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TECHNOLOGY STARTUPS ENTERPRENEURIAL REVIVAL AND THE NEW FRONTIER FOR AFRICA'S ECONOMIC SECURITY

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ABSTRACT

Africa has been perennially touted as a continent heavily dependent on foreign aid. However, the strength of this assertion appears to be eroding. Six out of the ten fastest growing economies in the world are from Africa. Together with other affirmative statistics, there is a growing belief that the continent is at the threshold of reigniting development for economic security. A critical factor evident in this trend is the rise of entrepreneurship on the continent. In this regard, a sector that is experiencing a lot of growth and investment and touted for being at the forefront of the entrepreneurial revival is the Tech Startup sector. From a neoliberal perspective, this article explores tech startups as channels for entrepreneur-induced development. It particularly highlights the extent to which the solutions of tech startups are driving Africa's quest for economic security.

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1. Introduction

The quest for development among African countries has been persistently marked by heavy reliance on foreign aid from the advanced industrialized economies. Yet, due to economic mismanagement, corruption and political instability, among others, much of the foreign assistance has not resulted in substantial growth and development. In some cases, periods of increased development aid also saw a decline in the real per capita income of most African countries.¹ This trend, however, appears to be changing. The International Monetary Fund's (IMF) *2014 World Economic Outlook Report*, for instance, notes that of the ten fastest growing economies in the world, six will be from Africa.² An earlier report by the *Economist* pointed out that six of the ten fastest growing economies from 2000 to 2010 were from Africa and, forecasts that the continent will host seven out of the ten fastest growing economies by the end of 2015.³ Similar statistics have thrown new light on economic performance of African countries and thereby engendering optimism that the countries are at the threshold of reigniting their economic development. Contrary to past efforts, however, the current picture is hardly aid induced. Rather, it is wheeled by an increase in foreign direct investment and a surge in entrepreneurship.⁴ This phenomenon is observed all over the continent, where infant entrepreneurial concerns are addressing the myriad of challenges confronting African countries.

A phenomenon which is seeing a lot of growth and investment and touted for being at the forefront of the surge in entrepreneurship in Africa is Tech Startups.⁵ Technology Startups are a global trend in entrepreneurship generally manifesting as newly created companies adapting technology towards the development and implementation of

solutions to challenges confronting individuals and organizations. Brands such as Facebook, Google, Microsoft, and WhatsApp are global examples of Tech Startups.

Africa's Tech Startup sector was first captured on the global radar following the activities of M-PESA in Kenya in 2007. Known popularly as mobile money, M-PESA enabled the conduct of financial transactions via mobile phones. This is now being replicated in India, Afghanistan, Egypt, Ghana and parts of Eastern Europe, among others.⁶

One of the consequences of M-PESA has been the surge in Foreign Direct Investments (FDIs) from Microsoft, Intel, IBM, Google, among others to startups in Africa. The year 2013 saw the largest of such investment on the continent.⁷ States are also touting a renewed belief in the ability of technology startups to promote development in Africa. The United States, through the State Department, is using initiatives such as DEMO Africa to promote and support tech startups.⁸ In Nigeria, the National Information Technology Development Agency (NITDA) has announced plans to support the growth of technology, especially startup innovations with 1.5 billion Naira.⁹ African States are also being encouraged by the United Nation's Economic Commission for Africa to develop ICT policies with emphasis on creating the enabling environment for small businesses to thrive.¹⁰

With the increasing proliferation of mobile devices and access to cheaper Internet bandwidth, and with most African countries hosting similar socio-economic landscapes, solutions from tech startups can be replicated across the region. Developments in the tech-startup sector represent the core of entrepreneurial revival expected to engender growth and development towards an assurance of economic security in African countries.

This article explores the entrepreneurial revival manifesting in the tech startups on the continent and the extent to which it engenders economic security in Africa. This will be achieved by deconstructing Africa's tech startup ecosystem and examining how its various components operate. The article then presents the contribution of tech-startups to economic security while highlighting some constraints. It particularly focuses on the extent to which the solutions of technology startups are driving Africa's quest to develop in key sectors.

