The Role of Technology in Global Financial Development: A comparative study of Mobile Banking Markets in Three Different Economies

By:

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"Banking is necessary, banks are not"-Bill Gates[i]

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Abstract

Globalization and the facilitation of international trade have occurred because of various influencing factors. Some of these factors include the creation of international financial institutions such as the World Bank and IMF. Other factors that influence international trade include free trade policies, increase in transnational communication, and technology adoption.

With the increase in globalization countries and economies from all different levels have been able to experience financial development. Financial development occurs when individual who did not have access to financial institutions or financial services are now able to access them. Each type of economy whether it is an advance economy, an emerging economy, or developing economy is impacted in its own different way.

Technology has had a huge impact in changing how the finance sector works. For example, it has increased communication which has led to more international transactions, foreign investment, and the rise of multinational corporations. It has also created new ventures and innovations that have changed the financial sector itself such as online banking or mobile

banking. This has allowed for developing countries and emerging economies to experience financial development. Financial development has allowed countries to experience economic growth and become more involved in the world market. I am trying to analyze the role technology has had on globalization, more specifically on the world financial systems by enabling countries to become key players in the international money market. In this thesis I will explore how financial technology advancements such as mobile banking have helped developing countries and emerging economies experience financial development.

Introduction

Globalization can be defined as "the development of an increasingly integrated global economy marked especially by free trade, free flow of capital, and the tapping of cheaper foreign labor markets".[ii] Because of globalization countries have gained better access to capital, information, and other resources that have enabled them to experience "development". By improving or "developing" the economies of developing countries, certain economies have been able to develop to the "emerging economies". Emerging economies are "low-income, rapid-growth countries using economic liberalization as their primary engine of growth. They fall into two groups: developing countries in Asia, Latin America, Africa, and the Middle East and transition economies in the former Soviet Union and China. The access to global resources has allowed such countries to differentiate themselves form other developing nations, such as countries in South East Asia or Africa, and become more financially integrated in the international economy."[iii] Policies such as Free Trade Agreements and technology such as phone the internet have facilitated this globalization process.

Globalization has facilitated the expansion of technological information and the diffusion of new technological products. One technological product that has expanded to different sectors of the international economy is mobile banking. Depending on the type of economy whether it is an economy from an advance country, an emerging market country, or a developing country the implementation of mobile banking has had different effects. This paper plans to study the different socio-economic effects mobile banking has had on different economies and compare and contrast these effects.

Mobile banking allows individuals to perform financial transactions, whether it is sending or receiving money, through a mobile phone.[iv] Mobile banking services vary from telecommunication companies, banks, and countries. Despite the different effects in each economic category mobile banking has constantly shown positive effects in a country's economy.

Based on academic research studies available, I hypothesize that technology diffusion will help countries experience financial development and become more integrated in the international financial system. I hypothesize that the increase in number of individuals with digital access to financial services such as mobile banking phone services will lead to more international transactions. These international transactions will then help create more financial integrations and more capital for a stronger economic ecosystem within a specific geographic area. This survey will explore the intersections of technology diffusion, international trade, financial integration, and development. My research design will compare and contrast different metrics from developed and developing countries. The countries were chosen based on academic research. I chose the advanced country with the most mobile banking users, the United States.[v] From then on I chose a country that is categorized as an "emerging economy" with high level of

mobile banking usage, China. Finally, I chose a developing country with mobile banking sectors, Kenya.

I will treat each country as a case study, and compare and contrast them to see how technology has impacted different economies differently. Some metrics I plan on using include increase international GDP, and mobile banking users, and foreign direct investment.

First Case Study: Developing Economy-Kenya

The Beginnings of Mobile Banking:

Mobile banking initially flourished in Kenya. The reason why it was so popular there is because Kenya was a good initial market. What mobile banking needed was a population with access to cell-phones while being unbanked and Kenya provided both of these things. It created a perfect ecosystem in which mobile banking could thrive.

An example of mobile banking in Kenya is M-Pesa. M-Pesa. M-Pesa was created by Safaricom, Kennya's largest tele-communication company, in 2007. This new mobile banking system allowed individuals to transfer and withdraw money aside from the traditional bank accounts they had.[vi]M-Pesa allows users to "exchange cash for e-float" on their phones. A "float" is the term used to describe a form of mobile currency which can be transferred between accounts and exchanged for cash currency.[vii]

Even though you can have both an M-Pesa account, and a traditional bank account most of M-Pesa users are unbanked. According to a survey conducted by Jack and Suri in 2009, more than half of M-Pesa users are unbanked.[viii] M-Pesa has been able to substitute the traditional

banking services for these individuals because it is more affordable and has fewer prerequisites than its competitors.[ix]

M-Pesa: An Example of Mobile Banking

There are several reasons why people in Kenya do not feel comfortable opening up a bank account. According to a survey the most common reason people do not save money in their bank accounts is because they do not feel like their bank is trustworthy. Other common reasons people do not save their money in a formal bank account is because the feel like the bank is unreliable and that the fees are too expensive.[x]

How Mobile Banking Works:

Many times a currency's value may increase or decrease depending how strong it is relative to the market. However, M-Pesa mobile money or "e-float money" retains its original value. For example, if a person deposits x amount of money and then transfers that x amount to another person, then the other person will receive the original x amount of money deposited. Depending on the actual currency used to buy e-floats the market value may increase or decrease.[xi] Individuals are able to transfer money based on short messaging service (SMS) technology.[xii]

Individuals are able to receive mobile banking services by registering their cell phone's subscriber identity module (SIM) to M-Pesa. Individuals are then able to deposit, transfer, and withdraw money using their cell phone account; any fees that may apply are automatically withdrawn from the account balance.[xiii] If individuals do not deposit money with an agent then the agent does not have any e-money to give back to customers, and around 6% of M-Pesa users do not make any deposits.[xiv]This can create problems, because financial institutions need

individuals to constantly be depositing money so that it can continue to provide financial services while it continues to grow.

