows Phone f. Blackberry	
			Level of Interoperability in Business Model	33. How would you define the level of interoperability of your startup's business model (select one): a. Agent-Level – your customer can use the agent networks of other MNOs for cash in / cash out b. MNO-Level – your customer can use your product/service across multiple MNOs c. Platform-Level – customer can use your product/service across any other digital financial service platform (which may be similar to yours) d. None of the Above – Works only within my website / mobile app / system	
	Customer Strategy	**Customer Acquisition Strategy**	Methods to acquire customers	34. Describe your customer acquisition strategy – specifically, please provide an approximate percentage for each item below, which should add up to 100%: a. Traditional ads using TV, radio, billboards, newspapers, magazines _____% b. Online ads through different websites _____% c. Social media (Facebook, Twitter, other local social media) _____% d. Agents / distributors _____% e. Direct sales _____% f. Referral program _____% g. Other – please provide: _____%	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
			Customer Conversion Rate	35. What is the **average customer conversion rate** for your business **currently**? a. Less than 5% b. 5% to 10% c. 10% to 15% d. 16% to 20% e. 21% to 25% f. Greater than 25%	
		Agent Metrics	Agent Networks	36. Do you use an agent network for your product/service? If so, what is the current size of your agent network?	
				37. As a follow-up to the previous question, how many years did it take you to reach the current size of your agent network?	
				38. In how many cities and regions of the country does your agent network cover?	
				39. What % of your agents are in (percentages should add to 100%): a. Not Applicable – my startup does not use agents b. Rural areas _____% c. Urban areas _____%	
	Low Margins	**Low Margins**	Fees to Customer	40. Do you offer your main product / service for free? a. Yes b. No	
				41. How does your product / service compare to the existing products / services used by customers currently, in terms of affordability? a. Same price b. Lower price (10% to 50% lower) c. Significantly lower price (> 50% lower) d. Not Applicable – there is no existing product/service that this replaces	
				42. What is the fee / cost to the customer to do a transaction in your platform? Please describe the different fees / fee structures	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
			Discounts / Promotions	43. Do you currently offer significant discounts / promotions (discounts of 20% or greater) to incentivize customer usage of your products / services? a. Yes b. No	
				44. How often (# of times per year) do you offer significant discounts / promotions (discounts of 20% or greater) to incentivize customer usage of your products / services?	
Networks & Strategic Partnerships	**Strategic Partnerships**	**Strategic Partnerships**	Partnerships with Banks (local and multinational) Partnerships defined as having revenue sharing agreements, sharing of distribution channels and/or customers, and other legal agreements. It also means that you can use your partners' company name/logo in your app / website	45. How many partnerships do you currently have with the **top 10 local financial institutions (by revenue)**? Financial institutions refer to banks, lenders, insurance companies, microfinance institutions (MFIs), asset managers a. 0 b. 1 c. 2 to 4 d. 4 to 6 e. Greater than 6	
				46. As a follow up to the previous question, if your startup has been in business for more than 1 year, **how long (number of years)** have you had the partnerships with the **top 10 local financial institutions**? a. Not applicable – startup has only been in business for 1 year b. Less than 1 year c. 1 to 3 years d. 4 to 6 years e. Greater than 6 years	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				47. How many partnerships do you currently have with **multinational banks or financial institutions (lenders, insurance companies, microfinance institutions, asset managers, etc.)**? a. 0 b. 1 c. 2 to 4 d. 4 to 6 e. Greater than 6	
				48. As a follow up to the previous question, if your startup has been in business for more than 1 year, **how long (number of years)** have you had the partnerships with **multinational banks or financial institutions**? a. Not applicable – startup has only been in business for 1 year b. Less than 1 year c. 1 to 3 years d. 4 to 6 years e. Greater than 6 years	
			Partnerships with Mobile Network Operators (local and multinational) Partnerships defined as having revenue sharing agreements, sharing of distribution channels and/or customers, and other legal agreements. It also means that you can use your partners' company name/logo in your app / website	49. How many partnerships do you **currently** have with **mobile network operators**? a. 0 b. 1 c. 2 to 4 d. 4 to 6 e. Greater than 6	
				50. If your startup has been in business for more than 1 year, **how long (number of years)** have you had the partnerships with **mobile network operators**? a. Not applicable – startup has only been in business for 1 year b. Less than 1 year c. 1 to 3 years d. 4 to 6 years e. Greater than 6 years	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
			Partnerships with E-Commerce Companies (local and multinational) Partnerships defined as having revenue sharing agreements, sharing of distribution channels and/or customers, and other legal agreements. It also means that you can use your partners' company name/logo in your app / website	51. How many partnerships do you **currently** have with **local e-commerce companies?** a. 0 b. 1 c. 2 to 4 d. 4 to 6 e. Greater than 6	
