**MOBILE MONEY AND MOBILE FINANCE AS A TOOL FOR FINANCIAL INCLUSION AND ECONOMIC DEVELOPMENT IN SUB-SAHARAN AFRICA**

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This thesis examines the efficacy of utilizing mobile finance and mobile money as a tool for financial inclusion and economic growth in sub-Saharan Africa. Grounded in a conceptual framework constructed from selected schools of thought and economic growth literature, this study utilizes an ordinary least squares linear regression analysis to examine an endogenous econometric growth model. Accounting for other known drivers of growth – such as variables to capture capital accumulation, human capital, savings, technology, and institutional quality – the model examines the explanatory power of mobile subscription rate in determining the level of economic growth of a nation-state, as measured by Gross Domestic Product per capita at Purchasing Power Parity. Concluding that the mobile subscription rate is a statistically significant variable in explaining the level of economic growth, this thesis further examines the connection of mobile money and mobile finance services to the level of financial inclusion and the institutional quality in a nation. Finally, considering the results and previous germane literature on the subject, this paper develops specific policy prescriptions in order to optimize the growth potential from the use of mobile money and mobile finance services.

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**1. INTRODUCTION**

While completing a short-term, intensive microfinance internship with the Tokamalirawo Aids Support and Action Group Awareness (TASAAGA) in Uganda, I observed first-hand and even participated in the phenomenon known as mobile finance. The bustling streets of Entebbe, Uganda were laden with a variety of mobile money agents, eager to add airtime, transfer funds, or make a withdrawal – and all of these processes utilizing only two non-smartphone cellular devices. Cogitating the possibilities for mobile banking to circumvent the formal banking systemic endemic of developed countries, and ruminating the potential connections to economic development since my brief time in Africa, has led to the culmination of thought presented in the following thesis.

* 1. **PROBLEM STATEMENT**

*“Mobile phones are the single most transformative tool for development,”*

-Jeffrey Sachs (as cited in Must & Ludewig, 2010)

Incontrovertibly agreed upon as a wicked problem, poverty is the greatest and gravest problem facing the world. Where opinions diverge is on which methods and tactics are most efficacious in poverty alleviation – evidenced by the insurmountable supply of literature and innumerable quantity of scholars focusing on poverty from a multitude of disciplines. Despite extensive study of the subject, the results are inadequate and incongruent with the effort exerted in reducing the issue. However, theoretical growth literature explains that there are some factors which drive economic growth and development: advances in technology, increases in physical capital, development in human capital, etc. (Mankiw, 2013).

Aligned with technology as a driver of development, the recent *Pew Research Center* report – released April, 2015 – documents comprehensively the rapid proliferation of cell phone ownership in seven sub-Saharan African countries (South Africa, Nigeria, Senegal, Kenya, Ghana, Tanzania, and Uganda). Utilizing various face-to-face survey methods, the team of researchers came to the conclusion that texting is the most common activity among the general population in the surveyed countries (80% of cell phone owners texted in the past 12 months); however, mobile money was gaining popularity in several of the countries (30% of cell phone owners received or made a payment within the past 12 months). In addition, the publication discussed the high, positive correlation between education and cell phone ownership, the variation in the capability of the device (e.g. smartphone vs. non-smartphone), the lack of landlines in sub-Saharan Africa, and the prominent mobile banking services in each country.

This study explores the nexuses between mobile finance, financial inclusion, and economic growth and development and – by utilizing previous literature and theories, statistical analysis of empirical data, and critical discussion of prior models – seeks to recommend general policy recommendations on shaping a legal environment conducive to economic development through mobile finance. Ergo, the challenge that this paper and its findings seek to inform is that there is a need to more comprehensively understand the capacity for economic growth in the proliferation of mobile finance services, and ultimately mobile phones, in order to aid governments in developing countries implement policies akin to capitalize on this potential.

**1.2 PURPOSE OF STUDY**

This study will investigate correlations between increased mobile financial services, increased financial inclusion, and economic growth, in order to best cultivate a set of actions which maximize the potential poverty-alleviating elements of mobile finance. While previous scholars have investigated the link between informational communication technology (ICT) and economic development, this study is unique in focusing on mobile finance specifically. Additionally, this argument differentiates itself by including supplementary explanatory factors not present in previous studies such as financial inclusion, the individual user, and the clout of institutions. Lastly, this paper seeks to provide a more detailed set of policy recommendations rooted more exclusively in the results and findings of this analysis. In an attempt to fulfill these aforementioned purposes, the paper will investigate the following three research questions.

**1.3 RESEARCH QUESTIONS**

1. What correlations, if any, exist between (1) mobile finance and financial inclusion and (2) financial inclusion and economic growth/development? How do popular theoretical models elucidate these correlations and what explanatory powers are present in knowing these correlations?

2. What correlations exist between mobile finance and economic growth as a result of the correlations investigated in the first research question? What degree of influence do individuals and institutions (e.g. financial institutions, non-financial institutions the government, etc.) play in the level of economic growth resulting from mobile finance?

3. Utilizing conclusions from the first two research questions and the results from this analysis, what general policies should be implemented in developing countries to create a regulatory environment conducive to optimizing the benefits of mobile finance on national economic growth?

**1.4 CONCEPTUAL FRAMEWORK**

In an attempt to establish a lens through which to analyze the relationship between the proliferation of mobile devices, financial inclusion, and economic growth, this theoretical framework will merge various theories of economic development and financial inclusion while incorporating various insightful perspectives from international relations theory. Principally, the theoretical framework will seek to:

1. Explicitly define the scope and level of analysis for this research
2. Develop working definitions of key terms and theories utilized in both the literature and analysis of this paper
3. Provide a critical analysis of these aforementioned theories as they relate to the research questions and hypothesis
4. Present germane background necessary to comprehensively understand the literature, analysis, and conclusions of this thesis

The international relations theory concept of “levels of analysis” – developed by Kenneth Waltz and further expanded by J. David Singer in his “International Conflict: Three Levels of Analysis” – is employed to narrow the scope of this study. Levels of analysis can best be defined as the analytical framework grounded in the assertion that occurrences in international relations can be elucidated by focusing on the different levels of causes: individuals, states, or the international system. While all three levels provide unique insight on the interrelationship between different causes in ultimately engendering an action, this study will utilize only the individual and state levels of analysis, and the event of focus will be the occurrence of economic development in sub-Saharan Africa. In a breadth of development literature, researchers limit their analysis to the state level of analysis, focusing only on the macroeconomic implications of certain economic policies or growth tactics; however, these research studies ignore the potential impact on individuals, as well as the possible explanations at the individual level capable of strengthening their argument. The theoretical framework employed in this study highlights the impact of mobile devices as financial tools on the individual, the potential individual-level explanations for macroeconomic development, the institutional impact on efficaciousness of mobile finance and development, and the overall macroeconomic development trends present at the state-level as a result of increasing numbers of mobile devices.