Implementation & Connectedness:

M-Pesa allows individuals to use their mobile banking account like if it was their formal bank account due to SMS technology.[xv]By providing these services M-Pesa has been able to satisfy consumer needs. This is causing many individuals to not feel the need to have a formal bank account. [5:14]M-Pesa has been able to provide all the services needed for individuals to substitute formal banking with M-PESA.[xvi]However, using M-Pesa does allow and encourage individuals to later try to open a formal bank account.[xvii]

M -Pesa had quick distribution and implementation, by August 2009 an M-Pesa had round 7.7 million users.[xviii] M-Pesa initially began with a very niche market. Most of its users were well educated and more economically well off. But as it has expanded its services more individuals, more specifically more individuals in rural areas are using these service. Since M-PESA is expanding to a wider audience the average transaction has decreased.[xix]

M-Pesa does not have many official branches, instead it has around 16,000“agents” that act like branches.[xx]Individuals are then able to go to their local agents to deposit and withdraw any cash. If they wish to transfer money to someone far away they can transfer it to the nearest agent, and then the recipient can go pick up the money from their local agent. M-Pesa allows individuals who otherwise did not have access to financial services or who were too physically separated to trade, to have financial transfers.[xxi]M-Pesa is helping increase the connectedness between Kenyan individuals. This increase in connectedness will help establish better networks which will increase the movement of financial and economic goods that can facilitate economic

development.[xxii]

Weaknesses and Failures:

Even though M-Pesa's growth and adoption in Kenya has been successful around 29% of agents do not have sufficient funds by the end of the month.[xxiii]This means that they do not have enough funds to be able to give out cash currency to people when they need to take money out. This can be problematic in the short run since individuals may need the money in a timely manner, and it can be problematic in the long run since individuals may no longer trust this system. This may cause many to look for more stable financial services, and weaken M-Pesa's presence in the finical services industry.

The Increase of cell phone technology diffusement:

M-Pesa is establishing a mobile banking financial system that has been able to reach newer audiences by providing financial instruments to the previously unbanked. Through the diffusion of this new innovative technology-Pesa has been able to expand financial services M-Pesa is creating financial development.

Mobile Banking creates competition:

M-Pesa mobile banking technology has created competition among the traditional financial services industry. It has been able to do this by providing substitute services to those provided by traditional banks with lower prices and restrictions. This competition has caused other companies to improve their prices and services.[xxiv] By creating this competition M-Pesa has led to the decrease in the cost of financial services in the banking sector.[xxv]

Mobile banking as a disruptive technology:

M-Pesa has been able to transform the financial industry in Kenya. This transformation process could be described as “disruptive technology”. Disruptive technology is technology that not only improves the current technology available, but also transforms it to the point that there might be a new market created. Some common characteristics among disruptive technology include “high rate of technology change, broad potential scope of impact, large economic value that could be affected, and substantial potential for disruptive economic impact”.[xxvi] M-Pesa has been able to transform the Kenyan financial industry, because it changed the way money transfer works. Now individuals who otherwise may not have had the opportunity to send money to remote places are now able to do this through their phone. This technological innovation helped advance the money transfer technology, and begin to develop and mature another market, the mobile banking market.[xxvii]

Mobile banking and financial development:

M Pesa is helping increase financial development. By reaching out to a previously unbanked community by providing low cost and little requirements it has been able to increase the proportion of the unbanked group by 28%.[xxviii] With more individuals with access to financial instruments and the banking sector the financial industry develops and matures into a stronger industry. As M-Pesa increases it is also helping increase the connectedness between Kenyan individuals. This increase in connectedness will help establish better networks which will facilitate economic development. [4:98] As financial development increases, the flow of economic goods is easier to move around from one individual to another. This can sometimes encourage the movement of goods where they were previously not at, helping increase businesses and revenues creating a stronger economy.

A lot of M-Pesa users are unbanked. However, M-Pesa encourages individuals to seek out

more financial banking services.[xxix]New consumers gain exposure to banking and financial services, allowing them to become more comfortable within the financial services industry. This new knowledge and experience often encourages individuals to open an account within the formal banking system.

M-Pesa is highly popular in Kenya. It has helped create a thriving mobile banking market. In 2009 the Ministry of Finance conducted an audit in which it reported that around Ksh. 17 billion were transacted using mobile banking services for the month of August 2008.[xxx] However, despite its popularity and growth the number of transactions and the amount of transactions are not big enough to influence the international economic transfer system. [xxxi] Even though M-Pesa has been successful it has not developed and matured to the point where it impacts the overall global economy.[xxxii]That does not mean it will not get there one day, but it still need to continue to grow not only with its number of users but also with its services. As of now, M-Pesa users can transfer money to someone with a local agent; this means it can only transfer money domestically. Maybe in the future users will be able to transfer money internationally, thus impacting the international financial services market.

