Institutions, Innovation and Economic Growth in Sub-Saharan Africa: A Literature Review

Dejene Mamo Bekana[1]

Abstract

Based on the theory of institutions and empirical literature survey from Sub-Saharan African economies, this review article examines the state of development in institutional quality, and absorptive capacity and the implication these bear for economic performance in the region. Drawing on the theory of institution by North, D.C. (1990), and Acemoglu, D., & Johnson, S. (2005), and the indigenous growth theories by Schumpeter (1934), Romer (1986) and Lucas (1988), to assess the state affairs in institutions, innovation, and economic growth in Sub-Saharan Africa. Empirical evidence points out that institutions and absorptive capacity are underdeveloped in most of the Sub-Saharan countries. However, institutions and innovative capacity of the region is gradually evolving with substantial implication over the economic growth record of the Sub–Saharan region. This study claims that if current trends of institutional development (i.e., democratic and governance institutions) and improvement in innovation infrastructure continue: Sub-Saharan Africa will become more democratic with strong rule of law in the near future; innovative capability of Sub-Saharan African states will be improved; and Africa will maintain its momentum in terms of economic growth.

Key words: Institutional Theory; Institutions; Absorptive Capacity; Innovation; Sub-Saharan Africa, Economic Growth
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[1] PhD in Political Studies –Political Economy; Assistant Professor of Finance and Political Economy, Ethiopian Civil Service University; E-mail: dejenemamo@gmail.com
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1. Introduction

In development discourse the sources of growth and development has been one of the most controversial issues. The non-state interventionist policy framework from its early root of Classical Economic Model (Harrod, 1939; Domar, 1946) to the present neo-liberal theory (Williamson J., 1990) suggests market liberalization with focus on capital formation as the rules for economic growth and development. The classical growth model focuses on formation of capital formation needed for financing productive investments in local business. The growth models of Harrod and Domar explain that capital formation raises the standard of living, which in turn results in higher growth. Criticizing the growth models proposed by Harrod and Domar on the ground of the fixed proportion of factors of production and substitutability between labor and capital, Solow (1956) argued that capital formation increases labor productivity in a dynamic process of investment growth.

Indigenous growth theories (Schumpeter, 1934; Romer, 1986; Lucas, 1988) explain growth in terms of government policy to foster the right kinds of investment in physical and human capital formation for economic expansion, growth, and development. Similarly, Romer (1990); Helpman and Grossman (1991) incorporate knowledge capital gained through research and development to explain growth along with other variables. Overall theoretical growth literature demonstrates the role of capital or changes in definition in capital (knowledge capital or human capital) in enhancing economic growth. Developing economies are poor in innovation capacity partly because institutions (i.e., economic, political, and legal institutions) are poorly developed to promote the right form of investment into human capital development through education and training. For economic development, human and physical capital formation is essential for the efficient utilization of natural resources (Schumpeter, 1934).

Institutional theory recommends the improvement of the quality of institutions for long-run economic growth and development (North, D. C., 1990; Acemoglu, D., & Johnson, S., 2005; Yao and Yueh 2008; Hasan et al. 2009; Casson et al. 2010; Huang, 2010; Angelopoulos et al. 2010; Blackburn and Forgues-Puccio, 2010; Frunza, R., 2011). The institutions represent a network of formal and informal rules meant to introduce order in the economic and social life and to improve a mechanism of applying and monitoring these rules in view of efficiently using the available national resources (North, 1990). The institutions form the environment that can influence favorably or unfavorably the

itinerary of economic and social activities of a country (Frunza, R., 2011). Strong legal, political, and economic institutions are essential to promote development directly and through influencing policies including innovation policy. According to North (1990: pp.3), institutions are defined as the "rules of the game in a society, or more formally, humanly devised constraints that shape human intervention". Among the institutions that are the most crucial to economic growth are those that enable a country to allocate capital to its most productive uses. Moreover, institutions that promote economic freedom are also essential in promoting economic productivity and efficient use of economic resources. Such institutions establish and maintain strong property rights, an effective legal system, and a sound and efficient innovation system. In recent years, the field of economic development has concluded that institutional rules are critical to economic growth. According to Ramona Frunza (2011), institutions represent a network of formal and informal rules meant to introduce order in economic and social life and to provide a mechanism for applying and monitoring these rules with a view to efficiently using the available national resources. However, empirical literature proved that the effect of institutions on economic development is also indirect through affecting policies. Accordingly, institutions help install policies targeting institutional reforms that aim to promote growth-driven innovation systems. It is clear from research in institutional economics that the levels and modes of innovative and entrepreneurial activity will be affected by the surrounding institutions (Licht and Siegel, 2006; Busenitzet.al. 2000). Effective institutions can help alter the constraints and structure of incentives in a society to direct self-interested behavior towards either more or less economically productive activity (Baumol, 1990; Nee, 1996). However, in the African context for example, extractive or predatory institutions do the opposite resulting in poor economic and social development. New opportunities arise as emerging economies undertake the shift from redistributive bureaucracy to open markets (Nee, 1996), but we still lack an understanding of which shifts are more important for increasing technological innovation.

Innovation capacity determines the level of capital formation. Similarly, the use of innovation results directly rather than innovating per se could contribute to capital accumulation. Like any other region, the economies of the Sub-Saharan African region innovation capacity development demand institutional and economic reforms to improve the performance of formal institutions and thereby to enhance economic growth. The theoretical argument for linking innovation capacity to economic development is that well-developed

innovation systems improve the efficiency of capital allocation (Schumpeter, 1912; Helpman and Grossman, 1991). A modern innovation system promotes investment by identifying and funding good business opportunities, mobilizes savings, monitors the performance of managers, enables the trading, diversification of risk, and facilitates the exchange of goods and services. These functions result in a more efficient allocation of resources, in a more rapid accumulation of physical and human capital, and in faster technological progress, which in turn feed economic growth (Bagehot, 1873; Schumpeter, 1934). In the neoclassical framework, the impact of innovation is treated as part of the Solow residual and hence a key contributing factor to economic progress and long-term convergence (Solow 1957, Fagerberg, 1994). In recent decades, due to the popularity of endogenous growth theories, economists are increasingly of the view that differences in innovation capacity and potential are largely responsible for persistent variations in economic performance and hence wealth among the nations in the world (Grossman and Helpman, 1991). In the Grossman and Helpman approach innovation is viewed as a deliberate outgrowth in investments in industrial research by forward looking and profit seeking economic agents.

