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A Study on ICT'S Role in Complementing Financial Sector Development

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Abstract: *This study examines the role of ICT (Internet and Mobile Phone penetration) in financial sector development. The exact proof depends on Summed up Strategy for Minutes with 53 African nations for the period 2004-2011. The connections between ICT, the growth of the financial sector, and financial activity lead to the following conclusions. First, financial activity decreases or increases as a result of the interaction between ICT and financial formalization (informalization). Second, the expected signs for the majority of net effects are established. The overall net effects of financial informalization are positive, despite the negative marginal effects. Thirdly, positive thresholds that fall within acceptable ranges are produced by the potentially appealing interaction between informalization and ICT. There are three main strands of discussion about policy implications. They have repercussions for (i) online and mobile banking; ii)a peaceful life and (iii) ICT in decreasing data deviation and surplus liquidity.*

Keywords: Efficiency, Financial Access, Innovation, Development, ICT

I. INTRODUCTION

On close inquiry and on linkages among data and correspondence innovation (ICT), monetary area improvement and monetary access in Africa has a fourfold inspiration, to be specific: (i) the scope of information and communication technology (ICT) on that continent; ii) the need for alternative sources of finance to meet Africa's growing investment needs; iv) rising concerns about excess liquidity and insufficient measures of financial development; and v) a lack of research on the development of the financial sector.

First, in comparison to other parts of the world, Africa has a lot of room for ICT development. According to recent ICT research the continent is experiencing uneven growth in the use of mobile phones and the internet. According to the narrative, while mobile phone and internet penetrations had reached saturation levels in developed economies by 2010, their development in Africa was low and asymmetric, with 41% (9.6%) of mobile phone penetration. Because high-end markets in Asia, North America, and Europe are experiencing stabilization in the penetration of the internet and mobile phones, the studies support the view that the ICT market in Africa presents significant business opportunities.

Second, the literature on African business supports the notion that domestic sources of capital are required to fund Africa's expanding investment goals (Rolfe & Woodward, 2004; Bartels and other, 2009; Tuomi, 2011; 2012, Darley) The role of financial intermediaries in the conversion of mobilized domestic deposits into credit is one method of internal financing.

Thirdly, it is unfortunate that the continent's need for internal finance stands in stark contrast to well-documented concerns about excess liquidity in the financial intermediary sector (Saxegaard, 2006; Fouda, 2009; Asongu, 2014a). In addition, the literature has not assessed this anxiety in light of conceiving and measuring financial development efficiency, which refers to the capacity of financial institutions to carry out their fundamental role of converting mobilized deposits into credit. seeAtaullah et al. 2004; 2008, Al-Obaidan;2009, Kiyato; Kablan, 2010). In the literature on African financial development, the following financial efficiency indicators have been used: efficiency of profits (Hauner&Peiris, 2005);Data Envelopment Analysis (DEA) for cost effectiveness and technical efficiency (Kablan, 2009; Mensah and other, 2012).

Fourth, the development of the financial sector has not received the appropriate amount of attention from the financial literature. Based on recent research (O'Toole, 2014; Asongu, 2015b), the majority of studies have focused on more

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specific aspects of financial institutions like the participation and concentration of foreign banks. By concentrating on the expansion of the financial sector in terms of competition, we depart from this. Theoretically, despite the fact that a significant amount of research has examined the impact of financial reforms on financial development (Arestis et al., 2002; According to the findings of this research (Batuo&Kupukile, 2010), a significant gap in the existing body of knowledge stems from the fact that the idea of the development of the financial sector as a result of the proportions of formal and informal financial sectors.

It is clear that there is room for improvement in three main areas in the preceding literature.

They require him to: (I) center around districts where worries about monetary access are most

extreme; (ii) comprehend financial development from the fundamental role that banks play in converting mobilized deposits into credit in light of well-documented surplus liquidity issues; and iii) investigate the role that information and communication technology (ICT) plays in the expansion of the financial sector for the purpose of facilitating financial access.