				52. If your startup has been in business for more than 1 year, **how long (number of years)** have you had the partnerships with **local e-commerce companies?** a. Not applicable – startup has only been in business for 1 year b. Less than 1 year c. 1 to 3 years d. 4 to 6 years e. Greater than 6 years	
				53. How many partnerships do you **currently** have with **multinational e-commerce companies?** a. 0 b. 1 c. 2 to 4 d. 4 to 6 e. Greater than 6	
				54. If your startup has been in business for more than 1 year, **how long (number of years)** have you had the partnerships with **multinational e-commerce companies?** a. Not applicable – startup has only been in business for 1 year b. Less than 1 year c. 1 to 3 years d. 4 to 6 years e. Greater than 6 years	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
			Partnerships with multinational credit card / payment companies Partnerships defined as having revenue sharing agreements, sharing of distribution channels and/or customers, and other legal agreements. It also means that you can use your partners' company name/logo in your app / website	55. How many partnerships do you currently have with **multinational credit card / payment companies (i.e. PayPal, Visa, MasterCard, AMEX, etc.)**? a. 0 b. 1 c. 2 to 4 d. 4 to 6 e. Greater than 6	
				56. If your startup has been in business for more than 1 year, **how long (number of years)** have you had the partnerships with **multinational credit card / payment companies**? a. Not applicable – startup has only been in business for 1 year b. Less than 1 year c. 1 to 3 years d. 4 to 6 years e. Greater than 6 years	
	Business Networks	**Business Networks**	Experience in terms of local laws, regulations and how business is done	57. How many years have you done business in the country that you intend to operate prior to founding your startup? a. Less than 1 year b. 1 to 5 years c. 6 to 10 years d. 11 to 15 years e. 16 to 20 years f. Greater than 20 years	
			Connections to Government and/or Government-related institutions	58. Do you (or your founding team members) have connections with Government or Government-related institutions in the countries you operate? Connections can be defined as prior working relationship and/or friendships with folks in these institutions that can help open doors a. Yes b. No	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				59. As a follow-up to the previous question, how many connections do you have with Government or Government-related institutions?	
			Connections to top businesses in the country	60. Do you (or your founding team members) have connections with top businesses (as defined by revenue) in the countries you operate? Connections can be defined as prior working relationship and/or friendships with folks in these institutions a. Yes b. No	
				61. As a follow-up to the previous question, how many connections do you have with top businesses in the country you operate?	
Success (Business Performance)	**Business Performance Metrics**	**Operational Metrics**	Customer Growth rate	62. What is the **Average Monthly Growth Rate of registered customers since the founding of the company**? a. 0% to 10% b. 11% to 20% c. 21 to 30% d. 31% to 40% e. 41% to 50% f. Greater than 50%	
				63. What is the total number of **registered customers** that you currently have? (a range of values is fine)	
		Financial Inclusion Metrics	Active Customer Metrics	64. How do you define active customers in your business (select one)? a. Number of customers that have conducted at least 1 transaction over the last 30 days b. Number of customers that have conducted at least 1 transaction over the last 60 days c. Number of customers that have conducted at least 1 transaction over the last 90 days d. Other – please provide	
				65. What is the total number of **active customers** that you currently have? (a range of values is fine)	
				66. What is **the Average Monthly Growth Rate of active customers since the founding of your startup?** a. 0% to 10%	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				b. 11% to 20% c. 21 to 30% d. 31% to 40% e. 41% to 50% f. Greater than 50%	
			Active Ratio Metrics	67. **Active ratio** is equal to the **ratio of Active customers divided by the total registered customers**. **Currently, what is the Active ratio for your startup**? a. Less than 15% b. 15% to 29% c. 30% to 45% d. Greater than 45%	
				68. As a follow-up to the previous question, if your startup has been in business for more than 1 year, **what has been the improvement in Active Ratio (in percentage points) since the founding of the startup**? a. Not applicable – startup has only been in business for less than 1 year b. 0 c. 1 to 3 percentage points d. 4 to 6 percentage points e. 7 to 9 percentage points f. Greater than 9 percentage points	
		Merchant Metrics	Merchant Growth Rate	69. If your startup has been in business for more than 1 year, what is the **Average Monthly Growth Rate of merchants** accepting and/or using your product / service? a. Not Applicable – my startup does not target merchants b. 0% to 10% c. 11% to 20% d. 21 to 30% e. 31% to 40% f. 41% to 50% g. Greater than 50%	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				70. What is the current number of merchants accepting and/or using your product / service? How many years did it take you to achieve the current level?	