Beginning at the individual level, many different concepts from differing schools of thought will be compiled in order to development the theoretical paradigm most germane to explaining the impact of mobile finance as a means to financial inclusion and poverty alleviation. At the individual level, the term poverty alleviation refers to (1) a decrease in individual costs (be it monetarily or non-monetarily), (2) an increase in income, or (3) a combination of both, which when leveraged sagaciously can lead to an increase in standard of living. As mentioned in the ensuing literature review, mobile phones and information communication technologies lead to the amelioration of information costs by allowing previously excluded individuals an avenue to access information pertinent to various decision making processes. More specifically, the decrease in transaction costs (transaction costs including, but not limited to, transport costs to a bank branch or to an exchange partner, service fees for sending remittances, etc.) lead to an increased income. Focusing alternatively on the use of microfinance as a potential micro-lending platform, the theories of Joseph Schumpeter on economic development, entrepreneurship, and innovation elucidate the importance of mobile phones in capital reallocation. Schumpeter writes in his seminal piece “The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle” that in order to best facilitate economic development, the financial system must allocate capital in a manner, which emphasizes entrepreneurial aptitude in lieu of the traditional criterion of wealth. Schumpeter adds that by allocating capital to entrepreneurs, the economy will undergo innovation in various forms which will spur both individual income increases and overall gains and economic development (Schumpeter, 1934).

In order to achieve Schumpeter’s suggestion of allocating capital to the individuals with the highest entrepreneurial aptitude, a country must pursue policies toward financial inclusion. Defined by the World Bank, “Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way.” Overall, the World Bank explains that financial inclusion is not an end in itself but rather a means toward economic development. Utilizing basic growth theory, the World Bank elaborates that financial inclusion and increased financial access allows individuals to plan for unexpected emergencies, use various financial services, invest in education, manage risk, and better mitigate the effects of financial shocks – all of which ultimately correlate positively with economic development and elevated living standards (Anon., 2016, Financial inclusion overview).

From the classical theory of growth, as developed by Adam Smith, the theoretical model derives the importance of capital in causing dynamic economic growth. This theory of capital accumulation is incorporated in the Solow growth model. Although the traditional Solow growth model makes the simplified assumption of one synonymous capital, termed “k,” there are many varieties of capital: physical capital (bulldozers or plant machinery), technological capital (computers or robotics), public capital (infrastructure, roads, and bridges), and human capital (educational investments or specific skills development). With this wide variety of capital, there exists an increased clout in the policy decisions made by the national government in allocating investment into each type of capital. In essence, the decision of policy makers aiming to achieve economic growth remains which specific varieties of capital yield the highest marginal products (Mankiw, 2013, p. 246-247).

Moreover, the importance of institutions in growth logically follows that the efficiency and efficaciousness of an institution directly relates to the informed decisions each government makes in allocating the constrained resources into each of the aforementioned capital varieties (Mankiw, 2013, p. 248-249). Econometrically modelling this theoretical paradigm, a study by W. A. Naude published in the *Journal of International Development* utilizes a single period cross-sectional data and panel data model to corroborate the aforementioned framework and the theoretical findings of Kaufman, Kraay, and Zoido-Lobaton from 1999 which found a positive and robust relation between a country’s governance and their level of economic growth. These aspects of governance can be categorized under various headings: voice and accountability, political stability, government effectiveness, regulatory framework, rule of law, and corruption and graft. Citing the magnitude of these results, Naude indicates that “Kaufman *et al.* (1999) find that ‘a one standard deviation improvement in governance leads to between a 2.5 fold (in the case of voice and accountability) and a 4-fold (in the case of political stability and violence) increase in per capita income” (Naude, 2004). In corroborating the significance of institutions in engendering positive economic development, the aforementioned measures of institutions are crucial in the both the theoretical and econometric model in order to first account for the varying levels of economic development observed in each country and additionally to facilitate a discussion on the potential impact of policy changes on economic growth.

Briefly touched upon in Schumpeter’s discussion on the entrepreneur, and further expounded on in his theory of creative destruction, the technological progress of a nation state plays a large role in the level of economic growth. Creative destruction in its most basic definition refers to the process whereby innovations in the production process render some previous aspect of production inefficient, and therefore this aspect of production is phased out in exchange for the new innovative method. For instance, the innovative creation of a machine capable of producing textiles resulted in unemployment for the previous skilled knitters, yet also resulted in increased production at a lower cost for the consumer; therefore, there is an overall economic gain for society which engenders economic growth (Mankiw, 2013, p. 257).

Although mentioned briefly in the theoretical framework, the Solow growth model will not be utilized as a leading model in this analysis, primarily as a result of the assumption that technology is an exogenous variable in the model. While useful for understanding certain drivers of growth, this key assumption is unrealistic and therefore diminishes the suitability of the Solow growth model in answering the previously defined research questions. In lieu of this model, the theoretical framework will rely heavily on the basic assumptions of endogenous growth theory, defined as an economic model which attempts to explain the rate of technological change rather than accepting the rate of technological progress as a given (Mankiw, 2013, p. 254).

**1.5 HYPOTHESIS**

There exists a robust and positive correlation between the employment of mobile finance, financial inclusion, and economic development in sub-Saharan Africa. Beyond this essential correlation, the influence of institutions on both economic development and the proliferation of mobile finance services will prove significant in shaping policy recommendations. In order for governments to maximize the potential for economic growth, these correlations and nexuses must be carefully considered in developing a regulatory environment conducive to the expansion of mobile finance.

**2. LITERATURE REVIEW**

Research on the potential correlations between mobile phones, financial services, and development has been rapidly expanding in congruence with the expeditious proliferation of cellular devices in developing countries; however, there exists a paucity of purely academic work on these connections, with a greater preponderance of publications centered around the specific needs of development practitioners. Additionally, an exceedingly disproportionate amount of studies on mobile finance have focused on assessing the potential needs, design, or adoption of mobile finance products leaving a meager number of publications dedicated to gauging the impact (Duncombe & Boateng, 2009). In order to provide the most comprehensive literature review to best answer the previously stated research question, this study apportions the existing literature into three thematic section: (2.1) Mobile Money and Mobile Finance; (2.2). The Finance-Growth Nexus; and (2.3) Financial Inclusion with the final section (2.4) critically assessing the state of the literature.

**2.1 MOBILE MONEY AND MOBILE FINANCE**

In analyzing the apposite literature on the use of mobile devices by citizens in developing countries to access financial services, it is important to make some key discernments between some common terminology utilized in order to avoid confounding terms that appear similar. To begin, the scope of this research project remains exclusively on the utilization of mobile devices as financial services in developing countries. Two especially salient terms relate to this process: mobile finance as an all-encompassing term, and mobile money as a particular process under the umbrella of mobile finance. A journal article in the *PolicyMatters Journal* by Britni Must and Kathleen Ludewig presents a thorough definition of the term “mobile money” in the context of development, stating, “Mobile money allows users to pay for goods and services by using short message service (SMS) to transfer either local currency or mobile minutes” (Must & Ludewig, 2010). Mobile money began informally when phone companies in developing countries began allowing the transfer of “air-time” from one person to another, and moved toward institutionalization when clients were authorized to then sell their air-time to brokers or agents who would give them cash in return (Jack & Suri, 2011). More broadly, the term “mobile finance” focuses on the breadth of financial services which can be offered through the use of mobile devices. In the context of development, this term includes mobile money but could include micro-loans made via a mobile device.