II. THE ORETICAL FOUNDATION AND GROWTH OF THE FINANCIAL SECTOR

This section is Organized into Three Main Sections: The first two focus on the connection between information sharing and financial allocation efficiency on the one hand, and the intuition behind the significance of ICT in information sharing for financial access on the other. The final strand explains the idea of financial sector development in the context of financial sector competition.

First, in accordance with Claus and Grimes (2003), the theoretical relationship between financial development and information sharing is dominated by two ideas in the literature. The earliest is worried about the change of hazard attributes of bank resources though the following spotlights on channels through which the arrangement of liquidity by banks can be solidified. In addition, both strands agree that consolidating financial allocation efficiency through cost reduction and the optimal funneling of financial resources from lenders to borrowers is the fundamental function of financial intermediation.

Second, ICT has been developed in developing nations to spread information among market participants. A portion of the allures of ICT working with monetary access incorporate (I) decreasing the expense of promoting and upgrading support on the lookout (Muto and Yamano, 2009) and (ii) diminishing data lopsidedness (Aminuzzaman et al., 2003). In a nutshell, the instinct fundamental ICT in monetary area contest for monetary advancement expands on the way that ICT has been reported to diminish data lopsidedness (Andonova, 2006) and support contest among formal and casual monetary areas (Asongu, 2013).

In the radiance of the abovementioned, the important inquiry fundamental the hypothetical supporting is the accompanying: what might ICT do in the improvement of one monetary area opposite one more considering working on monetary access? The establishments depend on the instinct that the ICT increments banking area rivalry for monetary access. This perception is consistent with Goel and Hsieh's (2002) theory of the growth of the internet and economic growth:

On the significance of ICT in monetary access, ICT is pertinent in empowering monetary establishments to build the accessibility of credit to organizations and families. As a result, financial institutions' ability to evaluate the risk profiles of borrowers is improved as a result of ICT's contribution to the reduction of information asymmetry through the sharing of information. As a result, banks and credit agencies can share information about borrower risk profiles thanks to ICT. Because banks can more thoroughly examine the collateral of borrowers with information provided by sharing six offices, they use this information to reduce their adverse selection when such credit history data is provided to them by means of ICT. This cycle at last abatements monetary access limitations in families as well as little, miniature and medium undertakings .

III. SIGNIFICANCE OF ICT -DRIVENFINANCIAL SECTOR

There are two perspectives on the significance of ICT-driven financial sector development for financial access. ICT systems that would increase the amount of the monetary base that circulates through the formal financial sector can be implemented more effectively by the formal financial sector, which is more organized than the informal financial sector. This is the case in developed nations, where almost the entire monetary base of their economies circulates within

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the formal financial sector thanks to information and communication technology (ICT). On the other hand, from an indirect point of view, information sharing offices, which are ex-post of the borrowing process, also contribute to market discipline by advising borrowers about the negative consequences of not meeting their financial obligations in the hope that using the informal financial sector might be an alternative that works. The ICT channels that information sharing offices naturally use facilitate this discipline.

Thirdly, Asongu (2014b) has addressed the International Monetary Fund (IMF)'s International Financial Statistics (IFS) definition of the financial system, which does not include the informal financial sector, by building on shortcomings in the literature on measuring financial development. As per the creators, the writing has either deducted money circling outside the formal monetary area in the estimation of fluid liabilities as well as utilized head part examination to constrict worries about the predominance of monetary improvement pointers. Besides, there is a typical affirmation of the disregard of the casual monetary area in the estimation of monetary turn of events. Unfortunately, none of the solutions have included the informal financial sector in the measurement of financial development, so the underlying neglect of the sector has not been addressed.

In light of the research that has shown that the informal financial sector has been ignored (Aryeetey, 2005; Adeusi and other, 2012; 2013 Meagher; According to Tchamyou&Asongu (2017), the propositions challenge existing views in four primary areas, particularly: i) with a definition of the financial system that takes the informal financial sector into account; (ii) Separation of the formal and semi-formal parts of the current definition of the financial system; ii) the inclusion of the informal financial sector, which was previously absent, and iv) the introduction of the concept of financial sector development within the context of financial sector competition.