Future of M-Pesa and Mobile Banking in Kenya:

A lot of people wonder if M-Pesa will one day develop into a bank and replace the banking system all together. M-Pesa may provide some financial services that are also provided by the traditional banking system, and act like a bank to many however it cannot fully replace the traditional banking system. It will most likely work along or with the traditional banking system. The reason why it can't replace it is because it is not able to fully replace or reproduce all the properties of a bank. For example, M-Pesa doesn't have any solvency.[xxxiii] Solvency means that it does not have the ability to pay its debts in the long run.[xxxiv]The way that M-Pesa works is that

individuals deposit money and then use e-currency that has the same value as the amount of money deposited. M-Pesa has no money for the future; it only functions with the money deposited since it only works as a medium of exchange it cannot fully pay off any debts in the future which makes it unstable for it to develop into a full financial system.

Second Case Study: Emerging Economy-China

The Beginnings of Mobile Banking in China:

One of the countries we will be analyzing in this paper is China. China is a good example of an emerging economy. China's workforce has been expanding giving China an edge. This population increase is not only helping China economically move forward, but it also creates the potential of an untapped market, causing industries to blossom there. A lot of industry leaders move there in order to have access to this growing market.

A market that has been growing in China over the last couple of years is the telecommunications market. In 2008 the number of internet users surpassed other developed countries. Economists and market analysts predict that this number will reach 690 million.[xxxv] This number is important because it is positively correlated to the number of electronic banking users.

The Chinese mobile banking industry began in 2009. In January 2009 the Chinese government allowed phone companies to have 3G mobile phone networks. Some of the companies awarded this license include China Unicom, China Telecom, and China Mobile.[xxxvi]By allowing these phone companies to operate 3G networks, the Chinese government helped create the technological infrastructure needed to operate an e-commerce and e-banking

market. With that new technological infrastructure telecommunication companies began to provide mobile banking services. This financial innovation pressured other companies such as the traditional retail banks like the Bank of Beijing and the Shenzhen Development Bank to begin providing, improving, and expanding their services by also providing mobile banking.[xxxvii]

The Chinese mobile banking market is not only serving a niche market. It is expanding to serve most of China's population. A lot of Chinese individuals who live in the rural part of China are turning to mobile banking for their financial services. Due to economic strain over 30,000 banks have closed down in the rural parts of China, in the last couple of years. This has led a huge number of individuals to turn to online and mobile phone services.[xxxviii]Around 64 percent of the rural poor population doesn't have access to banks.[xxxix]This unbanked population is a potential market for future mobile banking customers.

Security, Safety, and Trust under Chinese government:

In order to ensure security and safety as well as trust in mobile banking the China Security Payment Union was established in 2011.[xl]A year later, other unions such as the China Third-Party Payment Security Union was formed by industry leaders such as Alipay, as well as banks, third-party payment forms, and network security firms. [xli] The creation of these unions helped decrease the risk of online transactions. During the first 6 months of 2012, these unions helped close down around 133,000 fraud websites.[xlii]By eliminating risky websites, the online e-commerce market became more secure. With a secure e-commerce market individuals are more encouraged to use electronic and mobile phone banking services.

Unions that help protect individuals with the uncertainty that comes from using new innovative financial and commercial services increases security. By providing an increase in

security of financial payments, these firms have been able to reduce financial losses by up to 90%.[xliii]The majority of these third party companies are Payment Card Industry Data Security Standard certified.[xliv]The most competent companies in the industry are those that are able to successfully enhance their financial services while simultaneously enhancing security.[xlv]China's mobile banking industry is expected to grow because of the increase in security.

Mobile Banking Expansions in China:

Before the 2015 Chinese yen market crash everyone thought China was doing really well. It was believed that China was expanding its economy in all areas including its mobile commerce industry. However, this is not the case. Even before the market crash, China's mobile finance industry was expanding however it is not as strong and mature as its nearby countries such as "Japan and Korea".[xlvi]

China is actively trying to expand its mobile banking market, along with other e-commerce services. China's mobile commerce is expected to grow, not only because of the advancement of technology but because the government is actively working to help increase its e-commerce market. For example, in part of their Five-Year Plan for National Economic & Social Development of China they specifically included "promote the building of credit services, online payment, & other supporting services for the public".[xlvii]This plan was created to help create better economic infrastructure so that the Chinese economy could grow and become stronger. By specifically stating that they will work on the improvement of technological financial services it shows that key market leaders know the importance of this in the well-being of the economy and in its future.