Offering a comprehensive introduction to mobile money in developing countries, Must and Ludewig examine the various aspects of mobile finance including: the provision of an inexpensive manner in which consumers can transfer funds, access to savings mechanisms, the facilitation of insurance purchasing, and the reduction of transaction costs associated with microfinance institutions. However, there are noteworthy challenges which plague the mobile money industry, particularly the regulatory environment which limits third-party mobile-money agents – who are responsible for mobile money dispersal – from handling cash for deposits and withdrawals in mobile money accounts (Must & Ludewig, 2010).

In the discussion of mobile money, it is crucial to cogitate the leading examine of mobile money in the context of development – M-PESA. Launched formally in March of 2007 by the Kenyan mobile service provider Safaricom, M-PESA allowed SMS-based money transfers including deposits, transfer, and the withdrawal of funds all utilizing a cellular phone. A NBER working paper by William Jack of Georgetown University and Tavneet Suri of MIT Sloan conclude that at least for M-PESA in Kenya, the mobile finance services are reaching an ever-expanding cross-section of the population and, therefore, meeting the potential for this service to reach remote populations known in much literature as the “unbanked.” At the household level, the study cites positive impacts on savings, investment, and insurance, and at the macroeconomic level, there exist some potential positive impacts on the money supply and inflation pending a hospitable regulatory environment (Jack & Suri, 2011). Another key lesson extrapolated from research completed on M-PESA corroborates that the existence of a physical entity specific to the mobile money service is paramount to increasing financial inclusion. Researchers studying M-PESA found a distinct correlation between the proximity of a M-PESA physical kiosk to a household and that household’s benefit from and participation in the mobile money services. While this need for a tangible locale would typically pose a challenge to a traditional bank, as constructing a formal location and implementing ATMs would be costly and non-profitable in the poorest areas of developing countries, mobile money kiosks can often run out of existing shops or even a market stall (Kendall & Voorhies, 2014).

In addition to the apparent uses and benefits of mobile money, the more-broad concept of mobile finance has unparalleled potential impacts on economic development and poverty alleviation. For example, the introduction of mobile finance ameliorates the access of impoverished citizens to required financial information, reduces the costs associated with providing financial services, and diminishes the processing time of micro loans. Statistically substantiating the robust relationship between connectivity (measured in number of mobile phone subscribers and internet users) and financial depth utilizing a generalized method of moments approach to cross-section data from 61 countries over a time-frame of 13 years, Farkhanda Shamiim concludes that the proliferation of cellular devices utilized for mobile finance services forms the backbone for a developing country’s growth (Shamim, 2007).

Further research into the advantages of mobile money reveal that the reduction in transaction costs not indicates a savings in potential expenses on sending money (an especially costly and unreliable process in sub-Saharan Africa), but also translates into an expansion in an individual’s financial network. For example, when an individual endures some economic shock engendered by some unexpected catastrophe – like severe illness – that individual is able to receive money for his or her social network easier, quicker, and from more sources which could mean the difference between life and death. In other cases, this expansion could equate to individuals maintaining their diets or perpetuating a child’s education, both of which leading to growth. Moreover, these diminished costs lead to an increased ease in sending remittances. (Kendall & Voorhies, 2014).

As the mobile money industry continues to grow and change, there are differing opinions on the path forward for mobile money. One option is to continue to formulization process documented previously with some telecommunication companies partnering with commercial banks (e.g. the formation of M-Shwari which pools the resources of Safaricom and the Commercial Bank of Africa and enabled current M-Pesa users to open real interest-accruing savings accounts or to apply for short-term micro loans using their mobile device) to avoid the regulations plaguing the private telecommunication companies currently leading the mobile money industry (Kendall & Voorhies, 2014). Equally import is Bill Maurer’s (Professor of Anthropology at the University of California at Irvine) analysis of “air-time” as a potential currency and store of value in the mobile money exchange. On this topic, Maurer argues, “airtime can function as both exchange and use: it is potential currency, and it is potential time. It is also potentially a specific kind of time: the time of talk, of relationality, obligation or duty. This may represent a potential democratization of money: ‘financial inclusion’ in the best sense of the term” (Maurer, 2011).

**2.2 THE FINANCE-GROWTH NEXUS**

Unparalleled in both the breadth and germaneness of his research on the connections between finance and economic growth is Ross Levine, professor at Haas School of Business at the University of California Berkley. Levine’s first seminal work on the finance-growth nexus, entitled “Finance and Growth: Schumpeter Might Be Right,” evaluates the claim made by Joseph Schumpeter in 1911, that financial services provided by intermediaries – like the mobilization of savings, evaluation of projects, management of risk, and facilitation of transactions – are imperative to both technological innovation and economic development. King and Levine utilize cross-country data which prove to be consistent with Schumpeter’s aforementioned presentiment. In order to examine the validity of Schumpeter’s assertion, King and Levine construct four empirical indicators of financial development: (1) the traditional measure of financial depth, the ratio of liquid liabilities to GDP; (2) the discernment between depository banks and central banks in the allocation of credit domestically; and the credit issued to nonfinancial private firms divided by either (3) total credit or (4) GDP. When examining and measuring growth, the study focuses on “per capita GDP growth, the rate of capital accumulation, and improvements in economic efficiency” (King & Levine, 1993). Generally speaking, the study concludes that the previously defined financial indicators are robustly and strongly correlated with economic growth which is ultimately congruent with the hypothesis that financial services stimulate economic growth (King & Levine, 1993).

Eleven years later, Levine continues to shape the study of the finance-growth nexus with his working paper “Finance and Growth: Theory and Evidence” which comprehensively reviews the apposite literature on the correlation between the financial system of a country and its level of economic growth present. Before further scrutinizing the relationship between finance and growth, Levine explicitly defines the functions and roles of financial systems both specifically and broadly with the overall purpose of all financial systems remaining to “ameliorate … the effects of information, enforcement, and transactions costs” (Levine, 2004).

Germane to the informality and specificity of Mobile Finance, Levine discusses the literature documenting the easing of exchanges. Citing Adam Smith, Levine maintains that financial interactions which lower the transaction costs involved in the exchange could promote specialization, innovation, and ultimately growth. Further on, Levine notes that literature looking at the impact on income distribution and poverty alleviation asserts that, “informational asymmetries produce credit constraints that are particularly binding on the poor because the poor do not have the resources to fund their own projects, nor the collateral to access bank credit” (Levine, 2004). Levine therefore concludes that by ameliorating the existing information and transaction costs present – prominently to those impoverished – would allow more entrepreneurs to receive external credit, which would also disproportionately and positively impact a country’s capital allocation in favor of the poor. Briefly hinting at the benefits of financial inclusion on growth, Levine mentions political economy theories which suggest well-functioning financial systems increase access of services to a wider population leading to increased entrepreneurship, the emergence of firms, and long term economic growth (Levine, 2004).