2. Africa's Economic Security Landscape and the Entrepreneurial Missing Links

The entrepreneurial history of African countries predates colonialism.¹¹ Evidence of this resides in the numerous routes established to facilitate trade between the hinterlands and the coastal communities, including foreign traders. One of such routes, the Trans-Saharan trade route of the fifteenth century,¹² for instance, led to the growth of African cities and kingdoms including Jenne, Gao, Timbuktu, Kumbi and Ghana, which promoted innovation and led to the building of large craft industries. The entrepreneurial activities included the setting up of indigenous establishments for the exchange of manufactured goods – silk and cotton cloth, beads, mirrors – from North Africa with commodities of the West African savanna – gold, ivory, gum, kola nuts and captive slaves.¹³ However, the trans-Atlantic slave trade and the economic consequences of European trade with Africans led to a reduction in entrepreneurial activities on the continent, as the people looked more and more to the West and their colonial powers for technology and innovation.

After independence, most African states organized their societies with development strategies based on the dominant role of the state, with public sectors driven by governments controlling the “commanding heights” of the economy.¹⁴ This was due in part to the fact that the new African states inherited an economic system that was structured around the economies of their colonial masters which usually involved supplying raw materials to “feed” the latter’s industries. In addition, due to the commodity booms of the 1960s and 1970s, African states had enough resources to pursue ambitious socialist-inclined entrepreneurial ventures aimed at the state owning the means of production in order to share the proceeds equally to its citizens. Consequently, entrepreneurial pursuits from the private sector were very low.¹⁵

Soon, the deficiencies of such a system became apparent. The end of the commodity boom, the inefficiencies of the State-Owned Enterprises (SOEs), the development of the bloated administrative state – one in which the government is envisioned as playing an omnipresent role in driving industrial development and socio-economic progress –

and the oil price hikes in the late 1970s plunged African economies into serious debt and a probable collapse.¹⁶ Following from this, African leaders saw the need to join efforts to put together plans for more sustainable economic development. This led to the Lagos Plan of Action in 1980, which was aimed at enhancing Africa's self-sufficiency by decreasing reliance on the extraction of raw materials, promoting industrialization, and equity in global trade relations, as well as an increase in development aid from the international community.¹⁷ The Lagos Plan of Action was stillborn as the release of the Elliot Bergs' Commission report in 1981 eventually led to the Structural Adjustment Programs (SAPs) by the Bretton Woods institutions.

It is widely believed that the externally imposed Structural Adjustment Programs (SAPs) introduced by the Bretton Woods institutions as a response to the economic malaise in some African countries, brought entrepreneurship and private sector participation onto the agenda for economic development.¹⁸ Structural Adjustment Programs emphasized the liberalization and privatization of the economy. These are necessary ingredients for entrepreneurship and thriving enterprises. With SAPs, the economic structure of African states began to shift from one of a state dominated and centrally planned economic structure to one where economic liberalization enhanced the role of the private sector in nation building. This was done through initiatives expanding support for the private sector, creating the enabling environments for business to thrive, and promoting economic integration with other States.¹⁹ Economic liberalization enabled entrepreneurship to take off on the continent, albeit very slowly.

This entrepreneurial revival is reflected in the emergence of a wave of very optimistic recent reports on the performance of the African private sector. Accenture (2010),²⁰ in a study entitled "Africa: the New Frontier for Growth," argues that the moment is right to look beyond BRIC (Brazil, Russia, India and China) to view Africa as the new emerging market, because Africa's gross domestic product (GDP) growth of more than five percent during the 2000s makes it the second fastest growing region in the world. They continue that this growth is very profound considering Africa's very poor average growth rates of 2.5 per cent in the 1980s and 2.3 percent in the 1990s. The report con-