In order for China to continue to expand its mobile commerce industry it needs to develop

new ways to expand, it cannot be included under e-commerce. Mobile commerce requires a different technological infrastructure than e-commerce adoption. In more developed economies, there is a differentiation between mobile banking from online banking. Although there are some types of carriers that incorporate online usage into their mobile banking services, mobile banking usually has its own platforms. Since it needs its own platforms and it is relatively new mobile banking is in the process of developing its own models and infrastructure.[xlviii]

After studying Chinese culture as well as mobile commerce infrastructure MIN Qingfei suggested they make the UTATUT model a bit more complicated. Although it does explain technological adoption it does not fully encompass all the complexities adopting a new technology entails. UTATUT is one of the most popular models used to describe technological adoption. Based on the study he suggested that the new model should also include attributes such as "trust, privacy protection, and cost should be included in the revised model."[xlix] In order to continue to experience more technology adoption and diffusions expand mobile commerce and mobile banking in China these new factors should be implemented since they are specifically tailored to the needs of Chinese consumers.

Implementing Mobile Banking:

Implementing mobile banking into any economy is difficult. There are theories and models that help predict the best way to implement new innovations in society. Some things that make it difficult to implement mobile banking include "integration with existing systems, equipment compatibility, security and privacy concerns, staff training and acceptance.[l] Some things that impact whether or not mobile banking is implemented and accepted include "accuracy, security, network speed, user-friendliness, user involvement and convenience."[li]

Security is among the biggest concerns in future Chinese mobile banking users. Other things that also influence individuals to not practice mobile banking include traditional cash-carry financial systems as well as low computer skills.[lii] Most of the internet users in China are young and fall unto the 18-30 age group (77%). Most of them are also educated since 86% of them have college degrees and above.[liii]There are also computer and internet fees that make these products "luxury items" to those individuals with modest incomes.[liv]All these different factors influence whether or not an individual wishes to open up a mobile banking account. By addressing these factors mobile banking companies can help create trust among its users and confidence in mobile banking allowing them to expand their markets while having mobile banking grow.

Another thing that makes it difficult to expand the mobile banking market is the lack of a good stable legal system. There are also constant news reports of fraud baking stories. These impact the way people perceive the reliability and safety of mobile banking causing them to be more apprehensive about mobile banking services.[lv]Consumers also do not like the lack of free market since the majority of the banks are owned by the government.[lvi]Compared to the United States China has less and lower quality mobile banking services.[lvii]China is an emerging economy with the potential of a huge market, however without addressing the concerns of Chinese consumers the mobile banking market cannot fully develop to its potential.

Financial Development and Economic Growth:

Scholarly articles show that helping increase financial transactions and accessibility to financial institutions can create financial dynamics and economic ecosystems that help foster economic growth.[lviii]In a study conducted by Goldsmith, a "positive correlation between financial development and economic performance" was found.[lix] However not all economists

agree with him. There are disagreements among economist and market analyst on what role financial development has on economic growth. For example, some economists such as McKinnon and Shaw believe financial development has a positive relationship on the economic growth. Others though such as Lewis believe that it is a more circular binary model, where financial development impacts economic growth and where economic growth helps create financial development creating a "bidirectional model". [lx]

However though, there is a lot of literature that show that financial development can lead to a financial system with a "higher savings rate, a, stimulate investment, avoid premature liquidations of capital, reduce the cost of external finance, enhance the efficiency of capital allocation and insure more productive technological choices, all factors that in turn lead to high economic growth."[lxi]The relationship between financial development and economic growth is not a causal linear relationship. Is more of a directional relationship? They both influence each other at the same time, as one grows the other one grows as well causing the other one to continue to grow. [lxii]

Some ways that "financial growth" can lead to economic growth is through various financial instruments such as "raise savings rate, stimulate investment, avoid premature liquidations of capital, reduce the cost of external finance, enhance the efficiency of capital allocation and insure more productive technological choices" which together help stimulate economic growth.[lxiii]Economic growth is driven by several factor the Schumpeterian Hypothesis states. Some of these factors include "financial development, physical capital stock, international trade and real interest rate".[lxiv]

Third Case Study: Developed Economy-United States

Mobile Banking in the United States:

Technology has impacted different types of economies differently. A way to explore mobile banking's role in a developed nation is by examining how it impacted the country socially, economically, politically, and technologically. For the developed nation we will examine the role of mobile banking in the United States. The United Sates is a good country to analyze its impact, since it is the developed nation with the most mobile banking users.

Mobile banking first became implemented in the U.S. in the 1980's and became mainstream in the 1990s.[lxv] As this market developed it mainly constituted of niche group. Like in other nations, there was a "digital divide" created, in which more affluent and educated individuals had access to this while the rest of the population did not.[lxvi] In order to tackle this divide, the United States government passed several laws. One of the laws passed was the "EFT 99 Initiative". This initiative allowed social security recipients and government employees to receive their money electronically directly into their bank accounts.[lxvii]Another law that the United States also implemented was the "Check 21 Act of 2003". [lxviii] This law allowed banks and users to deposit checks electronically. These efforts by the US government helped encourage the implementation of mobile banking. However, with so many new laws and regulations passed this actually slowed down the implementation of electronic transfers.

Aside from the government the private business sector also had a role to play in helping get rid of the digital divide and create inclusivity. This not only helped the United States move forward with their technological innovations, but it also helped businesses since they were able to expand their market and create greater revenues. Expanding mobile banking is also beneficial for businesses since it helps them reduce cost. For example, it cost around "about $.01 per transaction compared with $1.07 for the same transaction via a teller at a bank branch."[lxix]By

reducing the cost of transactions banks and businesses are able to allocate less money for these services and invest more in other areas that may need improvement.