The study uses data from the World Bank's Financial Development and Structure Database (FDSD) and African Development Indicators (ADI) for the years 2004 to 2011 to examine a panel of 53 African nations 7 The selection of the periodicity was based on two factors, one of which is that the focus on African nations is consistent with stylized facts about concerns about excess liquidity discussed in the introduction. On the one hand, it falls on the same dates that public credit registries and private credit bureaus—information sharing offices—were established across the continent to improve information sharing. On the other hand, it is in line with why the empirical strategy was chosen. On a basic level, the reception of the

Summed up Strategy for Minutes (GMM) requires that (I) Time (T) is not exactly the Quantity of cross-segments (N) and (ii) a higher request of T prompts instrument multiplication that refute assessed yield

There are two additional explanations for why the periodicity was chosen.

i) The World Bank's Financial Development and Structure Database (FDSD) contains the financial development variables that were used to calculate the propositions for the development of the financial sector. The World Development Indicators (WDI) of the World Bank are released one or two years after the FDSD is calculated. There is typically a delay of two years before WDI are published. As a result, data points for the years 2016 and 2017 will not be included in the WDI that will be published in 2017 because 2015 will be the most recent year.When the data were collected from WDI in 2015, 2013 was the most recent year, while 2011 was the most recent year from the FDSD.

ii)The information utilized by Asongu (2015b, 2015c) to propose the pointers is not up to the year 2011. Thus, we processed new pointers to reflect current reality. financial institutions and other organizations'). Second, financial allocation efficiency is measured using (i) banking-system efficiency (with "banking system credit" on "banking system deposits") and (ii) financial-system efficiency (with "financial system credit" on "financial system deposits"), which measure the capacity to convert mobilized deposits into credit.

It has been demonstrated that trade openness has a positive impact on financial development (see Do &Levchenko, 2004; Huang and Sanctuary, 2005). Huang (2011) has established a positive link between investment and financial development. Both scientific (Boyd et al., According to the theoretical (Huybens& Smith, 1999) and empirical (2001) literature, countries with chaotic inflation are thought to have smaller, less active, and less efficient banks. The literature has established a positive relationship between growth and financial development (Greenwood &Jovanovic, 1992; Holy person Paul, 1992;Levine, 1997; (2001, Jaffee&Levonian) The narrative says that increased financial intermediation is linked to economic prosperity because, among other things, more money is available for productive investments and there is more competition. According to Easterly (2005), the saving-or-financial-investment gap that poor nations face is anticipated to be reduced by foreign aid, which is anticipated to improve financial development.

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However, these effects could also be negative from a practical standpoint if development assistance is not spent in recipient nations for a number of reasons, including: A corrupt elite diverts foreign aid and recycles it in tax havens based in developed nations, or the majority of the funds distributed are spent in donor nations.

The definitions of variables and summary statistics are provided in Appendix 1 and Appendix 2, respectively, while the correlation matrix is provided in Appendix 3. From the summary statistics, we can see that the means of the variables are comparable. In addition, we can be confident that reasonable estimates of linkages can be derived from the corresponding standard deviations. The study is able to avoid concerns about multicollinearity thanks to the correlation matrix. Concerns about multicollinearity between financial sector competition, financial development, and ICT variables emerge from a preliminary examination.

The ICT and financial sector competition variables are used in different specifications, so this issue is not particularly important for the financial development indicators, which only use them as dependent variables.

IV. STRATEGY

Particular- The exact system embraced by this study is the GMM with forward symmetrical deviations instead of differencing. Arellano and Bover's (1995) empirical strategy was expanded upon by Roodman (2009a, 2009b). This empirical strategy limits the proliferation of instruments and accounts for cross-sectional dependence, as Love and Zicchino (2006) and Baltagi (2008) demonstrate. In GMM, the two fundamental requirements for good fit are met because: i) Because the correlation between the financial dependent variables and their corresponding first lags is greater than the threshold of 0.800 (see Appendix 4), there is persistence in the dependent variables. ii) the quantity of cross-areas (N=53) is higher than the quantity of time series (T=8) in the cross-areas.