In response to the global financial crisis, Levine has shifted the scope of his research toward analyzing financial policies and regulations which are conducive toward promoting economic growth. In this research, he takes the finance-growth nexus as an assumption and focuses instead on constructing regulations which incentivize capital allocation on the basis on entrepreneurial ideas and abilities rather than political connections or wealth. Contemplating the importance of financial innovation, Levine presents cross-country empirical findings from one of his previous studies which assets that, “financial innovation is necessary for sustaining technological change and economic growth” (Levine, 2011). Ultimately, Levine argues that the best financial regulation conducive toward promoting growth would be policies geared toward creating sound incentives while adapting legislation to perpetuate sound incentives during and after financial innovation (Levine, 2011).

Additionally, Yabibal M. Walle completed an examination of the long-run impact of the finance-growth nexus in 17 countries in sub-Saharan Africa, and concluded through the utilization of a series of error correction-based panel cointegration tests that there is a statistically significant and positive correlation between finance and growth in sub-Saharan Africa. These results corroborate Levine’s aforementioned views that policies aimed at increasing the financial depth and infrastructure of a country is key in promoting long-run economic growth and development (Walle, 2014).

**2.3 FINANCIAL INCLUSION**

Simply defined as the share of individuals and/or firms who utilize financial services, financial inclusion has become a hot policy topic among the major development institutions. While the majority of literature surveyed for this thesis focused on the financial inclusion in terms of utilization of formal financial institutions, Talwar and Kulhari allude to the utilization of innovative models – like the Grameen Bank – and technological advances – like mobile phones – to reach out to the “unbanked” and increase financial inclusion (Talwar & Kulhair, 2012). Conceptualizing the link between financial inclusion and economic growth, Babajide and others empirically substantiate the relationship of financial inclusion as a driver of economic growth utilizing Nigeria as a case study (Babajide, Adegboye, & Omankhanlen, 2015).

Delineating the complexities of financial inclusion, Karpowicz asserts that the obstacles impacting financial inclusion can be apportioned into the three broad categories of access, depth, and efficiency. Most germane to the research of mobile finance is the obstacles related to access, which include but are not limited to a disparity in physical infrastructure, complex paperwork related to formal bank accounts, and any red tape precluding the creation of a banking relationship between someone “unbanked” and a formal financial institution (Karpowicz, 2014). In addition to these obstacles to access, other factors like economic volatility, a lack of trust, unrealistic collateral requirements, and cultural differences could preclude the formation of a banking relationship for someone in the “unbanked” category. However, solutions to these issues are endemic to the simplicity of mobile finance making it almost a panacea to financial inclusion – or so some say.

**2.4 STATE OF THE LITERATURE**

Largely problematic to the development of truly beneficial empirical literature on the impact of mobile finance is the paucity of data as this is a quasi-novel concept of interest; therefore, as databases are further developed by institutions like the World Bank and the International Monetary Fund – or even as the private mobile phone companies in developing countries begin to publicize its data – there should be further empirical analysis completed. However, until these data sources significantly expand, the literature will remain largely theoretical. One caveat, nonetheless, aforementioned in the previous sections is that even when data exist, measuring complex concepts like financial inclusion, financial depth, and economic growth can prove to be enigmatic. Additionally, a bulk of the literature poses questions regarding policy implications or makes unbolstered policy recommendations as an afterthought to the analysis. Ergo, there exists a dearth of qualified recommendations for mobile finance policy in which developing countries could implement to augment the positive impacts to economic growth.

**3. DATA**

One of the greatest challenges in completing the following model and analysis was finding complete and accurate data for the intended years and countries. Therefore, the criteria for choosing the countries of interest included: (1) that the country was first and foremost a country in the region of sub-Saharan Africa, which meant the maximum possible number of countries was 50; (2) after deciding on 2014 and 2015 as potential years of analysis, the countries needed to have corresponding data for the selected dependent variable, which eliminated some of the smallest territories with little to no data on the World Bank databank; (3) utilizing 2014 as the year of analysis for the independent variables, the countries needed to have corresponding data for all of the major independent variables. All in all, this led to a sample size of 31 countries (Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Democratic Republic of Congo, the Republic of Congo, Cote D’Ivoire or Ivory Coast, Ethiopia, Gabon, Ghana, Kenya, Madagascar, Malawi, Mali, Mauritius, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe). Data was exported from the World Bank’s “Databank,” the World Factbook, and the International Monetary Fund.

In the following analysis, the dependent variable needed to represent economic growth and development in order to construct a descriptive model which to economic growth and development as a function of a set of independent variables. In order to best capture the level of economic growth rather than the rate, the Gross Domestic Product per capita at Purchasing Power Parity for current international dollars (abbreviated as: GDP per capita at PPP International $) was selected to be the dependent variable. As explained in the findings section, this variable was selected both for 2014 and 2015 in order to account for potential lags and time delays in the effects of some independent variables.

Rooted in the theoretical paradigm forged earlier in this paper, the independent variables needed to serve as proxy variables for the aforementioned drivers of growth. Beginning with the development of human capital, the selected variable needed to accurately represent some level of education in a society. With the limited educational data for some of the most impoverished countries, the proxy variable utilized to represent human capital development is the literacy rate of individuals 15 years or older. Next, the level of physical capital accumulation was represented best by the level of investment as a percentage of GDP; however, many limitations exist in this data as corruption can often direct investment dollars toward a corrupt personal gain, often limiting the impact of investment spending in developing countries. Financial inclusion, one of the major explanatory factors of the impact of mobile finance, was represented with one variable which served a dual purpose. The utilization of the percentage of individuals age 15 and older who saved at a financial institution represents first – to some magnitude – the level of financial inclusion in a society by measuring the precise utilization of the accounts, and second in representing some semblance of a savings variable as public savings drives growth as well. In order to represent the government and the institutional/environmental impact on development, the estimated political stability variable was utilized. Lastly, to capture the proliferation of mobile phones in Africa, the variable Mobile Subscription per 100 people was employed; however, it is imperative to note that as aforementioned in the introduction not all of these individuals use their mobile device as a tool to access finance. Therefore, it would be incorrect to assume this represents mobile finance as an explanatory factor of economic growth.

Various limitations exist in this data. First, in the selection of countries by deliberately excluding those for which certain data were unavailable, there may be some level of bias against countries of smaller size or of greater poverty. Nonetheless, the exclusion of these countries was necessary in order to ascertain an accurate statistical analysis of a complete dataset, rather than allowing holes in the dataset to skew the results. In addition, the lack of infrastructure in sub-Saharan Africa as a whole constrains the availability of data which means that while some of the independent variables serve as decent proxy variables, they do not capture the full picture to provide the most realistic results. However, the inclusion of 31 countries and the various explanatory factors has allowed the circumvention of some of these limitations and should, in the end, prove to offer a valuable contribution to answering the research questions of this study.