A common theme throughout the literature showed that the individuals with lower education levels and income were less likely to try new technological products. Since they had not been exposed to this new type of innovation and knew little about the product they felt less comfortable using this new technological innovation. A way to fix that is by allowing individuals to "test drive" or try out the product so that they become more comfortable around the new product.[lxx] Another concern consumers have aside from product knowledge is the fear of identity theft. Since individuals are do not fully know if their information will be safe many are unsure if they should try mobile banking and stick to traditional financial services.[lxxi]By addressing these concerns companies can attract more US costumers and expand their market.

Market Expansion & Market Competition:

Like other mobile banking payment markets, the mobile banking market in the United States is independent of the traditional banking financial system. Initially companies such as PayPal, which is a company that is based on making electronic transfer payments, where the main pushers for mobile banking.[lxxii]Since they began gaining a greater amount of market share other traditional banking companies and banks also began expanding their services to include mobile banking.[lxxiii] If businesses wanted to remain competent they would have had to update their financial services to include those such as electronic services to appeal to the consumers. Even though these companies do provide competition to banks they are creating a new market itself.[lxxiv]

Most companies develop their own network in which the electronic transfers can happen. Since this market is decentralized in the U.S there is not one main network so each bank and third party accounts operate on their own network. It is predicted that this may slow down the full implementation of mobile banking.[lxxv] The reason why that is predicted is because even though a huge amount a various companies providing the same services can help create competition and improvement of products, the networks work independently. So individuals and companies are bound to their networks, preventing the interaction and expansion within networks. This is something that the current mobile banking/ electronic payments companies are trying to improve as they expand their own networks.

Adoption:

The way mobile banking is adopted, developed, and expanded is similar to how other innovative technological products are integrated in society. A couple of models developed in the science and technology academia world try to explain this technological innovation adoption phenomenon. Sociologist Everett Rogers proposed a "diffusion of innovation theory" in which he argued that the five main characteristics that impact technological adoption include "consumer acceptance of new products and services: relative advantage, compatibility, simplicity/complexity, observability, and trial ability. Years later Davis proposed another model called the "Technology Acceptance Model". This model is more concise since it states that "perceived ease of use and perceived usefulness" are enough to determine the technological diffusion of a new innovative product.[lxxvi]

Different Types of Financial Transactions:

In the United States the mobile banking market is more developed and there are more

varieties of financial services provided. Mobile financial services can be divided into two categories. The first category is “mobile banking”. Mobile banking allows individuals to conduct normal banking services such as deposits, transfers etc. over their phone. There are three main types of methods that allow this to happen. One of the methods it the traditional methods used in other mobile banking financial systems which are through SMS text. The other two methods involve internet “browser-based programs”, and mobile cellular applications.[lxxvii]The second category is “mobile payments”, which are payments done by the consumer over their cellphone. Individuals can either produce “proximity payments” and “remote payments”. Depending on the type of payment different technology will be required. For example, for “proximity payments” they can be done using NFC technology, while “remote payments” can be done through a collaboration of mobile cellphone companies and payment companies.[lxxviii] Since there are many more types of mobile banking, there are more sophisticated mobile banking markets.

Since there are more types of mobile banking transactions there are more sophisticated mobile banking products. One way scholars define or classify mobile banking is how scholar Oz describes mobile banking transactions in his academic paper. According to OZ, In the United States there are many different types of financial transactions, such as business to business, business to government, etc. within the mobile banking industry. The most common type of transfer is that of account to account “A2A” accounts.[lxxix]These account to accounts forms of payment are electronic transfers between two different bank accounts that does not involve any human interaction throughout the whole process.[lxxx]

Another way money transactions can be classified is as “direct transfers” and “indirect transfers”. “Direct transfers” are defined as money transfers are directly received from one bank account into the other bank account. On the other hand, “Indirect transfers” involve third party

payment systems such as mobile PayPal and Amazon Payments where the customer pays the company then the company deposits that money into the payees account.[lxxxi]

Mobile Banking Expansion in the United States:

Mobile banking can differ greatly by the type of economy. In the U.S., a developed economy, its expansion depends on various factors such as "financial inclusion opportunities, data security considerations, and coordination issues".[lxxxii]These influencing factors differ from other types of economies such as a developing economy.[lxxxiii]These factors can be seen to impact the United States as well as other developed nation's mobile banking market. Since these nations are more "developed" the implementation of mobile banking was easier than in other developing nations such as Kenya. This however, leads to new challenges faced at the frontier of financial technology.

The use of cell phones has increased. Now there are more people requesting cell phone services than traditional landline services. In the US over 84% of the population own a cell phone. This pattern can be seen in other countries too. For example, "in India, there were 44.9 million cell phone users in 2004 but only 43.9 million landlines. At the end of 2005, China had 393.4 million cell phone subscribers but only 350.4 million landline users. In Africa, in 2007, there was more than five times the number of people using mobile phones compared with those who used landlines."[lxxxiv] The increase in cell phones means that there is a bigger population with the infrastructure needed for mobile banking.