However, the question of what fundamental forces results in a well-developed innovation system, as well as what basic factors hinder the development of innovation capacity, are still debatable in the plethora of economic literature. One thing apparently clear, however, is the consensus that institutions which foster investment into education, training, research and development are critical for nourishing innovation systems. though there is still significant knowledge gap about the factors that ultimately determine a country's rate of innovation capacity, economists have increasingly becoming aware that institutional arrangements affect knowledge accumulation (Rodrik, 2000; Sala-i-Martin, 2002; Gradstein, 2004) and as a result, recognize that institutional arrangements affect the long-run growth of output. If one wants not only to diagnose the problem of growth, but also search for ways to stimulate growth, it is very important to understand how institutions and innovation are linked. Despite these, the existing literature reveals that political economists are still challenged by the daunting task of understanding the nexus between institutional quality and innovation capacity and to integrate institutions into the standard theoretical framework of economic growth (Huang & Xu, 1999; Sala-i-Martin, 2002). Besides, few growth models explicitly address this issue (Huang & Xu, 1999; Fedderke, 2001; Gradstein, 2004; Tebaldi & Elmslie, 2008) and little empirical cross-country analyses directly examine such a link. The existing

literature on institutional and economic performance finds a positive association between institutions and levels of income (Hall and Jones, 1999; Acemoglu et al., 2001; Easterly and Levine, 2003; Alcala and Ciccone, 2004). Also, the link between institutions and the transitional growth rates of per capita income has been well explained in previous literature (Barro, 1991; Mauro, 1995; Acemoglu et.al., 2001). As far as the literature reviewed in this study an unambiguous empirical association between institutions and technical innovation has not yet been established. In addition, very little has been done in terms of theoretical explanation and empirical evaluation of the influences of institutional quality on technical innovation. This study contributes to the literature by examining empirical and theoretical literatures that provide evidence for links between technical innovation and the quality of institutional arrangement on the one hand and the link between innovation capacity and economic performance on the other hand. Following from this the author argues that institutional development is imperative to improve the innovation capacity of a nation and there by the performance of its economy.

1.2 Background to the African Social and Political Issues

The international experience in economic and institutional reform carries the central idea of the role of the state and markets in economic development. The dominant idea of the post second World War period is that the state could do better than the market and should therefore play a critical role in guiding societies that lack a strong entrepreneurial class towards a sustainable growth path. Most states directly concerned themselves with production in an attempt to accelerate capital accumulation and to acquire new technologies. The argument culminates with the conclusion that the society knows little or nothing as to how to move forward from vicious circle of poverty to virtuous cycle of wealth accumulation and therefore should be guided by the state policy makers and planners (Tipps D., 1976). According to Fenelli and Popov (2003), Norman v. Louyza and Raimundo Sotto (2003) the state policymakers in Africa experimented with tools like manipulation of relative prices, protectionism and intervention in the process of financial intermediation to influence resource allocation in the desired direction.

However,1970s began to show up the drawbacks of the model in the form of increased burden on government finance resulting from inefficient state-owned enterprises, inflated bureaucracies, low productivity, and foreign exchange shortages resulting in reducing the role of the state and increasing reliance on

markets (Heidhues Franz, 2009). In the late 1980s the embrace of market-oriented development approach became widespread as many reforms were put together when the Washington Consensus (Williamson J., 1990) development policy prescriptions were in place demanding a market liberalization, privatization, and deregulation measures as the only way out of poverty for underdeveloped economies. The irony is the policy prescriptions failed in most of the cases because it exports only the sets of policy prescriptions but not the institutional array necessary for implementation of the policies. At the same time many countries moved to political systems that, at least on the surface, were more democratic than their predecessors. The 1990s saw even more dramatic institutional changes, particularly in the former socialist economies of Europe, East Asia and Africa. For Sub-Saharan Africa, economic performance in the 1970s and 1980s was very poor (Acemoglu, et al., 2002; Jerven, 2009; IMF, 2009). Much of the region was unable to break away from paths of negative or low per capita income growth (Ferguson, 2006; Thomson, 2010), high inflation and fiscal deficits (Hodges, 2004), and balance of payments difficulties, which in some countries culminated into political and social turmoil (Sender and Smith, 1986; Chabal, P. & Daloz, J., 1999).

For African economies, the historical experience is quite the same as that observed in many other developing countries. Since independence in the 1960s, Africa's development scenario was very interesting for about two decades. Sub-Saharan average economic growth was 3.4 percent between 1961 and 1981(World Bank, 1981). Over this period Ivory Coast and Nigeria outperformed Indonesia, while countries such as Congo Democratic Republic, Ghana and Uganda were in par with South Korea's development performance (Klasen, 2003). By the end of 1970s the general development prospect of Sub-Saharan African countries was unsatisfactory although some countries had experienced better economic growth (World Bank, 1981). Development motives in the region since the late 1960s have been full of controversies (Gareth Austin, 2010). During the 1970's and 1980's, almost all the countries implemented policies of self-reliance and protectionism, which entailed the state taking the leading role in national development under socialist systems (Heidhues Franz, 2009). These included extensive compulsory villagization, nationalization, and price controls. Among others, nationalization of private owned companies and creation and management of state enterprises was based on the infant industry protection and development considerations and the thinking that the state was in a better position

to guide the society towards sustainable development. This process has adversely affected the then institutional development in Africa in general.