**4. ECONOMETRIC MODELING**

In order to investigate the macroeconomic impact of the proliferation of mobile finance, a simple ordinary least squares linear regression analysis model (OLS) is utilized. However, prior to completing such model, the correlation coefficients and statistical significance of such correlations were calculated. The bivariate correlation results:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | GDP Per Capita PPP (2015) | Literacy Rate | Investment as % of GDP | Saved at a financial institution (% age 15+) | Political Stability – Estimate | Mobile Subscription per 100 |
| GDP Per Capita PPP Pearson Correlation  (2015) Sig. (2-tailed)  N | 1  31 | .540\*\*  .002  31 | .243  .188  31 | .675\*\*  .000  31 | .523\*\*  .003  31 | .767\*\*  .000  31 |
| Literacy Rate Pearson Correlation  Sig. (2-tailed)  N | .540\*\*  .002  31 | 1  31 | -.136  .465  31 | .536\*\*  .002  31 | .377\*  .036  31 | .335  .065  31 |
| Investment as Pearson Correlation  % of GDP Sig. (2-tailed)  N | .243  .188  31 | -.136  .465  31 | 1  31 | .096  .608  31 | .222  .230  31 | .242  .190  31 |
| Saved at a Pearson Correlation  Financial Institution Sig. (2-tailed)  N | .675\*\*  .000  31 | .536\*\*  .002  31 | .096  .609  31 | 1  31 | .392\*  .029  31 | .468\*\*  .008  31 |
| Political Stability Pearson Correlation  (Estimate) Sig. (2-tailed)  N | .523\*\*  .003  31 | .377\*  .036  31 | .222  .230  31 | .392\*  .029  31 | 1  31 | .433\*  .015  31 |
| Mobile Subscription Pearson Correlation  per 100 Sig. (2-tailed)  N | .767\*\*  .000  31 | .335  .065  31 | .242  .190  31 | .468\*\*  .008  31 | .433\*  .015  31 | 1  31 |

**\*\*. Correlation is significant at the 0.01 level (2-tailed)**

**\*. Correlation is significant at the 0.05 level (2-tailed)**

These correlational results reveal a statistically significant bivariate correlation between GDP per capita PPP and literacy rate, savings account ownership, political stability and mobile subscription rate. Also germane to this analysis, there were statistically significant correlational coefficients between mobile subscription rates and savings accounts, as well as between mobile subscription and the institutional proxy of political stability, seemingly indicating a relationship between mobile banking and financial inclusion and between mobile banking and institutional efficiency, respectively. Other statistically significant bivariate correlations occurred between literacy rate and savings accounts, literacy rate and political stability, and savings accounts and political stability – some of these significant correlations will be further discussed in the findings section of this analysis, however do not fall in the purview of this argument. While this bivariate correlation analysis is insightful in many aspects, this model does not account, nor control, for the endogeneity problems which may be present as a result of the numerous moving factors explaining growth.

The econometric model utilized in order to answer the preliminary research questions analyzes the level of economic growth as a function of the five independent proxy variables rooted in the theoretical model and defined in the data section. In doing so, this thesis develops a simplified endogenous growth model utilizing ordinary least squares linear regression analysis (OLS) which produces the following equation:

Yi,2015 = β0 + β1LR + β2I + β3S + β4PS + β5MS

or

Yi,2015 = -7230.243 + (50.847)LR + (59.580)I + (149.223)S + (591.766)PS + (63.871)MS

(.025) (.135) (.367) (.030) (.409) (.000)

This cross-country linear regression model seeks to explain the dependent variable as a function of the sum of the independent variables first multiplied by their corresponding B-coefficients. On the left-hand side of the equation, Yi,2015 represents the level of economic growth as measured by the country’s GDP per capita at Purchasing Power Parity for the year 2015. β0 represents the constant of the equation as ascertained through the linear regression analysis, β1LR indicates that one percentage point increase in the literacy rate would lead to a $50.847 increase in the GDP per capita at PPP, β2I indicates that one percentage point of investment as a percentage of the GDP would lead to a $59.580 increase in the GDP per capita at PPP, β3S indicates that a one percentage increase in the percentage of individuals above the age of 15 with an active savings account at a financial institution would lead to a $129.223 increase in GDP per capita at PPP, β4PS indicates that a one point increase in the political stability measure would lead to $591.766 increase in GDP per capita at PPP, and β5MS indicates that an increase of one mobile subscriber per 100 heads would lead to a $63.871 increase in GDP per capita at PPP. The denotation i and t represent the country and year respectively. The coefficients resulting from the usage of this model for the variables and the Analysis of Variance (ANOVA) results are:

Coefficients

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| (constant) | -7230.243 | 3029.095 |  | -2.387 | .025\* |
| Literacy Rate | 50.847 | 32.886 | .193 | 1.546 | .135 |
| Investment as % of GDP | 59.580 | 64.803 | .098 | .919 | .367 |
| Saved at a financial institution | 149.223 | 64.989 | .290 | 2.296 | .030\* |
| Political Stability | 591.766 | 705.329 | .098 | .839 | .409 |
| Mobile Subscription per 100 | 63.871 | 15.227 | .500 | 4.195 | .000\*\* |

**\*\*. Correlation is significant at the 0.01 level (2-tailed)**

**\*. Correlation is significant at the 0.05 level (2-tailed)**

ANOVA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Sum of Squares | df | Mean Square | F | Sig. |
| Regression | 577402656.9 | 5 | 115480531.4 | 15.719 | .000 |
| Residual | 183659729.7 | 25 | 7346389.187 |
| Total | 761062386.6 | 30 |  |

GDP per capita at PPP data from 2015 were utilized in order to provide a delay of one year for the results engendered by the independent variables in 2014 to emerge in the data. Expounding upon this, a high data point in the investment as a percentage of GDP for 2014 is a promising indication of economic growth; however, there is a delay as this capital must be allocated and spent in order for the effects to materialize. This lag in the observed data points and the actualization of the resulting effects on economic growth is discussed later in the limitations section of this thesis. The decision to utilize proxy variables as opposed to a high number of independent variables results from the necessity of having a high number of degrees of freedom without overcomplicating or obfuscating the model. Lastly, the OLS linear regression model was utilized as it is a simpler model while still being the best linear unbiased estimator (BLUE). While the limitations of the OLS linear regression model will be discussed later in the results section of this thesis, the model nonetheless satisfies the objective of carefully analyzing the complex interrelationships of the multiple variables involved in determining the level of economic growth.