Technological Adoption Digital Divide in America:

Some of the most influential characteristics in technological adoption include income and education. Those individuals with more education and a higher income are more likely to adopt new technological products than those with less education and income. This is creating a "digital divide".[lxxxv]In order to fix this divide businesses and government can adopt new marketing methods to reach out to this untapped market. For example, the government passed the E-Sign Act.[lxxxvi] A different way the private sector could potentially reach out to this market is by allowing individuals to "test drive" their products.[lxxxvii]This will allow those individuals with low technological knowledge to become comfortable with the product before deciding whether not to commit. Overall, it would benefit everyone if this divide was slowly diminished. It costs "about $.01 per transaction compared with $1.07 for the same transaction via a teller at a bank branch."[lxxxviii] This would benefit both the individuals who are now able to use new technological innovations, and businesses since they now have more customers whom they can provide services to.

United States vs other countries:

According to some statistical analysis conducted by Oz comparing electronic transfers in developed countries that United States gets a lower than average with countries such as Sweden taking the lead.[lxxxix]Consumers in the United States makes on average 23.8 credit transfers per year which is below the average 38.6 number of transactions in a developed country.[xc]The United States is a developed nation with high mobile banking usage. However, there are countries that have higher cashless transactions.[xci]

Compare and Contrast between Economies

In order to compare how mobile banking has impacted economic and financial growth across all three different economies we will look at several factors. First of all, we will look at the increased number of mobile phone users over the last couple of years. Then we will see out of all those with access to mobile phones use mobile banking. With the increase in mobile banking unbanked populations now have access to financial services which leads to financial inclusion and financial development. In order to analyze the financial growth, the country has experience we will look at foreign investment patterns after mobile banking and other technological innovations had been implemented. Like many economic theories describe financial development and economic development are positively correlated. In order to see the economic growth experienced in a country we will look at the increase in GDP.

According to the World Bank mobile phone usage has been increasing over the last couple of years. Mobile banking is increasing at a higher speed in countries that are implementing or starting to adopt mobile phone usage vs countries that already have implemented mobile banking. According to the World Bank out of every 100 people in the United States 117.587 have mobile cellular subscriptions, which means individuals own more than one phone. Probably they have a company or work cell phone and then they have their own personal cellphone, or they own phones for individuals like their kids who are less than 15 years old. For China it is 93.161/ 100 and for Kenya it is 80.678/100.[xcii] As we can see there are more individuals with mobile cellular phones in a developed country and then it slowly starts diminishing from the developed country to the developing countries. Even though developed countries like the United States have higher subscriptions, the emerging economies have higher mobile banking penetrations. China has around 61 % mobile banking penetration while Kenya has 50%[xciii] and the United States has around 32%.[xciv] The reason why China and Kenya have

higher mobile banking penetration is because they have a large amount of unbanked population that are skipping landline phones and traditional retail financial and banking services, whereas in the United States most individuals already have traditional financial services. Since penetration has been higher in these developing and emerging economies the numbers of these countries have increased significantly. In Kenya (2013) there were a total of 31.31 mobile services subscribers and out of those there were 26. 02 million mobile money subscribers.[xcv]These numbers are increasing significantly because Kenya is developing and improving its services that individuals can receive such as getting stock dividend payments into their mobile financial services account without needing a formal bank account. In the United States it is estimated that there are around 95 million mobile banking users.[xcvi]For China it is estimated to be 352.1 million mobile banking users.[xcvii] Since China is a huge nation, even though the United States has a higher percentage mobile banking users out of mobile phones users China is more heavily populated so it has more mobile banking users, it has more than twice the amount of US mobile banking users.

Because there has been a new population of people receiving financial services financial inclusion and financial development has occurred. Some of the key factors in measuring this can be seen in the G20 Financial Inclusion Indicators that were chosen by the World Banks' Global Partnership for Financial Inclusion. Some of the factors include the number of accounts, and number of digital payments made/received.[xcviii]

Mobile Banking Statistics:

Kenya

The percentage of people who have accounts in Kenya who are 15 or older is 74.65%.The percentage of people who made or received digital payments in 2015 in China was 69.44%. The percentage of people who made a payment using a mobile phone in 2014 was 55.33%.[xcix] The percentage of people who received government wages or payments into their account we 22.40. The percentage that made a payment using the internet 4.66% .In Kenya there are 9.26 ATMs per 100,000 adults.[c]

China

The percentage of people who have accounts in China who are 15 or older is 78.92%.[ci] The percentage of people who made or received digital payments in 2015 in China was` 49.27%. The percentage of people who made a payment using a mobile phone in 2014 was 14.30%. [cii]The percentage of people who received government wages or payments into their account was 25.90%. In China in 2011 there were 29.99 ATMs per 100,000 adults. The percentage that made a payment using the internet was 19.16%. [ciii]

United States

The percentage of people who have accounts in the U.S. who are 15 or older is 93.58%. [civ] The percentage of people who made or received digital payments in 2014 in US was 92.01%. The percentage of people who made a payment using a mobile phone in 2014 was 31.75%.[cv] The percentage of people who received government wages or payments into their account we 56.66%. The percentage of Americans that made a payment using the internet (% age 15+) was 64.66%.[cvi]

GDP and GDP Growth Rate:

