ATLANTIS PRESS
Advances in Social Science, Education and Humanities Research, volume 240
2nd International Scientific Conference on New Industrialization: Global, National, Regional Dimension (SICNI 2018)

Low technological innovation and industrialization in Sub-Saharan Africa: The role of access to finance in the informal sector

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***Abstract*—What is the role of the business environment in the promoting or restraining growth, technological innovation of firms, and industrialization in an economy? Literature (both past and recent) points to a number of obstacles such as poor regulation and taxation, poor regulation on property rights, inefficient financial markets, which serve as the drawbacks to economic growth and industrialization. This paper studies the role of the financial sector in promoting technological innovation and industrialization in sub-Saharan Africa. We reviewed the factors prompting the fast-expanding informal economy, by giving evidence based reasons to the rapid expansion of the sector. The paper also looked at the role of access to financial services plays in an economy and how that promote firms' innovation, and speeds up industrialization. The paper analysed the reasons behind the low financial inclusion and less access to financial services in the informal economy, the economic powerhouse or backbone of the region. The paper concludes and substantiates the author's view that poor local infrastructure, the nature of knowledge appropriation, mistrust and wrong judgmental decisions as well as the preference of banks to use tangible assets like immovable properties are the causes of low access to financial services in the sub-Saharan informal sector. Thus, this at a larger extent stifles their growth and innovation, and hinders economic development and industrialization thereof. Finally, the author sums up the above to answer the research questions and substantiates his position on measures of addressing the issues of financial inclusion and financial access in the region.**

Keywords — access to finance, financial inclusion, economic growth, sub-Saharan Africa, informal economy, information asymmetry, technological innovation, industrialization

I. INTRODUCTION

One of the central problems towards economic growth and development, that remains a discourse, is the large and ceaseless gap in income and development between advanced and developing economies. The crucial role of finance in economic growth and development of countries cannot be exaggerated, following Schumpeter's exegesis on the financial role in stimulating industrial activities and economic development. Several scholars Lloyd-Ellis and Bernhardt (2000), Banerjee and Duflo (2005) and Levine (2005) have also devoted their research to this topic, and have shown that finance fuels growth and development by offering organisations the opportunities for investment and growth plans, providing the means through which households and individuals can invest in their activities and also facilitating co-financing of public investments efforts of government. Ayyagari, Demirguc¸ Kunt, and Maksimovic (2008) have shown that lack of access to finance, poses the challenge of stifled growth to firms [1, pp. 483–516]. Access to finance is therefore a very vital component of economic development, and determines to a larger extent the level of technological innovation, industrialization and hence economic growth. However, not many economies have the needed or required extent of financial inclusion and high access to financial service. Most of the developing economies, unfortunately, have very low level of access to finance and financial inclusion until the emergence of mobile money banking, which is gradually salvaging the situation in these countries. This paper studied how financial constraints of individuals and firms impedes economic development and the root causes of some of the difficulties encountered by firms in accessing funds, especially those in the informal sector in the sub-Saharan region and how this affects their innovation development activities. This informal sector has not been chosen by coincidence, but based on theoretical and empirical evidence regarding the vital role that the informal economy plays in developing economies and for that matter in the sub-Saharan countries. Fortuna & Prate (1989) have stated that defining informal economy has always proved difficult and problematic and the definitions of informal sector have a heuristic value with less theoretical legitimation [2, pp. 79-94]. The paper reviewed the problem of low financial inclusion and financial access in the informal sector and suggested measures of addressing it. Finally, we substantiated our position by justifying how an improvement in financial services accessible

to informal sector could speed up technological innovation and industrialization in the region.