cludes that this very impressive manifestation of growth from the continent presents new opportunities for African businesses, which are growing faster than their peers are in other parts of the global economy. A similar report by McKinsey Global Institute (2010)²¹ entitled “Lions on the Move,” also announced the claim of progress and the potential of African economies. They projected Africa’s GDP in 2020 to be at \$2.6 trillion, consumer spending to rise to \$1.4 trillion, and 128 million households to obtain “discretionary income”. From these projections, McKinsey forecasts that in the near future a dynamic African business sector will play an increasingly important role on the world economic stage. They claim that already 100 companies with revenues greater than \$1 billion can be identified on the continent. Further, a report by Ernst and Young in 2011 based on interviews with 500 business leaders portrays Africa’s economic development positively, pointing to stronger foreign direct investment (FDI) flows, improved investor confidence, and, in general, a positive macroeconomic outlook as signals.²² Adding to these, a study by the African Development Bank (AfDB), also in 2011, notes that manufactured exports from Africa roughly doubled during the 2000s.²³ Additionally, with FDI inflows to Africa at \$62 billion in 2009, the United Nations Economic Commission for Africa (UNECA) reported a dramatic increase in FDI on the continent during the 2000s as an almost sevenfold increase in just a decade.²⁴ These developments paint a picture of an African private sector that is poised to ultimately be the engine of growth in the continent.

The entrepreneurial renaissance cannot be fully understood by looking at macroeconomic figures alone. There are several studies pointing to positive developments at the entrepreneurial level that are contributing to the phenomenon. First, a study by the Organization for Economic Cooperation and Development (OECD) Center for Development in 2009 argues that growing numbers of businesses in Africa are moving from informality to formality due to improved governance and market institutions. Second, scholars like Olomi (2009), Kelley et al. (2010), and McDade and Spring (2005) argue that the world is currently witnessing the emergence of an African entrepreneurial class striving to develop medium and large-scale enterprises in the modern formal sector. Third, a number of studies describe the rise of “national cham-

pions." For example, the Boston Consulting Group (2010) released a report on the 40 fastest growing and globalizing African companies in which they suggested that a new "African Capitalism" is being defined because of "African Challengers" that are emerging from the "overlooked continent". Finally, several reports (for example, Accenture, 2010; McKinsey Global Institute, 2010; Ernst and Young, 2011) highlight the rapid increase in the number of foreign multinational corporations (MNCs) in the African business sector encouraged by improved conditions of doing business and changing views of Africa among decision makers of MNCs.

3. The Phenomenon of Startups in the Global Economy

Entrepreneurship in Africa is gaining increasing importance and is gradually being pushed as the solution to Africa's development challenges. Although the private sector includes companies of varying sizes from large multinationals to the small and medium sized enterprises (SME), the SME sector in particular is a very significant player. For example, SMEs accounted for 3.2 million jobs and 18 percent of Kenya's GDP in 2003 and were responsible for 95 percent of Nigeria's manufacturing in 2005.²⁶ Further, in Ghana, data from the Registrar General show that 90 percent of companies registered are in the realm of SMEs²⁷ and 70 percent of Ghanaians are employed in microenterprises.²⁸ For South Africa, SMEs account for almost half of the country's GDP and nearly a fifth of employment.

The importance attached to the SME sector and its prospects for development has led to many initiatives especially on the part of governments and international organizations to support it. In Egypt in 2004, the government passed an SME law (No. 84/2014) to improve and support the development of SMEs and set up a Social Fund for Development through its support programs to enhance the growth of SMEs.

The number one trend that gives credence to the entrepreneurial renaissance across the globe is tech startups.²⁹ Startups are new ventures aiming for high growth often with funding from venture capitalists. They pursue global opportunities based on introducing customers to innovations that have a clear competitive advantage and high growth

potential. Although most people automatically associate the term startup with tech startups due to its popularization by Silicon Valley's new technology ventures, it has grown to be representative of just more than tech startups. It is now very fashionable for almost any business venture starting out to describe itself as a startup. In this work, however, any reference to startups refers to those emerging from the technological industry. Eric Ries defines such tech startups as a "human institution designed to create a new product or service under conditions of extreme uncertainty."³⁰ Steve Blank, a technology startup expert, defined a startup as an organization formed to search for a repeatable and scalable business model.³¹ Through these definitions, it can be established that the key attributes of a technology startup are that it focuses on innovation and scalability. The former refers to the extent of originality or improvement engendered from the application of completely novel or pre-existing technologies in a way that enhances processes, productivity or outcomes relating to people and businesses. Scalability usually refers to a firm's ability to grow. Technology startups are not just expected to grow but are expected to have a high growth potential that is unconstrained by geography. This is because their solutions are believed to have a global reach due to technology and the Internet.