Restrictions regarding identification and exclusion in accordance with recent research (Dewan&Ramaprasad, 2014; All independent indicators are regarded as predetermined or suspected endogenous variables (Asongu&Nwachukwu, 2016a, 2016b). As a result, they are using the gmmstyle. In addition, only years are regarded as exogenous, and the treatment for ivstyle (years) is "iv(years, eq(diff))" because it is impractical for years to become endogenous in first-difference (Roodman, 2009b).Lagged regressors are used as instruments for the forward-differenced variables to address the issue of simultaneity. Helmet transformations, which are carried out in accordance with Love and Zicchino, are used as a result to eliminate fixed effects that have the potential to affect the examined connections. Variable forward mean-difference is one of these transformations. Consequently as opposed to deducting past perceptions from contemporary ones (see Roodman, 2009b), the normal of future perceptions is deducted from the markers. Between forward-differenced indicators and lagged values, the transformation allows for orthogonal or parallel conditions. With the exception of the final observation for each nation, the transformations are computed for all observations regardless of lag numbers in order to minimize data loss. Furthermore, "they are valid as instruments because lagged observations do not enter the formula" (Roodman, 2009b,

Taking into account the foregoing, years that are assumed to exhibit strict exogeneity only have an effect on the development of the financial sector through endogenous explaining indicators. The Difference in Hansen Test (DHT) for instrument exogeneity is used to test the exclusion restriction's statistical validity. In essence, the test's null hypothesis should not be rejected if the instruments (or years) only use endogenous explaining variables to explain financial sector development. As a result, the DHT is used to see if years exhibit strict exogeneity by not elucidating governance beyond the channels that were examined (or endogenous explaining variables). If the null hypotheses of DHT corresponding to IV (year, eq(diff)) are not rejected, the findings should therefore confirm the validity of the exclusion restriction.

V. RESULTS

The empirical analysis is presented in two steps. We initially survey the job of ICT on monetary area advancement in monetary allotment productivity prior to researching the comparing collaboration in monetary movement. The validity of models is evaluated using four post-estimation diagnostic tests (Asongu& De Moor, 2017)

There are three levels of discussion of the findings, particularly in terms of: marginal effects, net effects, and thresholds at which ICT alters the sign of the unconditional development effect in the financial sector. Additionally, for an ICT threshold to be economically significant, it must fall within the summary statistics' corresponding minimum-to-

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maximum range. In the second specification of Table 2, for instance: i) The internet has a marginal impact of -0.563 on financial formalization for the efficiency of the banking system; ii) the net effect is 3.945 ([6.822 -0.563] + 7.786) 10, and iii) the negative marginal effect's threshold for changing the unconditional position effects because informalization and ICT ought to work together to reduce the formal financial sector's activities. As a result, despite the marginally negative effects of financial informalization, the interaction as a whole still has a positive impact. Thirdly, positive thresholds fall within the ranges provided by summary statistics for the potentially appealing interaction between ICT and informalization. True to form, every one of the four edges at which the unrestricted adverse consequences of monetary informalization on monetary action become positive seem OK since they are inside the recommended ranges. Fourth, the expected signs are shown by the significant control variables. In like manner, expansion adversely influences monetary movement while the impacts from exchange, unfamiliar guide and public venture are positive.