II. LITERATURE REVIEW

Access to finance and financial inclusion are two closed terminologies. While there is/are no generally accepted definitions to them, however, the following definitions have been given by scholars and institutions; Claessens (2006) defined access to finance as "availability of a supply of reasonable quality financial services at reasonable costs, where reasonable quality and reasonable cost have to be defined relative to some objective standard, with costs reflecting all the pecuniary and non-pecuniary costs" [3, p.210] and according to Demirguc-Kunt & Levine (2008) access to finance is "the absence of price and non-price barriers" [1, pp. 483–516]. According to Demirgüç-Kunt, A., Klapper, L., Singe, D., & Oudheusden, P. V. (2015) access to finance and financial inclusion system which consists of the different groups of people, poor and middle class, is critical in alleviating inequalities and poverty in developing economies [4, p.6], while Rangarajan (2008) defines financial inclusion as "the process of ensuring access to financial services and adequate credit where needed by vulnerable groups such as low income groups at affordable cost" [5]. Beck, T., Demirgüç-Kunt, A et al. (2009) noted that "without inclusive financial systems, poor individuals and small enterprises need to rely on their personal wealth or internal resources to invest in their education, become entrepreneurs, or take advantage of the promising opportunities" [6].The World Bank (2014) points out, the concept of financial inclusion could range from "access and use of services provided responsibly and sustainably" to "delivery of financial services at affordable costs to disadvantaged and low-income segments of society." [7]. Access to finance and financial inclusion is can, therefore, be defined as the ability of households or firms to obtain vital financial services like credit, deposit, payment, insurance and risk management services. Thus, it is important to understand these distinct terminologies; unbanked and underbanked population. Whereas, unbanked population entails people who voluntarily do not have bank accounts and banking services, underbanked comprises of those who have bank accounts but are directly or indirectly deprived of banking services as listed above. The level of financial inclusion therefore has a meaningful influence on industrialization and technological innovation, given the role of the financial sector in economic growth and development.

Many economic scholars hold very divergent views on the role of financial sector plays in economic development. While on the one hand, some researchers think that the operation of the financial systems simply react to economic development, by adjusting to changes in demand from the real economic sector and is therefore exaggerated (Robinson, 1952; Lucas, 1988) [8], on the other hand, equally prominent economic scholars think that financial sector plays a vital role in the alleviation of market frictions or deficiencies by influencing investment decisions, savings rates, technological innovation and a long-term economic growth (Schumpeter, 1912; Goldsmith, 1969) [9]. One interesting area of research that this paper seeks to explore is the relationship access to finance has with firm-level of innovation and industrialization of an economy by using the informal sector of sub-Saharan region as a case study. Although, this sector has well developed literature, however, many researchers practice what can be termed as 'an elephant in a dark room, and each describing it based on the part they touched'. Informal economy gained the attention of many different scholars over the past five decades (see Lewis. 1958; Hart, 1973; Meagher, 1990; Centeno & Portes, 2006). For instance, informal economy is defined by economists LaPorta & Schleifer (2008, p. 1) as [10] "economic activity… conducted by unregistered firms or by registered firms but hidden from taxation." While Sociologists Castells & Portes (1989, p.12) state that the sector is [11] "characterized by one central feature: it is unregulated by the institutions of society, in a legal and social environment in which similar activities are regulated." Another great contributor to economic literature on informal economy is Keith Hart (2016, p.29), who has been credited for coining the "informal economy" terminology, and noted that the modeling economic activity as being formal or informal caused researchers to "mistake the category for the reality it identified," [12] thus, the complex nature of the real economic activity makes it difficult to be simply categorised as formal or informal. We seek to add to literature by identifying some of the causes of informality in economics and how this affects the technological innovation of firms and industrialization in less developed countries.

III. DATA AND METHODS

Recent research points to a couple of factors impeding innovation, technology and economic growth, are mostly deliberated without comparative evidence for their submissions [13, p.1-2]. Using firm and national economic data, this paper explores how financial access affects firms' innovation and growth in the Sub-Saharan region, where the informal sector activities are predominant. The informal economy gained full attention or was "discovered" in the early 1970s (Fox & Gaal, 2008) [14]. In the mainstream criteria, great flexibility was allowed by excluding agricultural sector in some countries (Devey, Skinner & Valodia, 2006) [15], since the agricultural serves as the main source of employment for some countries in the developing world like Mali, where about 80-90% of the population are into agriculture. However, the sector is deep behind the shadows of the formal economy (Schneider, 2007) [16]. Furthermore, businesses in the informal economy [17] World Bank (2009) "..typically grow more slowly, have poor access to credit and employ fewer workers, and their workers remain outside the protection of labor law." Firms in the informal economy face fierce hostility from authorities, who close down their operations without any notice. As illustrated in table 1 below [18, 19], some countries from sub-Saharan region is currently amongst fastest growing economies. Yet, the economies of this region lag behind in access to finance and the use of formal financial services by the various economic agents: Individual,

household and firms. Low access to finance is a huge obstacle that confronts firms in development and innovation activities Africa. Since the probability of a firm investing in growth and innovation activities is low if it is financially constrained and has a low access to finance. Thus, result is the failure of such firms, which is not uncommon amongst small and micro businesses in Africa. According to the World Bank's financial inclusion database, the unbanked population globally, in 2017, is about 1.7 billion [20]. The underbanked happens amongst the informal sector folks as a result of lack of literal access to frequent banking service due to language barrier or they often do not meet the requirements of the financial institution like lack of simple identification (due to poor local infrastructure) to qualify for the "Know Your Customer" practices. For instance, according to the World Bank's Identification for Development (ID4D) program over 1.1 billion people across the world are without proof of identity, and about 500 million [21] of this number lives in sub-Sahara (the population of this region is estimated to be about 1.06 million).