		Transaction Metrics	Transaction Volume and Growth	71. What is the **current average monthly transaction volume (based on number of transactions)** – refers to all types of transactions (loans, remittances, payments, savings, insurance, etc.) a. Less than 50,000 b. 50,000 to 100,000 c. 101,000 to 150,000 d. 151,000 to 200,000 e. 201,000 to 250,000 f. Greater than 250,000	
				72. What is the **current average annual growth rate of transaction volume (based on number of transactions)** – refers to all types of transactions (loans, remittances, payments, savings, insurance, etc.) a. 0% to 10% b. 11% to 20% c. 21 to 30% d. 31% to 40% e. 41% to 50% f. Greater than 50%	
				73. What is the **current average monthly transaction dollar volume (in US$)** – refers to all types of transactions (loans, remittances, payments, savings, insurance, etc.) a. Less than $500,000 b. $500,000 to $1 million c. $1 million to $5 million d. $6 million to $10 million e. $11 million to $20 million f. $21 million to $50 million g. Greater than $50 million	
				74. What is the Annual **current average monthly growth rate of transaction volume (based on US$)**– refers to all types of transactions (loans, remittances, payments, savings, insurance, etc.)	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				a. 0% to 10% b. 11% to 20% c. 21 to 30% d. 31% to 40% e. 41% to 50% f. Greater than 50%	
				75. What is the average transaction size per customer? A range of values is fine	
				76. If your startup has been in business for more than 1 year, what is the **average monthly growth rate in transaction size / loan amount per customer since its founding**? a. 0% to 10% b. 11% to 20% c. 21% to 30% d. 31% to 40% e. 41% to 50% f. Greater than 50% g. Not Applicable – startup is not a B2B, B2B2C or P2P model	
				77. For P2P lending companies and for companies that provide loan products, **currently what % of loans are fully repaid on time**? a. Less than 50% b. 50% to 70% c. 71% to 80% d. 81% to 90% e. 91% to 100% f. Not applicable – my startup is not in the lending area	
				78. As a follow up to the previous question, if your startup has been in business for more than 1 year, by how many percentage points has the **average % of loans that are fully repaid on time improved since its founding**?	
				79. For P2P lending startups and startups that provide loan products, **currently what is your % default rate?** a. 0% b. 1% to 5%	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				c. 6% to 10% d. 11% to 15% e. 16% to 20% f. Greater than 20% g. Not applicable – my startup is not in the lending area	
				80. As a follow up to the previous question, if your startup has been in business for more than 1 year, **by how many percentage points has the % default rate declined since the founding of your business?**	
		Financial Metrics	Revenue Growth	81. What is the **current monthly revenue growth rate** for the company? a. 0% to 5% b. 6% to 10% c. 11 to 15% d. 16% to 20% e. 21% to 25% f. Greater than 25%	
				82. What is the Total Revenue for the last fiscal year (estimate is fine)?	
			Average Revenue per User (ARPU)	83. What is the current ARPU for your startup?	
				84. What is the average annual growth rate of ARPU for your startup since its founding?	
			Sources of Revenue	85. What are your different sources of revenue? Please provide a list	
			Gross Margins	86. What is the **average gross margin** for your business **currently**? a. Negative b. 0% to 10% c. 11% to 15% d. 16% to 20% e. 21% to 25% f. 26% to 30% g. Greater than 30%	
				87. If your startup has been in business for more than 1 year, **by how many percentage points has gross margin improved since the founding of your startup**?	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				a. 0 b. 1 to 5 percentage points c. 6 to 10 percentage points d. 11 to 15 percentage points e. Greater than 15 percentage points	
			Burn Rate	88. What is your current burn rate? a. Less than $10,000/month b. $10,000 to $30,000/month c. $31,000 to $60,000/month d. $61,000 to $90,000/month e. $91,000 to $100,000/month f. Greater than $100,000/month	
				89. Please provide a breakdown of your burn rate in % terms (should add up to 100%): a. Development of product/service _____% b. Marketing / Customer acquisition _____% c. Management Salaries _____% d. Others – please provide: _____ _____%	
			Fixed vs. Variable Costs	90. For the last fiscal year, what are your total costs? What is % breakdown between fixed vs. variable costs?	