VI. RAMIFICATIONS FOR WEB BANKING

We have laid out that regardless of the negative minimal effects from monetary informalization, the net impacts from the connection among informalization and ICT on confidential homegrown credit is positive. Mobile phones have been shown to have a negative or positive correlation with Africa's formal (formal) financial sector, which goes against intuition (Asongu, 2013). Two experiences merit accentuation here. From one perspective, the discoveries of Asongu (2013) are deciphered as relationships since they depend on cross- sectional perceptions for the year 2009

The study, on the other hand, does not build on interactions. Although this study's findings allow us to infer causality, there are a number of explanations for the positive net effects. We focus on three main categories: (i) the usefulness of ICT transactions in the store of value, conversion of cash, and transfer of stored value; (ii) the concepts of basic and partially integrated savings in ICT banking; and (iii) banking in the Global System for ICT. We might manage one by one. To start with, ICT banking empowers clients in agricultural nations to do three central things: (i) It gives users the option to store value or money in a mobile phone that is connected to the internet. Both pseudo ledgers from the client's versatile administrator and genuine bank

accounts from the conventional financial area are utilized, (ii) ICT empowers the transformation of money into what's more, out of the put away worth. In addition, users can visit banks to cash in and out when conversion is linked to a formal bank account. Banks can use stored value to increase financial activity or provide credit. ii) The formal banking industry uses internet/mobile banking to transfer stored value between accounts, such as by using Short Message Service (SMS) for security codes when using internet banking.

Second, mobile savings can be divided into two categories (Demombynes&Thegeya, 2012). On the one hand, "basic savings" refer to the storage of money using a standard ICT mobile transfer system like M-PESA. There is no interest rate associated with this ICT savings option. A "partially integrated" ICT savings system, on the other hand, requires a bank account in a formal banking institution to earn interest. The interest produced by the last choice depends on the investment funds that are utilized by banks to increment monetary action

Thirdly, a mobile phone with an internet connection and a savings account in a formal bank can help increase financial activity in the following ways:

I)ICT can be utilized as a store of significant worth on the grounds that the supporter character module (SIM) is like a smartcard (or virtual bank card), (ii) ICT can assume the part of a retail location (POS) terminal by empowering exchanges and correspondences with the pertinent monetary establishment (for example in the sales of exchange approval) and (iii) ICT can be utilized as a computerized teller machine (ATM). In light of the foregoing, a mobile phone with an internet connection enables immediate transaction access to bank accounts

VII. CONCLUSION

This study examines the contribution of ICT (Internet and mobile phone penetration) to the development of the financial sector (financial formalization and informalization) for financial access. The exact proof depends on Summed up Strategy for Minutes with 53 African nations for the period 2004-2011.The following discoveries are laid out from linkages between ICT, monetary area advancement and monetary action. First, the interaction between ICT and financial formalization (informalization) has marginal effects that both decrease and increase financial activity. Second, as to net impacts, the normal signs are laid out generally. As a result, the overall net effects of financial informalization

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are positive, despite the negative marginal effects. Thirdly, positive thresholds fall within suggested ranges for the intriguing interaction between informalization and information and communication technology. These discoveries are talked about at three essential levels, remarkably as far as: (i) the effects that are marginal, ii) the effects that are net, and iii) the thresholds at which the effects that are marginal with ICT alter the sign of the unconditional effect of financial sector development. Three main strands are used to present policy implications. These include the implications for (i) internet and mobile banking; ii) a quiet life and iii) the role that ICT plays in lessening information asymmetry and excess liquidity.

The study has combined two fields of study by introducing the concept of financial sector development. It has also contributed to the macroeconomic literature on measuring financial development and responded to the expanding field of economic development through informal finance and ICT. Additionally, the empirical investigation has suggested a practical approach for separating the influence of various financial sectors on financial 20 development. In general, our study has introduced previously unexplored concepts of formalization andinformalization in the financial sector.The established links throughout the conditional distribution of financial development can be the focus of future research aimed at expanding the existing body of knowledge. Thissuggestion depends on the way that sweeping arrangements in view of laid out associations might be more powerful in the event that they are dependent upon starting degrees of monetary turn of events and custom fitted diversely across nations with low, halfway and elevated degrees of monetary improvement. Additionally, the primary impediment is that the review is centered solely around African nations. As a result, larger samples can be used in subsequent studies to determine whether the findings presented in this paper can withstand additional empirical scrutiny.

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