However, by the 1980's, African economies were among the world's poorest countries in terms of GDP per capita, and it seems that for the most part its problems were related to poor policies and structural weaknesses characterized by internal and external political frictions (Sender and Smith, 1986; Easterly and Levine, 1997; Heidhues Franz, 2009; Jerven, 2009; IMF, 2009). Since the demise of the socialist system at the end of 1980's, the countries started to reorient their policies towards a free enterprise system. The governments renovated their approach to structural adjustment policies suggested by the World Bank and IMF. Structural reforms carried out by the governments in Sub – Saharan Africa have focused on realigning the incentive structure towards efficient use of scarce foreign exchange, liberalizing markets for goods and services, and reducing the involvement of the public sector in the economy and privatization of public enterprises under capitalist economic system. However, a history of little to no success was reported from the implementation of structural adjustment programs because of the weak institutional array in these economies (Acemoglu, et al., 2002; Hodges, 2004; Ferguson, 2006; Williams G., 2007; Thomson, 2010). Those economies like Ethiopia and Rwanda which realized the failure and reoriented their development policy towards the Developmental State Model (mainly imitated from the Asian economies) proved to succeed, posing critical questions on the mechanisms of institutional development for improvement of innovation capacity and thus economic and social progress (Oliver Reynolds, 2018; Ben Shepherd and Anna Twum, 2018). Hence, this study argues that lack of quality institutions and failure to mobilize support for collective action has limited the ability of African countries to influence the design of innovation policy in particular and economic growth promoting policies in general.

1.3 Stylized facts

Contrary to previous studies, Edinaldo Tebaldi & Bruce Elmslie (2008) suggest that a good way to study the role of institutions in promoting economic growth is not to study in terms of its direct effect alone, but to consider the impact of technological innovation on the nexus of institutions and economic performance. They argue that focusing only on the direct effect of institutions risks predefining the object and thus not seeing it as it really is. That means the dual effect of institutions is going to be overlooked if our analysis of the role of

institutions fail to capture the indirect effect of institutions. When institutions are poorly developed such as in Sub-Saharan African economies, one must take a comprehensive view to see it clearly. This is because improvement in institutions in such a context plays significant role directly and indirectly by harnessing sectoral policies. The alternative, North (1990), Rodrik (2000), Acemoglu et al. (2001), Easterly and Levine (2003) suggests, is to consider the direct effect of institutions on economic performance.

This review article seeks to briefly explain how the findings might be important for understanding the broader picture of how technological change and various elements of political and governance institutions are related in promoting economic performance in Sub-Saharan African economies, along with policy-making implications. Understandably, it is difficult and to try to develop predictions, particularly about the future state of affairs. Nevertheless, it is important to consider some key themes and trends that have emerged through empirical examination of the role of institutions, and what might be the implications for future developments in the nexus of institutions, technological change, and economic performance in Sub-Saharan Africa.

There are significant disagreements among scholars of sub-Saharan African studies about the likely future directions of institutional development, particularly on the development of political and governance institutions in Sub-Saharan Africa (Gareth Austin, 2010; Cheeseman, 2015; Temnin John, 2018). Partly, this is because of different theoretical perspectives playing into the diversity of African countries in terms of social, political, and economic issues. Cheeseman affirms that significant portion of the African continent is democratizing by acknowledging that the large bulk of African states are still in murky ground between democracy and autocracy. Temnin John based on data from the freedom house provides evidence that democratic development in Sub-Saharan Africa has distinctive regional divergence. While southern and western Africa have shown significant improvement in the development of democratic political and governance institutions, eastern and central Africa have experienced major backlash. In general, the institutional development in Sub-Saharan African countries is relatively changing towards democratic institutionalization. Sub-Saharan African state institutions as a result are fairly complex, producing contradictory observations and conclusions on how the state politics functions (Cheeseman Nic, 2015; John Stremlau, 2016; Jakkie Cilliers, 2016). In this brief review the author aims to add another piece to the attempt to better understand state of development in political and governance institutions in Sub-Saharan

Africa and the implications of these developments on economic growth in the continent.

Scholars of African study tended to focus on the question of how to reform the politics and governance of African states so that typical African states become a liberal democracy. This review claims that this is not only wrong question, but also misguided and misinformed, and in fact focusing on this consequentialist question will obscure our understanding of contemporary African states as they actually are. This review considers that it's essential to take an objective view, to analyze the key trends in institutional development and how they might keep on developing in the future, without any presumption that a typical African state should evolve into a liberal democracy. The author of this review proposes that the relevant debate in future research should focus on what type of democracy (i.e., liberal democracy, consensus democracy or social democracy) is viable for African states. To this effect, future research need to focus on examination of specific country cases. Previous research underscored institutions in Sub-Saharan African states are indeed evolving with significant implication on innovation and economic growth that the continent witnessed in recent periods (Radelet, 2010; Africa rising, 2011; Kathleen et al., 2016; Asongu, 2017). It is clear that establishing innovation encouraging institutions require as a necessary and condition, good politics, and good governance. This is not to say that the development is uniform across Sub-Saharan Africa (see: Appendix Tables A1, A2 and A3). Also, it is not to say that institutions in Sub-Saharan Africa are developed enough. The large numbers of regimes in Africa are still quite identified as either authoritarian or hybrid. In terms of democratization, The Economist Intelligence Unit's democracy index awarded full-democracy status only to Mauritius in 2018. This signifies that there is still a long way to go for democracy to take root in Sub-Saharan Africa. A quite significant number of African states are still authoritarian and weaknesses in freedom of speech, accountability and transparency are observable. However, what are the implications if current trends of democratization continue? Based on the evidence analyzed in this research, it could be argued that. (1) Sub-Saharan Africa will become more democratic in the near future; (2) innovative capability of Sub-Saharan African states will be improved; (3) Africa will maintain its momentum in terms of economic growth.