With a global economy increasingly hinging on information and tech startups occupying the core of this information age, the proliferation of startups portends significant prospects for the future of the global economy. A special report by the *Economist* on tech startups described this phenomenon as "a Cambrian moment," equating the explosion in the rise of new startups to a biological evolution that occurred 540 million years ago where life forms began to multiply leading to what is popularly known in biology as the "Cambrian Explosion."³² This allusion of tech startups to the Cambrian explosion supposes that tech startups like the Cambrian explosion are "reshaping entire industries and even changing the very notion of the firm."³³ It is noteworthy, for instance that the significant achievements of Alibaba, the retail giant, have been achieved without any physical inventory or huge outlays of infrastructure. Many such operators in the tech industry owing their origin to small startups today harness the power of technology while

barely registering ownership of inventory, services or information traded or supplied on their platforms.

According to the *Economist*, the explosion in the number of tech startups is caused by “cheap and ubiquitous building blocks for digital products and services”.³⁴ Others are services for sharing code (GitHub), finding developers (eLance, oDesk) and testing product usability (UserTesting.com). Additionally, “application programming interfaces” (APIs), digital plugs that are multiplying rapidly and allowing one service to use another, are one of the cheap and ubiquitous building blocks for tech startups. For example, a person designing a product can integrate these “APIs” into his product - (Twilio), maps (Google) and payments (PayPal) — without having to rebuild them. The most important of these building blocks are services that can play host to startup technologies, as well as make available, distribution and marketing opportunities. These are collectively referred to as platforms and can include such Application Stores on both IOS and Android and social media such as Twitter and Facebook. This makes the Internet a key platform in any startup ecosystem.

Tech Startups, unlike other firms, usually operate in communities where they support each other to thrive. These communities consist of entrepreneurs, and large companies. Silicon Valley, arguably one of the largest of such tech communities in the world, for instance presents an environment for hosting and nurturing multiple startups by bringing together entrepreneurs, investors, mentors, and service providers among other stakeholders. Countries around the world are doing their best to recreate and compete with Silicon Valley.³⁵ The Chilean government has established the Startup Chile program “to attract world-class early stage entrepreneurs to start their businesses in Chile.”³⁶ China is also investing significantly towards replicating a Silicon Valley-style ecosystem. Similarly, Canada is promoting a startup visa hoping “some of Silicon Valley’s top tech prospects from around the world will consider setting up shop north of the border.”³⁷ In Kenya, a presidential decree has opened 30 percent of public contracts to young entrepreneurs, especially in its tech startup ecosystem.³⁸ All these efforts are increasing the boom of startup ecosystems across the world with Israel

having been able to closely follow Silicon Valley and earning the entire country the name “Startup Nation”.

4. Overview of Africa’s Startup Ecosystem

The revolution in the rise of the number of startup ecosystems across the world is not leaving Africa behind. Over the years, across its major cities, more and more startup ecosystems are springing up in Africa. The most vibrant startup ecosystems are found in Nairobi, Cape Town, Accra, Lagos, Dakar, Kampala, Dar Es Salaam and Johannesburg. In total, there are fully developed startup ecosystems in varied shapes and sizes in at least 29 African countries.³⁹