Some ways to measure economic growth include GDP and GDP Growth rate. For China the economic growth rate has been fluctuating. The Chinese GDP in was 1990 358.973 Billion. It has been rising since then with a GDP of 1.205 Trillion in 2000 and 6.04 Trillion in 2010.[cvii] The GDP later continued to increase 10.866 Trillion in 2015. The GDP growth percentage has been fluctuating. In 1990 the GDP growth was 3.934 % which continued to increase to 8.429 % in 2000. It later continued to increase up to 10.632 in 2000 but the Chinese GDP growth lowered in 2015 with a 6.9 % of GDP growth.[cviii] A key number to look at to see how economic development has improved China is to look at the GDP Per Capita/ Growth. The Chinsed per capita growth (annual %) in 1990 was 2.42% In 2000 it was 7.578% continuing to increase to 10.099% in 2010 and coming back down to 6.358% in 2015.[cix]

The Kenyan GDP in 1990 was 8.752 Billion.[cx] It has been rising since then with a GDP of 12.705 Billion in 2000 and 40 Bill in 2010. The GDP later continued to increase to 63.398 billion in 2015.[cxi] The GDP growth rate in 1990 was 4.192%. It later decreased to .6% in 2000. It later increased up to 8.402% in 2010 but the Kenyan GDP growth lowered in 2015 with a 5.649% of GDP growth. The Kenya GDP per capita growth (annual %) in 1990 was .735% . It later decreased to -1.876% in 2000. [cxii] However, it got back up to 5.558% in 2010 and come back down to 2.927% in 2015.[cxiii]

In the United States the GDP in was 5.98 Trillion back in 1990. It has been rising since then with a GDP of 10.285 T in 2000 and 14.964 T in 2010. The GDP later continued to increase 17.947 T in 2015.[cxiv] The GDP growth percentage has been fluctuating. In 1990 the GDP growth was 1.919% It then increased to 4.092 % in 2000. Due to the economic recession the United States faced the GDP growth rate lowered to 2.532% in 2010. It continued to go down, but not by much remaining stable in the 2% range with a growth rate of 2.426% in 2015.[cxv]The United

States GDP Per Capita/ Growth percentage has also been fluctuating. The GDP per capita growth annual percentage in 1990 was .775%. In 2000 it increased to 2.94%.[cxvi]However it did decrease to to 1.678% in 2010 and coming back down to .626% in 2015.[cxvii]

Foreign Direct investment:

One way to also measure financial development is by seeing how foreign direct investment has increased. As more resources and investments are poured into an economy it is able to develop its financial and banking industry as well as helping other industries grow by providing capital. By looking at the difference in foreign direct investment we can analyze whether or not foreign investment has increased, remained the same, or decreased. In 2000 Kenya received $110, 904, and 550.4 in foreign direct investment it then increased to $178, 064, and 606.752 in 2010.[cxviii]China also saw an increase in foreign direct investment. In 2000 it received $42.095 billion, this number increased dramatically compared to Kenya within a decade reaching $243.703 billion in 2010[cxix]. The United States however, has not been as fortunate. On the contrary instead of increasing like the other two economies it actually saw a decrease in its foreign direct investment. In 2000 it received 350.066 billion while in 2010 the number lowered to 259.344 billion.[cxx] Some notable events that happened within that decade that may have affected investments in the U.S. is that it aced an economic recession causing individuals, businesses, and governments to invest with more caution. Another reason why foreign direct investments decreased in the United States is because it is being spent on other countries that also demonstrate potential. Emerging economies are attracting investments since it is such a promising market due to its high GDP and economic growth pulling resources from developed nations such as the United States.

Remittances:

One way to analyze how mobile banking has impacted an economy is to see if it this technology has helped individuals have more financial transactions. One way to do this is by noticing if there was an increase in remittances received after mobile banking had been implemented. We are going to analyze the difference in remittances between the years of 2000 and 2010. Remittances may have increased for various reasons not just because of mobile banking. However, since mobile banking does allow individuals to send and receive money there is a correlation between theses financial services and the increase of remittances. All of the countries showed an increase in remittances received. For example, Kenya had $537, 900, 024.4of remittances and it increased to $685, 757, and 272.443 in 2010.[cxxi] China saw the biggest increase with $758, 082,000 in remittances received in 2000 and having $13.636 billion in 2010.[cxxii] The United States also saw an increase with $4.395 billion remittances in 2000 and 5.93 billion in 2010.[cxxiii]Technological advancements have facilitated the transfer of money form one individual to other causing local economies to become more connected, which can be seen across all different types of economies whether it is a developed economy, emerging economy, or a developing economy.

Similarities:

Even though mobile banking is impacting theses three different economies differently there were some patterns seen across all the different economies. One of the patterns seen was that for the most part individuals with education and higher income/class were the main consumers. For Kenya the number of digital payments made using a mobile phone by the poorest 40% of the population was 46.67% of the total mobile phone payments made. The percentage of mobile phone payments made by the richest 60% of the population was 61.22% of the total mobile phone payments made.[cxxiv] For China the percentage of digital payments made using a

mobile phone by the poorest 40% of the population was 5.31%, while 20.42%. Of the total mobile phone payments made were done by the richest 60% of the population.[cxxv] For the US the percentage of digital payments made using a mobile phone by the poorest 40% was 25.99% of the total mobile phone payments made while by the richest 60% of the population made 35.59% of total mobile phone payments. [cxxvi]The numbers do not fully add to 100% because the world bank was not able to confirm the income of all the participants, so for those individuals from which they were not able to get their income they were classified as "other" since it was unknown if they belonged to the richest percent of the population or the poorest. Even though, the World Bank was not able to get a hold of all the incomes one can still see a pattern develop, where the more well off individuals had the means to make more payments using mobile banking. These numbers, correspond to the literature where there was a common theme across all the economies where the more economically well off had more access to mobile banking services.