1.4 Democratic Africa is emerging

The general popular perception that Africa's democratic deficit puts the continent behind the rest of the world in the most obscure of political terms is fading away. In spite of the fact that millions of people elsewhere in the world live under regimes that can be described as authoritarian, oppressive and undemocratic, Africa is considered as the most vulnerable to democratic deficit. Cheeseman and Klaas (2018) provide strong evidence that there is strong African bias regarding democracy and good governance. Available evidence shows that large portion of the African continent is democratizing against the odds. According to the 2008 report of The Economist intelligence unit's democracy index the number of successful "coups from within" in Sub-Saharan Africa has been dropped substantially since early 2000s. The index identifies four categories of regime types: full democracy, flawed democracy, hybrid, and authoritarian. It puts most African countries in murky ground between democracy and autocracy awarding full democracy status only to Mauritius, a country with very strong rule of law. Freedom House, a think tank based in the United States (US), reported in 1990 that only 17 out of the 50 African countries on which it reported could be classified as 'free' or 'partly free'. This classification is based on subjective measurement of democracy making it prone to measurement contaminants. In fact, that is not specific to freedom house indicator, and it is the limitations of indicators for democracy index in general (Sara Bush, 2015). Its most recent data in 2019 indicates that 32 out of 54 countries are 'free' or 'partly free'. Democratic progress in Sub-Saharan Africa is uneven (Temnin John, 2018) even though holding periodic elections is becoming common in African states (Democracy Index, 2018). The drop in number of successful coups is an indicator of the progress in development of democratic institutions in Sub-Saharan Africa; especially it signifies that peaceful transition of power is emerging in Sub-Saharan Africa. Some countries in Sub-Saharan Africa appear to defy the narrative of a democratic deficit in the continent. In 2016: Nigeria, Liberia and Ivory Coast are named among the countries with the biggest development in political rights and civil liberties by the freedom house. These countries were previously known for instability and internal conflict. For the first time in Nigerian history an opposition party obtained political power through elections in 2015. In recent reports countries such as Botswana, Ghana, Cape Verde, and Benin have also been lauded as democratic examples. Specifically, Ghana has witnessed the achievement of an established democracy by electing an opposition

for 50.5% of the votes over the 49.5% to the ruling party on 7 December 2016. Senegal and Ghana are examples of relatively well-governed states as a result of repeated and successful alternations of political power.

In east Africa the giants like Ethiopia, Kenya and Tanzania are moving towards the path of democratization. In Ethiopia for instance, a soft revolution from 2016 to 2018 has led into replacement of a very repressive regime with a relatively democratic one. Freedom house witnessed the development in Ethiopia as follows. "Following sustained protests in Ethiopia, the ruling party installed a reformist prime minister who lifted a state of emergency, released political prisoners, and permitted more open political debate" (Democracy Index, 2019). In Tanzania presidential election has already resulted in the opposition taking over the political power. In Kenya the opposition and the incumbent agreed to work together though it is after crisis in the aftermath of general elections. In central Africa a positive development is emerging as far as democratization is concerned. In democratic republic of Congo- a nation severely torn with instability and internal conflict - an opposition is elected to office in 2018 defying the conventional narratives. The 2016 polls in Central African Republic culminated to ending persistent conflict for years, and the presidential runoff was concluded peacefully in spite of months of sectarian and ethnic violence, albeit with a lower turnout. The southern African region is relatively more democratic compared with the rest of African regions (Temnin John, 2018). Electoral outcomes in this region of the continent are less contentious. Nevertheless, election is only one face of democracy. As the then UN secretary general Kofi Annan said: "Democracy is not just about one day every four or five years when elections are held, but a system of government that respects the separation of powers, fundamental freedoms like the freedom of thought, religion, expression, association and assembly and the rule of law … Any regime that rides roughshod on these principles loses its democratic legitimacy, regardless of whether it initially won an election." As result, Sub-Saharan African governments need to promote the rule of law if furtherance of democratic governance is to be realized. Jakkie Cilliers (2016: P.1) argues that "democracy in much of Africa is constrained from delivering on its development potential for three reasons. First, governance capacity is lacking. Second, the quality of electoral democracy is thin. Finally, neopatrimonialism undermines electoral democracy in Africa". This means Sub-Saharan African states need to focus on institutionalization of their democratic progress to avoid the risk of backlash. Cheeseman (2015) affirms that Sub-Saharan African countries are likely to continue to make democratic gains

and consolidate them over time but there is a risk of backlash owing to poor institutionalization. Furthermore, Cheeseman (2018) argues that against the historical posture of African political institutions such as constitutions, legislatures, and judiciaries are weak and vulnerable to manipulation, leading some to claim that the continent is 'institution-less', recent developments including the consolidation of presidential term limits in a number of Sub-Saharan African countries demonstrate that this depiction is no longer tenable. Institutional conditions that create the rule of law and guarantee a broad range of civil liberties to all citizens are preconditions to the institutionalization of democracy. Mohamed A. El-Khawas (2001) asserts that this aspect of democratization is being implemented slowly and unevenly among African countries, because it requires institution building and huge resources to make changes and to train people to perform new roles. As Jean-Germain Gros (1998: p.3) succinctly put it, the major purpose of the institutionalization of democracy is "to make intrastate and state-society relations more balanced. Separation of power . . . checks and balances, administrative decentralization and accountability, freedom of speech, press, assembly, and . . . civilian hegemony over the military are some of the components of the second phase of democratization." Hence, institutionalization of democracy needs to focus on the balance and exercise of power among the legislature, the executive, and the judicial bodies of the government system.

Available evidence reveals that there is impressive progress in Sub-Saharan Africa in terms of the rule of law in particular and the development of governance institutions in general. The Ibrahim Index of African Governance, an annual assessment developed by the Mo Ibrahim Foundation, focuses on what happens between elections. It conceptualizes good governance as safety and rule of law, participation by citizens and a respect for human rights, sustainable economic opportunity, and human development. The 2018 index provides strong evidence for positive development in governance institutions across Africa. At the top of the index were Mauritius, Seychelles, Cape Verde, Namibia, and Botswana, while Central African Republic, South Sudan, Eritrea, Libya, and Somalia – all nations torn by conflict – were at the bottom of the list. Chester A. Crocker (2019) attributes the prospect of governance development in Africa to macro variables such as educational access (especially for women), climate change impact and mitigation, development and income growth rates, demographic trends, internet access, urbanization rates, and conflict events. Chester A. Crocker (2019) further emphasizes on the potential influence exerted