TABLE I. GLOBAL ECONOMIC TRENDS

Economic regions	Gross domestic product				
	Annual	Per capita	Annual	Per capita	Annual
	% Growth	% Growth	% Growth	% Growth	% Growth
	2016	2016	2017	2017	2018(p)
Europe and Central Asia	1.8	1.3	2.6	2.2	3.2
Sub-Sahara Africa	1.3	-1.4	2.6	-0.1	3.1
South Asia	6.8	5.5	6.5	5.2	6.9
Latin America and the Caribbean	0.5	-1.5	1.7	0.7	1.7
East Asia and the Pacific	4.1	3.4	4.6	3.8	6.3
Euro area	1.8	1.5	2.4	2.1	2.1
World	2.5	1.3	3.2	2.0	3.1

Source: World Development Indicators 2017 and World Bank. (2018). [21, 22]

Thus, it is obvious that, averagely, closed to 50% of the population of sub-Saharan region are unbanked ; and about to 65% of small, medium and micro enterprises (SMMEs), which form about 90% of the African economic sector, have no access to credit from banks [22]. Table 2 shows the survey data of Global Findex, classified according to economic regions for the sake of comparative analysis. Sub-Sahara Africa has the least number of people with formal bank accounts, follow by Latin America and the Caribbean, another developing region. The lack of formal banking activities amongst the population by extent explains why there is huge firms' financial constraint in the region. Thus, this consequently affects the ability of the financial system stimulate the needed growth and industrialization in the region. This is supported by the theory that cross-country difference in credit market development (in other banking activities) contributes considerably to cross-country difference in growth and productivity [23] (see Duflo, 2005 & Levine, 2005 for survey). Although, some significant strides have been gained with regards to the fight against inherent economic challenges like poverty and inequality, but the continuous low access to finance, remains a major challenge, could be described as one of the main reasons behind the huge rate of poverty (about 60%) and inequality in the region [22].

TABLE II. FINANCIAL INCLUSION

Economic regions	Financial inclusion survey results (Weighted average)		
	Account	Account	Account
	% age 15+	% age 15+	% age 15+
	2011	2014	2017
Europe and Central Asia	69.29	77.72	81.46
Sub-Sahara Africa	23.24	34.19	42.61
South Asia	32.38	46.54	69.56
Latin America and the Caribbean	39.38	51.90	55.14
East Asia and the Pacific	55.07	69.13	70.62
Euro area	90.42	94.68	95.30
World	50.63	62.00	68.52

Source: Global Findex database

Financial access becomes more complicated when it is juxtaposed with sources of debt financing. The problem of low financial access in Africa does not mean people do not seek for finance. Figure 1 illustrates the borrowing habits of individuals and households in the various economic regions including the OECD countries [24]. In developing countries, more than 40% of borrowing or loans come from friends and family members, unlike in the developed world, where there high access to finance. Thus, this indicates and confirms the problem of low access to finance in sub-Saharan Africa

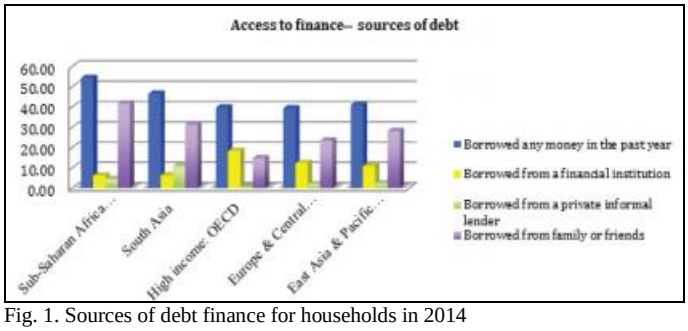

Fig. 1. Sources of debt finance for households in 2014
Source: World Development Indicators (2015)