Next, in order to further investigate the additional nexuses of interest, a bivariate correlation analysis was completed to look at (1) the correlations between mobile subscription per 100 and the five selected financial inclusion variables and (2) the correlations between mobile subscription per 100 and the institutional / governmental factors. These correlations are of particular interest to the second and the final research questions as well – as the policy recommendations – in discussing the importance of financial inclusion and the institutional environment on optimizing the potential for economic growth as a result of mobile money services. The results from these two bivariate correlation analyses are:

Bivariate Correlation Analysis: Mobile Subscription and Financial Inclusion

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Mobile Subscription per 100 | Credit Card (% age 15+) | Debit Card (% age 15+) | Borrowed from a financial institution (% age 15+) | Saved at a financial institution (% age 15+) | Account at a financial institution (% age 15+) |
| Mobile Subscription Pearson Correlation  per 100 Sig. (2-tailed)  N | 1  31 | .601\*\*  .000  31 | .552\*\*  .003  31 | .328  .072  31 | .468\*\*  .008  31 | .522\*\*  .003  31 |
| Credit Card (% age Pearson Correlation  15+) Sig. (2-tailed)  N | .601\*\*  .000  31 | 1  31 | .903\*\*  .000  31 | .653\*\*  .000  31 | .770\*\*  .000  31 | .865\*\*  .000  31 |
| Debit Card (% age Pearson Correlation  15+) Sig. (2-tailed)  N | .522\*\*  .003  31 | .903\*\*  .000  31 | 1  31 | .690\*\*  .000  31 | .867\*\*  .000  31 | .938\*\*  .000  31 |
| Borrowed from a Pearson Correlation  Financial Institution Sig. (2-tailed)  (% age 15+) N | .328  .072  31 | .653\*\*  .000  31 | .690\*\*  .000  31 | 1  31 | .783\*\*  .000  31 | .790\*\*  .000  31 |
| Saved at a financial Pearson Correlation  institution (% age Sig. (2-tailed)  15+) N | .468\*\*  .008  31 | .770\*\*  .000  31 | .867\*\*  .000  31 | .783\*\*  .000  31 | 1  31 | .966\*\*  .000  31 |
| Account at a financial Pearson Correlation  institution (% age Sig. (2-tailed)  15+) N | .522\*\*  .003  31 | .865\*\*  .000  31 | .938\*\*  .000  31 | .790\*\*  .000  31 | .966\*\*  .000  31 | 1  31 |

\*\*. Correlation is significant at the 0.01 level (2-tailed)

Bivariate Correlation Analysis: Mobile Subscription and Institutional Quality

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Mobile Subscription per 100 | Government Effectiveness: Estimate | Political Stability: Estimate | Regulatory Quality: Estimate | Rule of Law: Estimate | Voice and Accountability: Estimate |
| Mobile Subscription Pearson Correlation  per 100 Sig. (2-tailed)  N | 1  31 | .488\*\*  .005  31 | .433\*  .015  31 | .458\*\*  .010  31 | .486\*\*  .006  31 | .504\*\*  .004  31 |
| Government Pearson Correlation  Effectiveness Sig. (2-tailed)  Estimate N | .488\*\*  .005  31 | 1  31 | .660\*\*  .000  31 | .883\*\*  .000  31 | .947\*\*  .000  31 | .757\*\*  .000  31 |
| Political Stability Pearson Correlation  Estimate Sig. (2-tailed)  N | .433\*  .015  31 | .660\*\*  .000  31 | 1  31 | .595\*\*  .000  31 | .685\*\*  .000  31 | .630\*\*  .000  31 |
| Regulatory Quality Pearson Correlation  Estimate Sig. (2-tailed)  N | .458\*\*  .010  31 | .883\*\*  .000  31 | .595\*\*  .000  31 | 1  31 | .932\*\*  .000  31 | .794\*\*  .000  31 |
| Rule of Law Pearson Correlation  Estimate Sig. (2-tailed)  N | .486\*\*  .006  31 | .947\*\*  .000  31 | .685\*\*  .000  31 | .932\*\*  .000  31 | 1  31 | .790\*\*  .000  31 |
| Voice and Pearson Correlation  Accountability Sig. (2-tailed)  Estimate N | .504\*\*  .004  31 | .757\*\*  .000  31 | .630\*\*  .000  31 | .794\*\*  .000  31 | .790\*\*  .000  31 | 1  31 |

\*\*. Correlation is significant at the 0.01 level (2-tailed)

\*. Correlation is significant at the 0.05 level (2-tailed)

Significant correlations exist between mobile subscription per 100 (the variable serving as a proxy for the level of penetration by mobile devices, and ergo, the level of penetration by mobile money subscriptions) and the financial inclusion variables – excluding the borrowed from a financial institution variable – as well as between the mobile subscription rate and the institutional factors. These significant correlations indicate a robust relationship between these variables which will be further discussed in the findings section and considered later when formulating policy recommendations surrounding the regulatory environment of mobile money.

**5. FINDINGS**

In summary, the model had an adjusted R square of .710, meaning that about 71% of the dependent variable (GDP per capita at PPP from 2015) was explained by the independent variables included in the model. With 31 degrees of freedom, the ANOVA F-score of the model was 15.719 and the model was statistically significant with a significance score of .000. Conclusively, these results indicate a successful model that can be utilized to analyze the robustness of the relationship between mobile money and the level of economic growth and development.

A strong indicator of a robust relationship, the bivariate correlation analysis first indicates that the level of economic growth (as measured by GDP per capita at PPP) and the mobile subscription rate per 100 heads (serving as a proxy for the level of penetration by mobile telephones and ergo the level of penetration by mobile money services) have an extremely high statistically significant relationship at the 0.000 level (2-tailed). However, correlation does not equate to causation nor does it show whether a higher level of economic growth results from a higher mobile penetration or if a higher level of mobile penetration is the result of increased economic growth. Therefore, the developed model can aid in addressing this issue by bringing in a wider number of variables, as well as by defining in the model that economic growth is a function of the other variables. Most germane to this thesis and its research questions, the high statistical significance of the mobile subscription rate in the OLS linear regression model indicates that the mobile subscription is an important explanatory variable in determining the level of economic growth. In fact, the mobile subscription rate had the highest statistical significant of all of the variables utilized in the model indicating incontrovertibly that a robust relationship exists.

Many limitations exist in both the data and the OLS linear regression model. First, the data utilized in this analysis – while from a multitude of credible sources – are affected by measurement error. These data come from a number of different countries, and accordingly, the data could be inaccurate or inconsistent. Moreover, data measuring the main variable of interest in this analysis – mobile money participation rate – is neither easily accessible nor widely known for many sub-Saharan African countries. Therefore, the proxy variable of mobile subscriptions per 100 heads is utilized to measure the penetration of mobile phones in each country. The OLS linear regression model, while a great tool for analyzing the complex interrelationships contributing to the level of economic growth, has many limitations: omitted variable problems of unobserved fixed effects, the potential that regressors in the equation may be endogenous which would demand instrumental variables, and the loss of valuable dynamic information as economic growth is a dynamic process. In a perfect world, more consistent data would be accessible on the rate of mobile money subscription and a more dynamic model utilizing panel data regressions and instrumental variables would be utilized in order to improve the accuracy of the results; however, the results from the OLS linear regression model nonetheless provides valuable results regarding the relationship between mobile money and economic growth.

These results are congruent with the study, “The ICT Environment, Financial Sector and Economic Growth: A Cross-country Analysis,” completed by Shamim in 2007. While Shamim utilized a General Method of Movements (GMM) analysis – as opposed to an OLS linear regression analysis implemented in this thesis – both models concluded that a robust relationship exists between mobile subscription rate and GDP, indicating that mobile money and the proliferation of mobile devices is a significant explanatory variable of economic growth. Focusing on the theoretical underpinnings of this model, the robust relationship between mobile money and economic growth also demonstrates the presence of a positive feedback loop between these two variables, further deepening their interrelationship. For example, as the mobile money subscription rate increases, individuals’ incomes increase and the country experiences economic growth (as demonstrated through this paper), and as a country experiences economic growth, the number of individuals able to purchase a mobile phone and utilize mobile money services increases, ad infinitum. This positive feedback loop is endemic of many variables that attribute to the level of growth for a country: investment and literacy rates, for example.