by the region's leading states, measured in terms of size, population, economic weight, and overall political clout and leadership prestige. The positive development in a critical mass of the leaders—e.g., South Africa, Nigeria, Kenya, Ethiopia, Cote d'Ivoire, Algeria, Egypt—will pull some others along in their wake; of course, with a possibility for the reverse as well. Moreover, the Afrobarometer provides strong evidence that the critical mass in Sub-Saharan Africa has strong demand for jobs, better economic management, reduced inequality and corruption and such outcome deliverables as health, education, and infrastructure (Massa Coulibaly et.al, 2019). These outcomes entail efficacious and quality governance institutions (Chester A. Crocker, 2019). Although it is difficult to claim that such institutions will consistently emerge, public choice theory suggests that it is reasonable to expect that good governance institutions will evolve over time in response to the quest by the critical mass. It is vital not to overemphasize the institutional progress and its development in Sub-Saharan African countries as it is, but if these trends continue there is potential for democracy and good governance to flourish. That is with the unfolding democratic progress and good governance in Africa, if sustained; innovation inducing institutions will be established. One basic question for further investigation at this juncture is: what is the effect of democracy on good governance? This review leaves this question to future empirical investigation.

1.5 Innovative and Growing Africa in the Making

The findings from empirical literature review suggest that sub-Saharan Africa will become more innovative. Furthermore, the continent is likely to maintain its track record of economic growth momentum. For instance, the global innovation index reports show that most countries among the group of innovation achievers' category have been from sub-Saharan Africa region (Cornell University et al., 2018). Available evidence indicates that progress in institutional development and business sophistication has played essential role in helping the region as a whole to catch up with Central and Southern Asia in terms of innovation. The substantial improvement achieved in institutional development in economies such as South Africa, Mauritius, Botswana, Namibia, Rwanda, and Burkina Faso has led into highest scores in institutions and market sophistication in Sub-Saharan Africa in 2017(Cheeseman Nic, 2015; Cornell University et al., 2018). There is difference in the approach employed by Sub-Saharan African countries to improve their innovative capability for instance, large-sized

economies such as South Africa, Kenya, Botswana, and Namibia expanded their investment in infrastructure development, while others such as Mauritius, Rwanda, Senegal, and Zimbabwe are achieving progress in innovation through investment in human capital development (Cornell University et al., 2018). Kenya and Rwanda evolved as prominent examples in using technology to catalyse new areas of growth. The biggest innovations that are coming out of Sub-Saharan Africa is in the area of financial service, which has disrupted traditional financial models. Rwanda is a pioneer in digitalizing health care education and general government services. Ndubuisi Ekekwe (2015) provides strong evidence that in Sub-Saharan Africa, innovation is accelerating, and the continent is finding better ways of solving local problems, even as it attracts top technology global brands. However, Sub-Saharan Africa is the least innovative region in the world, despite the strong performance of individual countries such as South Africa, Mozambique, Mauritius, Kenya, Rwanda, Malawi, and Botswana (Cornell University et al., 2018).

The African union has a vision dubbed 2063 which aspires to transform African politics, society, and its economy. In pursuing this, African Union gives emphasis to the importance of innovation and development of technological capability. To this end, science and technology strategy has been developed (African Union, 2014). "Technology and Innovation Strategy for Africa 2024 (STISA-2024) places science, technology and innovation at the epicenter of Africa's socio-economic development and growth" (African Union, 2014). The strategy emphasizes the importance of investments in education, technical competence and training, because science, technology, research, and innovation remain critical to Africa's economic prosperity. The vision of the African union could be considered appropriate because the existing literature has affirmed the critical role of human capital formation for improvement of innovative capability (Bourdieu, 1986; Maskell and Malmberg, 1999; Dakhli & De Clercq, 2004). Concerning human capital development, the 2018 Mo Ibrahim index of African governance indicates that in Sub-Saharan Africa, there is a progress in education over the last decade. However, education quality remains poor in sub-Saharan Africa despite the growth in enrolment (Bashir Sajitha et.al, 2018). Current education quality is not matched to the growing demand for education and jobs. Mo Ibrahim index shows that half of the continent's countries (27) registered deteriorated Education scores in the last five years, meaning that for over half of Africa's citizens (51.5%) education outcomes are worsening. The poor quality of education if further deteriorates would have significant repercussions on

improvement in innovative capacity. As result, the improvement of the education quality is critical. This could be done by creating industry – university linkages so that industry operators are involved in the design of educational curriculum, which could avoid mismatch between skills needed and the skills developed by educational institutions.

Development of innovative capability of Sub-Saharan African economies has a very good prospect if: 1) improvement in political and governance institutions are sustained (discussed above); 2) focus on comparative advantage of Africa guides innovation policy in the continent; 3) the financial and infrastructural challenges are addressed. Effective rule of law and institutions that guarantee protection for intellectual and private property rights are critical for innovation (Gillian K. Hadfield, 2008; Mason, O'Leary, and Vecchi 2012; Ngatat 2016, Papageorgiadis N. and Sharma A., 2016). This is because in countries where the rule of law is strong, the incentive to innovate is high since proper rule and the protection of intellectual property imply maximum rent to innovators. That means a guarantee for protection of private property such as patent rights, copy rights and trademarks serve as incentives to invest into research and development, that spurs innovation. Makhtar Diop (2017) suggests that Africa's innovation system needs to be built on sectors where it had a comparative advantage, which at least initially consisted of natural resource sectors. He further argues that Sub-Saharan Africa needs to invest into three steps of innovation policy to improve its innovation capability. These are: first include managerial and organization capabilities organizations to adopt existing innovations and piggyback on the advances that rich countries make, capturing exactly the returns that the economist Schumpeter (1934) predicted. Second, start collaborative projects with higher performing countries (like China). And third step involves investing longer term in technological programs. This means long term evolutionary process approach to absorptive capacity development is adaptable to the context of Sub-Saharan African economies if they were to grow based on their natural resource endowment. Gustavo Crespi et.al (2018) offers strong empirical evidence to support the idea that growth on the basis of natural resource-based activities should be understood as a long-term evolutionary process, from inception of the industry to maturity and internationalization. Ndubuisi Ekekwe (2015) offers evidence that innovation in Africa remains challenged by factors that indirectly stymie access to capital, including property rights, poor technical manpower, and inadequate infrastructure. That means absorptive capacity development requires the intervention of the state through

government policy instruments in areas of protection for intellectual property, education provision, and funding for research and development among others. However, state intervention may generate government failure. Therefore, interventions such as these require systematic introduction to avoid possible government failure (M. G. Ukpabio et.al, 2016).