Another similar pattern seen in all the different economies was that there was a higher percentage of young subscribers using mobile banking vs the older generation. For example, in Kenya the younger population (individuals between 15-35) consisted of 55.38% of the mobile banking population while the older generation (35+) consisted of 44.62% of the mobile banking population[cxxvii]. In China young individuals consisted of 28.90% of the mobile banking population while the older generation consisted of 6.03%.[cxxviii] In the US the younger generation consisted of 46.60% while the older individuals consisted 24.96% of the mobile banking consumer population.[cxxix] One of the key reasons why this might happen is because the younger population has more knowledge about technological products. The fact that the older generation

may not have been exposed to technological products can cause apprehension of new innovation technological finance products causing them to stick to more conventional retail banking.

Another similarity was that in most economies men made more mobile payments compared to women. For Kenya men made 58.67% of the total mobile payment transactions while females made 52.39%.[cxxx] For China men made 14.68% of the mobile banking transactions, whether it was sending or receiving a payment. Women consisted of 13.90% of the mobile transactions.[cxxxi] In the United States, men made 32.42% of the mobile banking transactions while women made 31.08%.[cxxxii] The numbers are often close within a few percentages; however there is still difference between men and women and the amount of mobile banking transactions made. The difference was seen more significantly in the developing countries like Kenya. By looking at these numbers scholars and economist can come up with ways to close this gap.

Conclusion

After doing research and looking at the data we have seen how technology has enabled financial inclusion. Due to the implementation and spread of new innovative technological products individuals with very limited access to financial resources, because of economic and geographic factors, now have access. With access granted these individuals now have the opportunity to participate in the financial and banking services market. These opportunities are enabling more financial development which is strongly correlated to economic growth.

As we saw in the data obtained from the World Bank emerging and developing nations are using technology to become stronger. This is allowing them to experience growth at a faster

rate than developed countries. However, the Convergence economic theory states that developing and emerging economies will have a higher growth rate because they are falling behind. Once they reach the same amount of financial and economic growth it is expected to slow down and grow at the same rate as the developed country.[cxxxiii] Many scholars agree with this theory and predict that China and later Africa will grow at higher rates than the rest of the world, but later the economic growth rate will stabilize and be similar to those of developed economies. Due to the fact that a lot of the financial and economic growth is happening because of technology, and technology will always continue to improve and develop then so can the financial gains that come along with it. If political and economic structures can keep up with the growth of technology economies could still continue to experience financial and economic growth.

Since it is proven that mobile banning is helping create financial inclusion and financial development governments, businesses, and individuals should participate in the expansion of these programs. This is a good way to tackle poverty by empowering individuals with new financial and technological knowledge so that they can have better knowledge and participate in this technological driven fast moving market. Because laws have been created to help foster and implement the adoption of new technological innovation that is not only beneficial for the individuals but for the economy. These new products have can spread to bigger markets and impact more people.

This research is important because it helps show that technology is helping economies experience financial development and growth. By knowing this policy makers, economist, businesses, and industry leaders can develop models that frame or go around this knowledge to help strengthen this type of financial inclusion and growth. For example, banks can have

subsidized mobile banking services to individuals trying to start a business in a rural area so that they have access to financial information and services, even if they are geographically unable to reach them. This paper is also important because it shows how despite the different financial growth rates across economies they have similarities. For example, across all the different economies the more educated and financially well of individuals had better access as well the younger more technological savvy generation. By looking at these patterns, one can analyze its weaknesses, and see where things can improve in order to fix these gaps. An example could be that businesses or governments offer services where they teach older people in emerging economies how to navigate mobile banking, or subsidies cell phones to lower income individuals. Like Bill Gates said banking and financial services will always be needed it is what keeps an economy running. However, with the improvement in technology brick and mortar retail banks are not needed at the same amount they were needed a few decades ago. Now individuals can have their financial needs met through phones or internet without having to build physical banks. Banks may not be needed, but they also will not go way. Mobile phones and computers cannot fully replace the human interaction, relationships, and trust that is built with retail banks. Traditional banking services will not die out; however the growth of retail banks will not be as high as the growth of mobile banking and other financial technology products. Financial technology is growing faster than ever, and it does not seem to be slowing down now they are even developing electronic money. “E-money” may have been a term to describe the potential of a phone transaction but now it is beginning to develop to an actual currency that can potentially replace the dollar, or yen etc. that can be used worldwide for any online or in person transaction without any issues. With the growth of all these financial technological products it is important to examine its implementation and expansion strategies in order to try to fix any gaps

created, and in order to try to prevent any gaps from forming for other financial development products.

Mildred Santarriaga is a recent UC Berkeley graduate. There she studied Interdisciplinary Field Studies with a concentration in International Trade and Global Development. Under that she was able to explore her academic interest which includes the role of technology in globalization and the world economy. In the future she hopes to help develop ideas and strategies that help organizations implement innovative technology in developing countries to better help serve humanity.

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