In addition to the robust relationship between mobile money and economic growth, mobile money is correlated with a number of other variables, – namely those in the financial inclusion and institutional quality variable groupings – and these relationships are imperative to consider in formulating policy recommendations. While these correlations do not indicate a causal relationship between these variables, this is one research concept that should be further considered in future publications in order to provide the most accurate recommendations to optimize the economic growth potential from mobile money services. For instance, how does the political stability or the level of voice and accountability affect the level of economic growth resulting from mobile money services? While this broad of a research question rests outside the scope of this particular study, the bivariate correlation analysis does indicate that countries with higher quality institutions have higher rates of mobile subscription and thus higher levels of economic growth. Determining the direction of the relationship is challenging due to the simplicity of the correlation analysis; however, the significance of the relationship regardless demonstrates a need for high-quality institutions in order to maximize the potential for economic growth resulting from mobile money. Congruent with basic intuition and logically sound, this conclusion could be illustrated through a simple scenario. Imagine an extremely corrupt, failed nation-state – an individual will benefit less from mobile money services in this country than a stable country.

The highly significant and robust relationships between mobile phone subscription and the financial inclusion variables affirms the claim made throughout various literature sources that increased utilization of mobile money services leads to increased financial inclusion. Increased specificity of data would aid in more conclusively examining the exact link between mobile money and financial inclusion; namely, data that aims to record the number or rate of individuals who open an account at a formal financial institution resulting from the utilization of mobile money services. However, utilizing the results from the bivariate correlation analysis conducted using the mobile subscription rate and the financial inclusion variables, this paper is able to conclude that a statistically significant relationship exists and could further add to the economic growth and development potential for mobile money services in sub-Saharan Africa.

**6. CONCLUSION**

Aligned with results from previous studies on the topic of information and communication technology and economic growth, this study supports the hypothesis that there exists a robust and positive correlation between the employment of mobile finance, financial inclusion, and economic development in sub-Saharan Africa. This relationship supports the notion that one tool for economic growth and development is the utilization of mobile money and mobile finance services. Rooted both in the conceptual framework previously developed and the results obtained through the econometric model using OLS linear regression analysis, this thesis bolsters the argument that increasing the accessibility of mobile phone technology and mobile money services to individuals entrenched in poverty who reside in sub-Saharan Africa will incontrovertibly lead to significant and positive economic growth at both the individual- and state-level.

Beyond this essential correlation, the statistically significant correlation between the institutional quality variables and the mobile subscription rate, as well as between the financial inclusion indicators and the mobile subscription rate, indicates that the proliferation of mobile phones could aid in other manners to help develop a state both economically and politically. While these relationships were only briefly analyzed utilizing a bivariate correlation analysis, the correlations indicate that the proliferation of mobile phones could aid in increased financial inclusion as well as political development. I would venture that these relationships could also feature the positive feedback loop quality mentioned in the results section. For example, as political quality increases, individuals are permitted to have mobile phones at reasonable prices, this aids in connecting individuals which empowers them, therefore they are able to organize and fight political injustices, therefore the institutional quality increases, and this leads to increased freedom in use of the mobile devices, ad infinitum. Knowing the positive impact of institutional quality as discussed in Naude’s “The Effects of Policy, Institutions and Geography on Economic Growth in Africa: An Econometric Study Based on Cross-Section and Panel Data,” the increased political development and institutional quality leads to positive economic growth. Conclusively, these robust correlations increase the potential for growth of mobile phone technology.

**7. POLICY RECOMMENDATIONS**

According to the findings of this thesis, bolstered by the related findings by other researchers on this and other similar topics, mobile money and mobile finance services have immense potential as tools for economic growth and development in sub-Saharan African Countries. Given the unique nature of this service and the innumerous regulations surrounding the financial services industry, it is expected and justified for political regimes to be skeptical of non-governmental and non-financial institutions to play such a pivotal role in the financial development of a country. Therefore, some countries have become intolerant and inhospitable to the idea of allowing mobile money services most often owned and operated by mobile phone companies from becoming so prolific throughout their nation. However, countries like Kenya, Nigeria, and Ghana have built an environment conducive for the growth and expansion of mobile money services and have therefore become three of the mobile money centers in Africa. With any new technology, there is a need for policies that allow for the expansion of and adaptation to the mobile money services. These three aforementioned countries have embraced the new technology with policies promoting cashless transactions and the development of new technologies like ATMs that provide mobile money users with a one-time authentication code that allows them to send a text-message and withdrawal or deposit money without the need for a mobile-money agent – a safer and less-corrupt method (Bhan, 2014).

Make no mistake, this industry needs regulations and needs to be monitored because like any financial industry the potential for corrupt and unjust practices which can lead to unparalleled catastrophe nonetheless exist. However, the correct regulations are necessary in order to optimize growth as opposed to shutting down or pushing the industry in the wrong direction. The following policy suggestions are rooted in the findings made in this paper as well as through qualitative evidence presented through case studies of various African countries.

First, to countries that feel that mobile money is not an industry that should be exclusively privatized by cellular phone companies, an alternative exists. Various banks throughout Africa have successfully created and implemented mobile money services – Equity Bank of Kenya has launched MVNO (Mobile Virtual Network Operator), for example – however, the need for these banks to partner with mobile operators is imperative (Bhan, 2014). Firstly, in order for mobile money to work, it needs to utilize a mobile phone platform and SMS-technology; therefore, the mobile phone companies cannot be entirely excluded. Secondly, a large driving factor as to why so much of Africa’s population is unbanked is due to an inherit lack of trust in banks and financial institutions. Alternatively, Africans have a different social construct of mobile phone companies and feel less insecure utilizing financial services offered through these companies. A partnership between a bank and a phone company is the most ideal situation, as mobile money is viewed as a stepping stone out of poverty and into accounts with real financial institutions; ergo, increasing financial inclusion for a company. Therefore, governments should push for newly forged relationships between banks and mobile phone companies with the aim of providing new mobile money services like MTN Mobile Money or M-PESA.

Secondly, governments should invest in the development of technological services which will make mobile money easier to adopt and more accessible overall. Beyond the simple sending of money from one phone to another, or the basic deposit and withdrawal services, mobile money has the potential to continue expanding into the provision of micro-credit or the distribution of larger loans, or the development of more complex software to foster automatic and recurring bill payments, just to name a few options and directions the industry is already pursuing. However, in order for the number of mobile money subscribers to increase, these technologies and services must increase in number and geographic distribution. Moreover, national governments must invest into research as to how to reach the individuals most secluded in rural areas in order to know how much technology is the optimal amount and which steps in the mobile money process must be handled by an individual in order to successful integrate the truly unbanked individuals.