Given that institutional development and progress in innovation capacity has good prospect in Sub-Saharan Africa, the continent has a potential to maintain its economic growth record. Sub-Saharan African economies were described as hopeless in the early 2000s because of poor level of economic performance and rampant poverty (Hopeless Africa, 2002). Nevertheless, many African economies have been able to move from vicious cycle of poverty into virtuous cycle of unprecedented economic growth in just a decade (Africa rising, 2011). Radelet (2010) argues that large number of Sub-Saharan African economies exhibit the basic features of emerging economies. Moreover, Kathleen et al. (2016) provides strong evidence that Africa has enjoyed robust economic growth in over the last decade. However, evidence shows that the growth is not uniform across Sub-Saharan Africa and country level differences are significant. About seventeen countries in Sub-Saharan Africa (e.g., Angola, Chad, Equatorial Guinea, Ethiopia, Ghana, Liberia, Sierra Leone, Tanzania, Uganda, And Zambia) have experienced sustained high level of economic growth, rivaling those of rapid-growth, emerging economies in Asia (Kiertisak Toh, 2016). However, in countries such as Burundi, Central African Republic, Eritrea, Zimbabwe, Gabon, and many oil-exporting countries not only low growth rate is experienced, but also these economies remain fragile. Also, evidence suggests that emerging economies in sub-Saharan Africa are different in terms of economic fundamentals and quality of institutions and governance from none emerging slow-growth group (Garner Phillip, 2006; Kiertisak Toh, 2016; Cornell University et.al. 2018). Sub-Saharan African region has become one of the fastest growing economies in the world, albeit the need to work for structural transformation. The economic growth record is driven principally by primary exports such as fossil fuel, minerals, and unprocessed agricultural commodities and forest products.

The Global Economic Prospects report recently released by the World Bank for sub-Saharan Africa asserts that the continent will maintain its growth momentum at the rate of 3.4% in 2019. Economic growth across Sub-Saharan region varies significantly. The three largest economies of the region (i.e., Nigeria, South Africa, and Angola) are expected to grow below the regional average. Nevertheless, there are large numbers of economies which are expected

to grow at over 6 percent (e.g., Ethiopia, Rwanda, Burkina Faso, Cote d'Ivoire, Ghana, Niger, Tanzania, Senegal, and Uganda. Also, the predicted economic growth for Sub-Saharan African economies is below the average of other emerging markets. This is because large sized and commodity-driven economies such as South Africa, Nigeria, Angola, and Zambia—are overwhelmed by a combination of macro-economic forces that inhibits progress and domestic challenges like unemployment, political instability, and corruption. However, countries like Ethiopia are in the spotlight. Ethiopia is on path to have nearly the highest GDP growth rate in the world, and several smaller economies like Tanzania, Kenya, Rwanda, and Ghana are growing at rates over 6 percent, a number on par or higher than China's expected growth. Moreover, these countries are also effectively attracting global capital through progressive policies aimed at diversifying their economies and growing the middle class. It is evident that Sub-Saharan African economies are growing, and they are expected to grow in the near future as well. However, the economic growth in Sub-Saharan Africa failed to result in significant progress in poverty reduction in the region (Kathleen et al., 2016; Sabina Alkire et al., 2017). Workers' productivity is still low, while the population is growing above the economic growth rate. Sluggish progress towards key business needs such as power and rail infrastructure may also hurts investor confidence. Heidhues Franz (2009) argues that many of strategies and approaches pursued to foster development in Sub-Saharan Africa since independence in the early 1960s has failed. Heidhues Franz points to two basic factors for the failure. The first is related to faulty strategies and policies propelled to Africa by international donors and development partners, and the second has to do with Africa's difficult geography and socio-cultural and institutional history, which cannot be changed in the short and need to be recognized as the given context within which development must take place. Hence, for Sub-Saharan African region to maintain its growth record these bottlenecks need to be addressed. To this end, Sub-Saharan African region needs to focus on policies that tackle corruption, invest in infrastructure development, and enhance workers' productivity if it were to maintain its growth record.

1.6 Final Remarks

This study aimed to contribute to the literature on the nexus among institutions, innovation, and economic performance in the context of developing countries. The results in prior empirical studies proved that stable democracy

provides avenue for improvement in economic growth and development (North, D. C., 1990; Przeworski et al., 2000; Todaro and Smith, 2009) and stimulates countries' level of innovativeness (Hall, R. E., and C. I. Jones, 1999; Daniel, 2002; Rodrik 2007; López-Claros, A. and Yasmina Mata, 2009). Empirical literature review affirms that the impact of democratic political institutions on economic performance is more profound in underdeveloped economies than in consolidated democracies (Pereira and Teles, 2010; Acemoglu et al., 2018). This is due to the power of democratic political order in protection of fundamental political and civil rights which in turn improves economic productivity. In democracy, openness, free flows of information as well as the flow of goods fosters efficient, customized, and effective policies (Siegle, Joseph T. et.al, 2004). Similarly, quality of governance institutions contributes to economic growth and development. This means poor governance is one of the major reasons that some countries are in a vicious cycle of poverty. For instance, corruption causes low level of economic growth leading into poverty trap through misappropriation of public resources (Tanzi and Davoodi, 2002; Blackburn et al., 2006). Political instability and poor performance in freedom of speech and accountability generates low level of economic growth. On the other hand, strong rule of law provides appropriate protection for intellectual and private property rights, serving as a strong incentive for innovation and improvement in economic productivity. Haggard, S., & Tiede, L. B. (2011) argues that it is "the weakness of the government and the inability to provide law and order in the most basic sense that constitute[s] the most profound barrier to growth". Overall, the evidence analyzed suggests that developing countries in the Sub-Saharan region need to focus on development of quality institutions, improvement of innovative capacity through research and development, and investments in education and training, in order to improve their economic performance and overcome poverty traps. For institutional development, Sub-Saharan African economies need to follow an evolutionary approach because of their difficult geographic, socio-cultural and institutional history, which cannot be changed in the short run and need to be recognized as the given context within which development must take place. If countries in the region focus on development of hegemony of the civil government over the military and formal institutional check and balances in the exercise of power among the legislatures, the executive, and the judicial system, Sub-Saharan Africa has great potential to overcome poverty traps. One of the most important factors that prohibits countries from focusing on it is the involvement of the military in politics and the infiltration of party indoctrinated