The low financial access brings forth other challenges in the form of structural gaps in very important needs of households and firms; gaps in education, healthcare, security and public infrastructure. The paper studies some background analysis of access to finance in the sub-Saharan region and concurrently discusses the challenges in connection with financial access and structure. This is done by examining various elements or channels of the financial system, through which finance play certain vital institutional functions in stimulating the creation of wealth and general economic

growth. Innovation by firms is a crucial driver of productivity and industrialization around the world [25]. Technological innovation in advanced economies typically involves research and development (R&D) and the development and patenting of novel products and technologies. However, in developing countries, innovation usually entails imitation, where firms adopt and adapt existing products and processes to local demands [26], although such innovations tend to be about how to catch up with the technological and development frontiers, other than pushing the frontier forward by competing. The speed of these processes, however, varies from country to country based on the national income level [27], and also expenditure on research and development. Inadequate financial access makes firms in developing countries unable to fully exploit the available option of adapting R&D that has been worked out by firms of technologically developed economies. This makes firms to remain stuck and limited with slow growth and low-productive activities, which causes the persistent wide gaps in development or divergent growth around the world, especially amongst the economic regions.

IV. RESULTS AND DISCUSSION

Beck, Demirgüç-Kunt & Maksimovic (2005) have indicated that, generally, small businesses face severer financial problems [28]. As earlier stated about 90% of African businesses are mainly SMMEs and most of these are in the informal sector, hence either are unbanked or underbanked. The paper looks at some general characterizations about the causes, in recent years, of the informal sector's growth in Africa. As argued by Lipton (1977), certain development policies pursued by some African government were merely urban bias, hence devoting a lot of resources toward their development at the expense of rural areas [29]. Also, Schneider & Klinhmair (2004) noted that the labor laws in the urban areas have been a contributor to the growth on the informal economy [30], as the minimum wage laws tend to hinder the expansion of firms and deter them from moving into the formal sector. Furthermore, consequences of war is another reason to the increase in informal business activities, Sethuraman (1997) noticed a reasonable increase in the movement mostly young people from rural to urban centers of war torn Angola and Mozambique in the 1980s in search for jobs [31], which later took up to informal activities for survival as result of inadequate formal employment. The Structural Adjustment Policies (SAPs) of these countries in the 1980s and 1990s promotes informal businesses (Lee & Viuvarelli, 2004), as vast numbers tend to be unemployed in the public sector due to the IMF conditions, which require governments to cut down spending and downsizing the public sector [32] (one of which is through job cuts or ban on employment). There are several evidence to back this argument: In the case of Kenya, Ikiara & Ndung'u (1999) state that the informal sector increased from 4% in the 1970s to about 50% 1994 [33], while in Ghana, the recent signee, there has been no employment in the public sector for over 2 years with graduate going into informal businesses to make ends meet. Lastly, the business unfriendly regulations in these countries deter entrepreneurs from registering their businesses, according the World Bank (2009), [17] "Where regulation is particularly onerous, levels of informality are higher." Sub-Sahara Africa has the highest number of licensing procedures and days (as much as 63) were required to set up a new business, building a warehouse requires on average 20 licensing procedures and an average of 251 days are needed to obtain a license [17]. These amongst other reasons are the cause of the rapid expansion of the informal sector in developing countries, especially in sub-Saharan Africa.

Information asymmetry is one of the prime causes of this economically uncomfortable situation of financial constraint. The influence of information asymmetry on development and efficiency of financial markets is well investigated in literature (see the works of Akerlof (1970), Rothschild &Stiglitz (1976); Stiglitz & Weiss (1981) and Beck et al. (2014)) [29]. Information asymmetries between borrowers and lenders have resulted in a high cost in accessing funds or the rejection of applications thereof [22], and this is very common and rampant in African small sized firms, despite their huge role in the economies. However, over the years, what was unexamined the root cause of information asymmetries and how the necessary interventions required in mitigating the situation. As mentioned earlier, this study aims to explore the causes of the low financial access in the sub-Saharan economic region. Information asymmetry (gap) occurs when the lender (financial institution or agent) assumes that the borrower (firm) has additional ante ex ante information which may negatively affect the returns/gains from the project or the repayment of the loan. Hence, the problem associated with information asymmetry is the perceived problem of low probability of repayment or returns, high transaction thus increasing the high risk involve.