Similarly, in attempting to reach the individuals most entrenched in poverty and those who most likely do not even have a mobile device, governments should consider subsidy programs or micro-loans which make mobile phone technology more accessible to these individuals. In doing so, these individuals will have access to a savings account which was previously unfathomable and can begin practicing basic financial skills such as saving and investing. These skills will be key in aiding these individuals to become included in the financial system and to increase their potential for escaping from poverty.

Lastly, yet most importantly, governments must unequivocally show their support of mobile money services. This could be accomplished financially through heavy investment in the industry; however, for countries unable to do so, an alternative exists. By allowing individuals to make payments to the government or receive refunds from the government via mobile money services, the national regime would be making a statement that mobile money services are safe, convenient, and approved. Additionally, governments would benefit from the mass amounts of data that could now be collected by mobile phone providers that was previously uncaptured due to the use of cash, incentivizing the government to place priority on mobile finance. Furthermore, in placing priority on mobile finance, these governments are sending a message that financial inclusion and institutional quality are of grave importance as the increased utilization of mobile technology is incontrovertibly correlated to these two concepts.

In following these policy recommendations, a nation-state is constructing an environment that is conducive to the growth and development of mobile finance and therefore the growth and development of the economy. The potential for mobile money to benefit a developing nation in sub-Saharan Africa is truly boundless – it is imperative that governments realize this fact and begin constructing policies that foster the expansion of these services throughout their countries.

**9. BIBLIOGRAPHY**

Adelman, I. (1961). *Theories of economic growth and development*. Stanford, CA: Stanford University Press.

Aker, J. & Mbiti, I. (2010). *Mobile phones and economic development in Africa.* (Working Paper No. 211). Center for Global Development: Washington, D.C.

Alleman, J., & Rappoprt, P. (2010). Mobile money: implications for emerging markets. *Communications & Strategies. 79*(3), 15-28.

Andrianaivo, M. & Kpodar, K. (2011). ICT, financial inclusion, and growth: Evidence from African countries. (IMF Working Paper). International Monetary Fund: Washington, D.C.

Asongu, S. (2013). The impact of mobile phone penetration on African inequality. *International Journal of Social Economics. 42*(8), 706-716.

Asongu, S. & Moulin, B. (2016). The role of ICT in reducing informational asymmetry for financial access. *Research in International Business and Finance. 38*, 202-213.

Babajide, A., Adegboye, F., & Omankhanlen, A. (2015). Financial inclusion and economic growth in Nigeria. *International Journal of Economics and Financial Issues. 5*(3), 629-637.

Banerjee, A. V., & Duflo, E. (2011). *Poor economics: A radical rethinking of the way to fight global poverty*. New York: PublicAffairs.

Bhan, N. (2014). *Mobile money is driving Africa’s cashless future.* Retrieved from <https://hbr.org/2014/09/mobile-money-is-driving-africas-cashless-future>

Chibba, M. (2009). Financial inclusion, poverty reduction and the millennium development goals. *European Journal of Development Research. 21*(2), 213-230.

Demirgüç-Kunt, A. (2014). Presidential address: financial inclusion. *Atl Econ J., 42*, 349-356. doi: 10.1007/s11293-014-9429-z

Duncombe, R. & Boateng, R. (2009). Mobile phones and financial services in developing countries: a review of concepts, methods, issues, evidence and future research directions. *Third World Quarterly. 30*(7), 1237-1258.

Financial inclusion overview. (2016, October 2). Retrieved from https://www.worldbank.org/en/topic/financialinclusion/overview

Inoue, T. & Hamori, S. (2016). Financial access and economic growth: evidence from sub-Saharan Africa. *Emerging Markets Finance & Trade. 52,* 743-753.

Jack, W. & Suri, T. (2011). *Mobile money: the economics of M-PESA*. (Working Paper No. 16721). National Bureau of Economic Research: Cambridge, MA.

Karippacheril, T., Nikayin, F., de Reuver, M., & Bouwman, H. (2013). *Telecommunications Policy. 37,* 24-34.

Karpowicz, I. (2014). *Financial inclusion, growth and inequality: A model application to Colombia.* (IMF Working Paper). International Monetary Fund: Washington, D.C.

Kendall, J. & Voorhies, R. (2014). The mobile-finance revolution: how cell phones can spur development. *Foreign Affairs.* *93*(2), 9-13.

King, R. & Levine, R. (1993). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics. 108*(3), 717-737.

Levine, R. (2004). *Finance and growth: theory and evidence* (Working Paper No. 10766). National Bureau of Economic Research: Cambridge, MA.

Levine, R. (2011). *Regulating finance and regulators to promote growth* (Presented at Federal Reserve Bank of Kansas City’s Jackson Hole Symposium). Kansas City Jackson Hole Symposium: Jackson Hole.

Mankiw, N. G. (2013). *Macroeconomics* (8E ed.). New York, NY: Worth.

Maurer, B. (2011). Mobile money: communication, consumption and change in the payments space. *Journal of Development Studies. 48*(5), 589-604.

Meier, G. M., & Baldwin, R. E. (1957). *Economic development: Theory, history, policy*. New York: Wiley.

Mingst, K. A., & Arreguín-Toft, I. M. (2015). *Essentials of international relations* (6th ed.). New York, NY: W. W. Norton.

Mishra, V. & Singh Bisht, S. (2013). Mobile banking in a developing economy: a customer-centric model for policy formulation. *Telecommunications Policy. 37*, 503-514.

Must, B. & Ludewig, K. (2010). Mobile money: cell phone banking in developing countries. *Policy Matters Journal. 7*(2), 27-33.

Naude, W. A. (2004). The effects of policy, institutions and geography on economic growth in Africa: An econometric study based on cross-section and panel data. *Journal of International Development. 16*, 821-849.

Osei-Assibey, E. (2015). What drives behavioral intention of mobile money adoption? The case of Ancient Susu savings operations in Ghana. *International Journal of Social Economics. 42*(11), 962-979.

Padayachee, V. (Ed.). (2010). *The political economy of Africa.* New York, NY: Routledge.

Schumpeter, J. A., & Opie, R. (1934). *The theory of economic development; an inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, MA: Harvard University Press.

Schumpeter, J. A. (1989). *Essays: On entrepreneurs, innovations, business cycles, and the evolution of capitalism* (R. V. Clemence, Ed.). New Brunswick, NJ, U.S.A.: Transaction.

Shamim, F. (2007). The ICT environment, financial sector and economic growth: a cross-country analysis. *Journal of Economic Studies*. *34*(4), 352-370.

Talwar, S. & Kulhair, S. (2012). Promoting financial inclusion: reaching out to hither to excluded masses. *Pranjana X. 15*(1), 37-46.

Walle, Y. (2014). Revisiting the finance-growth nexus in sub-Saharan Africa: results from error correction-based panel cointegration tests. *African Development Review. 26*(2), 310-321.

Weber, R. & Darbellay, A. (2010). Legal issues in mobile banking. *Journal of Banking Regulation. 11*, 129-145.

Yang, A. (2009). Exploring adoption difficulties in mobile banking services. *Canadian Journal of Administrative Sciences. 26*, 136-149.