military commanders in the army. This is often pursued by ruling parties to ensure the military's loyalty and to remain in power. At times this has backfired, resulting in military coups as is the case in many western African countries. Hence, it is essential to focus on the professionalization of the army as well as the entire security structure of the state.

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Appendix – A:

Appendix Table A1: Lists of Countries and Mean Values of the Key Variables

Country	ID	Polity2	lnSJA	DEMO	ATR	HC
Angola	AGO	-2.2381	2.130582	1.714286	3.952381	1.361142
Benin	BEN	6.52381	4.214989	6.52381	0	1.523739
Botswana	BWA	7.952381	4.657352	7.952381	0	2.607398
Burkina Faso	BFA	-0.38095	4.436408	2	2.380952	1.131863
Burundi	BDI	2.619048	1.602067	4.333333	1.714286	1.264374
Cameron	CMR	-4	5.461935	1	5	1.803056
Central African Republic	CAF	1.190476	2.101296	-12.5238	-13.7143	1.43828
Congo Republic	COG	-4	3.85501	0.285714	4.285714	2.000335
Dem. Republic Congo	ZAR	3	2.081521	3.714286	0.714286	1.590991
Cote D'voire	CIV	0.619048	4.71709	2.238095	1.619048	1.492009
Ethiopia	ETH	-1.28571	5.647005	1.857143	3.142857	1.250761
Gabon	GAB	-1.33333	3.563768	1.52381	2.857143	2.332142
Gambia	GMB	-5.04762	3.538028	0	5.047619	1.402539
Ghana	GHA	6.285714	5.39069	6.666667	0.380952	2.210005
Kenya	KEN	5.047619	6.228357	6.238095	1.190476	2.06716
Lesotho	LSO	7.047619	1.92472	7.857143	0.714286	2.036762

Madagascar	MDG	5.714286	4.005382	6.190476	0.428571	1.594221
Malawi	MWI	5.761905	4.520296	5.952381	0.190476	1.662526
Mali	MLI	6.047619	3.655342	2.571429	-3.47619	1.196794
Mauritania	MRT	21	-3.76191	1.930861	0.190476	3.952381
Mauritius	MUS	10	3.790405	10	0	2.395448
Mozambique	MOZ	5	3.494667	5.190476	0.190476	1.161901
Namibia	NAM	6	3.606275	6	0	2.092194
Niger	NER	3.47619	3.350271	5.285714	1.809524	1.147668
Nigeria	NGA	3	7.43206	-0.38095	-3.52381	1.633099
Rwanda	RWA	-3.85714	2.755321	0	3.857143	1.508193
Senegal	SEN	5.809524	5.039578	6.380952	0.571429	1.398857
Sierra Leone	SLE	4.809524	1.937011	2	4	1.447756
South Africa	ZAF	9	8.536566	9	0	2.342954
Sudan	SDN	-4.38095	4.886726	0.333333	4.809524	1.467113
Swaziland	SWZ	-9	2.88311	0	9	1.697869
Tanzania	TZA	-0.61905	5.3801	2.190476	2.809524	1.554498
Togo	TGO	-2.47619	3.31371	1	3.47619	1.735146
Uganda	UGA	-2.28571	5.30845	0.571429	2.857143	1.863473
Zimbabwe	ZWE	-1.71429	5.03896	2	3.714286	2.276592

Appendix Table A2: Summary Statistics (1995–2015).

Variable	Obs	Mean	Std. Dev.	Min	Max	Source	Description
LnSJA	723	3.8884	1.7514	-.91629	9.1777	World Bank and Science Web Citation	Measured by the citation index of Scientific and Technical Journal Articles
POL	724	1.669	5.3035	-9	10	Polity IV Project	A codified measure of a country's political regime based on (Jaggers and Gurr 1995; Marshall and Jaggers 2002). Scores can range from -10 to 10, with 10 representing a full democracy
DEM	720	3.7111	3.2512	0	10	Polity IV Project	A codified measure of a country's level of democratization based on (Jaggers and Gurr 1995; Marshall and Jaggers 2002). Scores can range from 0 to 10, with 10 representing a full democracy
ATR	720	2.2056	2.3638	0	9	Polity IV Project	A codified measure of a country's level of democratization based on (Jaggers and Gurr 1995; Marshall and Jaggers 2002). Scores can range from -10 to 10, with 10 representing a full Autocracy
HC	724	1.692	.4022	1.0493	2.8336	Pen World Tables	A codified index of a country's level of human capital development based on (Barro, Robert J. and Jong-Wha Lee,2013) data set of educational attainment
LnGDPPC	717	6.8956	1.0298	5.1295	9.3848	Pen World Tables	the national income per person
LnPOP	724	16.099	1.1602	13.879	18.994	Pen World Tables	The total population of a country
LnEMP	724	14.993	1.293	12.207	17.855	Pen World Tables	The total number of people engaged in productive economic activities
LnCK	724	24.778	1.2917	21.889	28.435	Pen World Tables	The level of accumulated capital due to saving and investment
LnFCF	724	2.8968	.51648	-1.2280	4.3151	World Bank	Gross fixed capital formation as a percentage of GGDP
LnUPOP	724	3.4989	.48462	1.9756	4.4677	World Bank	The total size of the urban population
LnTRD	720	4.1989	.47799	2.6928	5.77341	World Bank	The ratio of the total trade (i.e., import plus export) to national GDP
MID	724	.29282	.45537	0	1	World Bank	Middle income dummy which assumes a value of 1 if the country is in the middle category as classified by the world bank, otherwise 0