			Asset Base	91. Regarding the asset base in your startup, **currently what are fixed assets as a % of total assets**? a. Less than 10% b. 10% to 30% c. 31% to 50% d. 51% to 70% e. Greater than 70%	
				92. What **% of total assets are working capital items such as inventory and accounts receivable**? a. Less than 10% b. 10% to 30% c. 31% to 50% d. 51% to 70% e. Greater than 70%	
		Funding Metrics	Funding and Investment (VC and Other Sources)	93. Have you raised any funding at all? a. Yes b. No	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
				94. If you answered Yes to the previous question, what is the current funding stage that your startup is at? a. Seed (includes Angel funding) b. Series A c. Series B d. Series C e. Series D	
				95. What is the total amount of funding that the startup has raised so far (VC and other corporations)? a. Less than $500k b. $500k to $1 million c. $1 million to $2 million d. $3 million to $5 million e. $6 million to $10 million f. $11 million to $20 million g. Greater than $20 million	
				96. If you have not raised funding from VCs and only the founders have invested in the startup, what is the total amount that has been invested in your startup? a. Less than $500k b. $500k to $1 million c. $1 million to $2 million d. $3 million to $5 million e. $6 million to $10 million f. $11 million to $20 million g. Greater than $20 million	
				97. When did you raise your last funding round? When do you expect to raise the next round of funding?	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
		Valuation Metrics	Valuation	98. What is your current implied post-money valuation? a. Less than $5 million b. $5 million to $15 million c. $16 million to $25 million d. $26 million to $35 million e. $36 million to $45 million f. $46 million to $55 million g. Greater than $55 million	
Resources / Capabilities	**Founder / Founding Team / Management Team Characteristics**	**Year Founded**	Year Founded (Vintage)	99. What year was the company founded?	
				100. In what year did you, or one of the members of the founding team, started working full time on the startup?	
			Year Launched	101. In what year did you officially launch your first product/service?	
		Founding Team Size	Founding team size	102. What is the size of the founding team? Please select one from the below: a. 1 b. 2 c. 3 d. 4 e. Greater than 4	
		Years Relationship between Founders	# of years of relationship between Founders	103. How long (number of years) have you known each of the members of the founding team (average for all the members)? Please select one of the choices below: a. Less than 1 year b. 1 year c. 2 to 5 years d. 6 to 10 years e. Greater than 10 years	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
			# of years of working relationship between Founders	104. On average, how long (number of years) have you worked with the different members of the founding team (average for all members)? a. Less than 1 year b. 1 year c. 2 to 5 years d. 6 to 10 years e. Greater than 10 years	
		Prior Industry Experience	# of years of Financial Services industry experience	105. How many years of prior experience have you or any member of the founding have had in the financial services industry – please provide a sum of the years for all of the members of the founding team a. Less than 5 years b. 5 to 10 years c. 11 to 15 years d. 16 to 20 years e. 21 to 25 years f. Greater than 25 years	
			# of years of Financial inclusion/development sector experience	106. How many years of prior experience have you or any member of the founding have had in the financial inclusion and/or working with the poor – please provide a sum of the years for all of the members of the founding team g. Less than 5 years h. 5 to 10 years i. 11 to 15 years j. 16 to 20 years k. 21 to 25 years l. Greater than 25 years	
		Team Capabilities	Technical Experience	107. Does one of the founding team members have technical experience (i.e., working in the technology industry either as a programmer and/or in-depth understanding of technology infrastructure, software architecture)? a. Yes b. No	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
		Prior Startup Experience	Number of startups founded in the past	108. How many members of the founding team have founded prior startups?	
				109. As a founding team, how many prior startups have you founded together?	
			Successful exits in prior startups	110. If you have founded prior startups, have you had successful exits? Yes or No. Success in this case is defined from the investors' perspective: you are able to sell your startup for a price that is higher than the amount that has been invested	
	Financial Resources	**Investments from Prominent Organizations**	Investment from prominent VCs	111. Can you please provide the names of the VC funds that have invested in your startup, and how much each has invested as well % equity ownership for each one?	
			Investment from prominent development organizations in financial inclusion	112. Have you received funding from other prominent sources that are involved in the non-profit and/or financial inclusion areas, such as Bill & Melinda Gates Foundation, IFC, Accion, Omidyar Networks, BRAC Bank, Skoll Foundation, Rockefeller Foundation, Schwab Foundation, MasterCard Foundation? a. Yes b. No	
	Inclusive Innovation	**Inclusive Innovation**	First to introduce a new product or service	113. How many other companies were providing the same product / service as you when you introduced your product / service in your target market? a. None b. 1 to 3 companies c. 4 to 6 companies d. Greater than 6 companies	

CATEGORY	SUBCATEGORY	FACTORS	POTENTIAL MEASURABLE VARIABLES	INTERVIEW/SURVEY QUESTIONS	ANSWER
			Uniqueness / Newness	114. When you introduced your product or service, was the product / service / technology considered unique or completely new when compared to other similar products / services in the country? a. Yes b. No	
				115. Is the product/service and the associated business model a completely brand new idea, or a Copy-Paste idea? a. Copy-Paste b. Completely Brand New c. Hybrid – Copy-Paste, but highly modified to the local market	
			Level of Inclusiveness	116. Does your product / service / technology / business model **solve a problem specifically for the marginalized poor or underbanked in a cheap and very cost efficient manner when compared to current products / services that they currently use**? a. Yes b. No	
				117. Does your product / service / technology / business model offer a clear roadmap to creating economic opportunity and improves the economic livelihood of your customers (either consumers or SMEs)? a. Yes b. No	