Evidence so far, suggests that firms' access to bank credit may actually facilitate firms' innovation plans. For instance, there is evidence about the deregulation of inter-state banking in the United States, which brought about bank competition during the 1970s and the 1980s, and that helped firms to innovate per the number of patents registered during the period [34]. Furthermore, evidence from Italy (a bank-based economy) supports the assumption that the density of bank branches are related to the growth of firm-level innovation [35], and studies on the transition region points out that reported finance constraint in the form of credit partly explains the disparity in innovation of firms [36]. But the traditional cause of asymmetric information between lenders and borrowers, thus it is mostly individuals and households are considered risky and its companied high transaction cost. This is because of the lack of identity as a result of poor local infrastructure in the sub-Saharan region, thus usually considered not creditworthy. Infrastructure is pivotal in facilitating the growth and industrialization, however, according to African Development Bank (2018) the infrastructure needs is estimated at $130-170 billion a year, whilst the financing gap is around $68-108 billion [37] However, the problem of information asymmetry regarding

the risk and returns of such projects, leaves the financing these project to the already highly constraint public sector, thus causing low level of firm-level innovation and industrialization. Furthermore, trade, on the perspective economic transformation, has been supported by theories and empirical evidence as one of the facilitators of development and industrialization. However, the African region still lags behind in term of its contribution to global and intraregional trade, thus it is not surprising that the continent is amongst the least developed regions worldwide. There are a number of factors contributing to the poor trade performance of the region, prominent amongst which is constrained financing of trade. Lack of trade funds makes firms unable to engage competitively on the international markets that involve huge suck cost including operational cost. These predicaments of trade are similar those of individuals, African businesses and so on, as the requirements for trade finance would definitely be much more cumbersome than that of firms on domestic markets. WIPO (2007) states that "a study on constraints to intellectual property protection in the informal economy, including the tangible costs and benefits of intellectual property protection [..]" [38]. The difficulty of accessing finance worsens in the informal sector, as noted in the work of Godfrey (2011, p. 240) "a firm that operates in the informal economy is unable to take full advantage of the …., financial, and marketing benefits that, in principle, the …. banking and economic systems of its country offer" [39] because, London and Hart (2004, p. 352) stated that, "in the developing world,., it is simply too costly or complicated for many entrepreneurs to enter the formal economy……In the formal economy, relationships are grounded on social, not legal, contract" [40] since those in the informal economy according to Hudson and Wehrell (2005, p. 288) avoid "various regulations to which they might otherwise be subject [41]. Thus, this explains why access financial is costly and/or inaccessible to informal businesses, which hinders their growth and technological innovation activities, and rapid industrialization at national level.

V. CONCLUSION

Access to finance was identified as a problematic factor constraining growth of businesses in Africa, hence the implementation of any measures or intervention to improve the access to finance will enhance the business climate, and facilitate industrialization in the region. This study is important, on the one hand, for the business community and by extension governments as high financial inclusion has the potential of increasing credit availability from formal financial sector at moderate and fair markets rates of interest. As the transfer of funds circulating in the informal sector to the formal financial sector can help the banking sector execute its role as the main financial intermediary in the allocation of resources, hence promoting the growth expansion of the informal business activities via the access to credit at moderate interest rates. This will help firms in the informal economy to innovate, adopt and adapt to already existing technological to suit or solve community needs and problems. Also, the paper is useful to the research community since financial inclusion is identified as one of the avenues to alleviate poverty and inequality in developing economies.

We therefore came to agree with Demirgüç-Kunt (2014) argument that issues pertaining to access to finance and financial inclusion are more matters of policy concern to experts of the financial sector, however, there was a disagreement on the measures to addressing financial inclusion and its expansion [42]. Kumar (2013) points out that the goal of financial inclusion is reachable via initiatives of the banking sector involving all the age groups and gender by encouraging banking habits [43]. Although, this places the obligation of driving financial inclusion on the banking system, but it fails to give or understudy the reasons behind the unbanked population from the perspective of being financially excluded. Hence, the mere encouragement of banking habits may not help to achieve desire results of financial inclusion, where there is mistrust, suspicion or information asymmetry toward the banking sector. Despite the fact access to financial institutions including banking services is one of the major drivers of financial inclusion, however, Global Findex data base (2014) noted that financial inclusion is concentrated on the use, and lack of use does not necessarily mean lack of access, thus opening or holding a bank account is just a step toward financial [44]. It is therefore important to note the argument of Gandhi (2013) that in order to achieve the goal of financial inclusion, financial literacy and frequent advice from the financial service provider are required to facilitate the effective use of the account [45]. Thus, the effective use by transacting via the bank account, making savings or obtaining credit for productive means at moderate interest rate is what would lead to technological innovation of firms and households, industrialization and economic growth in the sub-Saharan region.

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