Appendix B

Appendix Table B1: Lists of countries and mean values of governance institutions

Country	ID	lnSJA	GQ	VA	PSNV	GE	RQ	RL	CC	HC
Angola	AGO	2.130582	-1.26017	-1.25558	-1.13361	-1.17193	-1.25373	-1.41228	-1.33392	1.361142
Benin	BEN	4.214989	-0.1689	0.266396	0.533017	-0.44335	-0.37875	-0.39678	-0.59394	1.523739
Botswana	BWA	4.657352	0.723487	0.588086	1.067835	0.530219	0.59729	0.63274	0.924742	2.607398
Burkina Faso	BFA	4.436408	-0.36244	-0.31251	-0.24021	-0.63527	-0.24929	-0.53166	-0.20567	1.131863
Burundi	BDI	1.602067	-1.29301	-1.11427	-1.93918	-1.2981	-1.16966	-1.21238	-1.02444	1.264374
Cameron	CMR	5.461935	-0.93888	-1.02985	-0.67136	-0.8415	-0.81743	-1.12904	-1.14412	1.803056
Central African Republic	CAF	2.101296	-1.31848	-1.03554	-1.72003	-1.48014	-1.13732	-1.40755	-1.13026	1.43828
Congo Republic	COG	3.85501	-1.13691	-1.1287	-0.93726	-1.1915	-1.20148	-1.24896	-1.11355	2.000335
Dem. Republic Congo	ZAR	2.081521	-1.72009	-1.50325	-2.40868	-1.66925	-1.5958	-1.70729	-1.43628	1.590991
Cote d'Ivoire	CIV	4.71709	-0.94059	-0.89785	-1.28052	-0.89253	-0.65405	-1.11339	-0.80522	1.492009
Ethiopia	ETH	5.647005	-0.96154	-1.20963	-1.39262	-0.71713	-1.07369	-0.76243	-0.61375	1.250761
Gabon	GAB	3.563768	-0.45534	-0.72001	0.300543	-0.64961	-0.35653	-0.47674	-0.82968	2.332142
Gambia	GMB	3.538028	-0.46045	-1.02689	0.255773	-0.62091	-0.43171	-0.36929	-0.5697	1.402539
Ghana	GHA	5.39069	-0.03231	0.256717	-0.07195	-0.08106	-0.11428	-0.01895	-0.16433	2.210005
Kenya	KEN	6.228357	-0.70681	-0.40414	-1.19455	-0.52851	-0.25103	-0.85219	-1.01045	2.06716
Lesotho	LSO	1.92472	-0.14688	-0.10831	0.04302	-0.29953	-0.47992	-0.0799	0.043368	2.036762
Liberia	LBR	0.976679	-1.17278	-0.60418	-1.38274	-1.42458	-1.37997	-1.27451	-0.97067	1.667688
Madagascar	MDG	4.005382	-0.44848	-0.28006	-0.16402	-0.74452	-0.50479	-0.53208	-0.46539	1.594221

Malawi	MWI	4.520296	-0.35261	-0.20994	-0.06919	-0.53327	-0.49951	-0.26395	-0.5398	1.662526
Mali	MLI	3.655342	-0.4222	0.03993	-0.23984	-0.83272	-0.42011	-0.39116	-0.68927	1.220031
Mauritania	MRT	1.930861	-0.56742	-0.8362	-0.25649	-0.54938	-0.47002	-0.71303	-0.57941	1.589824
Mauritius	MUS	3.790405	0.749581	0.879562	0.965336	0.672197	0.66345	0.95671	0.360229	2.395448
Mozambique	MOZ	3.494667	-0.38291	-0.17179	0.069617	-0.52182	-0.43413	-0.70026	-0.53907	1.161901
Namibia	NAM	3.606275	0.330316	0.39087	0.674327	0.160789	0.14902	0.21320	0.393687	2.092194
Niger	NER	3.350271	-0.64128	-0.48319	-0.56984	-0.79688	-0.60777	-0.60747	-0.78254	1.147668
Nigeria	NGA	7.43206	-1.12578	-0.754	-1.71861	-1.02699	-0.8927	-1.18812	-1.17425	1.633099
Rwanda	RWA	2.755321	-0.68168	-1.33888	-0.99761	-0.42858	-0.54874	-0.68335	-0.09291	1.508193
Senegal	SEN	5.039578	-0.18429	0.076099	-0.38081	-0.27051	-0.19377	-0.14564	-0.19114	1.398857
Sierra Leone	SLE	1.937011	-0.93303	-0.49856	-0.84635	-1.269	-1.04609	-1.05658	-0.88162	1.447756
South Africa	ZAF	8.536566	0.330437	0.675996	-0.18655	0.554749	0.47065	0.14678	0.320986	2.342954
Sudan	SDN	4.886726	-1.5656	-1.73068	-2.35859	-1.26173	-1.3652	-1.43474	-1.24265	1.467113
Swaziland	SWZ	2.88311	-0.58437	-1.35801	-0.17518	-0.66557	-0.46464	-0.57719	-0.26563	1.697869
Tanzania	TZA	5.3801	-0.44388	-0.32305	-0.40839	-0.5229	-0.41359	-0.36132	-0.63402	1.554498
Togo	TGO	3.313712	-0.85459	-1.03103	-0.36321	-1.24999	-0.74342	-0.85099	-0.88889	1.735146
Uganda	UGA	5.308445	-0.64169	-0.68399	-1.18079	-0.50251	-0.10947	-0.47792	-0.89547	1.863473
Zambia	ZMB	4.109119	-0.37523	-0.28665	0.227111	-0.77672	-0.45509	-0.41265	-0.5474	2.208529
Zimbabwe	ZWE	5.038958	-1.27833	-1.28128	-1.00652	-1.04894	-1.71193	-1.47532	-1.14601	2.276592