So many factors contribute to the increasing number of startup ecosystems; chief among them is the expanding coverage of the Internet. The Internet is known to increase productivity of an economy, be it already developed or not. Empirical research has proven, with specific reference to developing countries, that a 10 percent increase in broadband and a 10 percent increase in wire line Internet penetration are associated with a 1.38 percent and a 1.12 percent increase in GDP growth, respectively.⁴⁰ According to an International Telecommunications Union (ITU) report in 2013, Africa was the fastest growing region in terms of mobile broadband. This included 93 million subscriptions, 11 percent penetration and an 82 percent cumulative annual growth rate (CAGR) between 2010 and 2013.⁴¹ Painting the picture more clearly, a decade ago there were roughly 10 million Internet users in the entire African continent. This figure has since increased annually. These developments have largely been pushed by the opportunities provided by the proliferation in the number of undersea cables connecting to Africa even since 2009.

The Internet is the backbone of the startup ecosystem and this has led governments such as Rwanda, Morocco and Nigeria to emphasize internet-driven growth by expanding high-speed Internet access to most of their populations. The consequent prospect for tech startups is the growing innovation in web-based ventures addressing virtually all aspects of the human endeavor on the continent.

Tech startup ecosystems have various components. An understanding of the tech startup ecosystem in Africa will not be complete without looking at the roles of the various components that enable it to thrive. In the following section, we will be looking at the main components of the startup ecosystem which are the regional and national policies, tech hubs, venture capitals, big tech companies, and the pool of skills and talents.

The journey towards developing a comprehensive startup ecosystem for the African region has gained traction with the development of regional and national policies. Recognizing the important role that ICTs play in helping countries attain development goals and the multiplier effect that it has on growth and socio-economic development, the Economic Commission for Africa (ECA) took up the challenge and launched the African Information Society Initiative (AISI).⁴³ The initiative was a shared vision to bridge the digital gap between Africa and the rest of the world and to create effective digital opportunities to be developed by Africans and their partners to speed the continent's entry into the information and knowledge-based global economy. The AISI established the National Information and Communications Infrastructure (NICI) whose main role is to develop and implement policies and plans within the wider national socio-economic development objectives, strategies and aspirations of African states.⁴⁴ In Ghana, an ICT for Accelerated Development (ICT4AD) policy was developed in 2003 simultaneously to focus on developing the ICT industry while at the same time using ICTs to drive other sectors of the economy. In addition, the government established the Ministry of Communication to manage the convergence of communications and technologies to promote a viable integrated national development process within a global setting. Kenya, through its Vision 2030 policy, recognizes ICT as a foundation for a knowledge economy. The government in its effort to drive the development of the ICT sector launched its first National ICT Master plan, meant to drive citizen adoption of the vision 2030 priorities through ICT policies and initiatives.⁴⁵ The Master plan projects that by 2017 Kenya's ICT industry will be contributing an estimated US\$2 billion (some 25 percent of Kenya's GDP) and will have created approximately 500 new tier-1 ICT companies and over 50,000 jobs.⁴⁶ Most other African coun-

tries have adopted similar ICT for development policies. These policies have provided the foundation needed for tech startups to thrive although there is still more that can be done relative to ICT policies.

Beyond the regional and national policies, one of the main sources of locally developed applications created by tech startups is the technology hubs that are springing up across Africa. Technology hubs provide a unique environment where technology startups can start faster. They nurture a network of entrepreneurs, providing places where they can work, meet, collaborate, network and learn. They believe that by getting the right people together in a physical space, good things happen. Within less than five years, the number of tech hubs on the continent has more than increased 10-folds. There are now more than 90 technology hubs across the continent, and more than half of Africa economies have at least one. They are located mostly in urban centers.

Hubs such as MEST in Ghana, the Co-Creation Hub in Nigeria and iHub in Kenya are widely regarded as models.⁴⁷ The latter was recently named by *Fast Company* magazine as one of the most innovative companies. The trend of increasing tech hubs development and the economic development potential they hold has impressed the Kenyan government so much that it has committed to establishing a tech hub in each of its 47 counties.⁴⁸ A study shows that startups that are part of hubs or participate in sector events are 23 percent more likely to get funding from investors or venture capitals.⁴⁹

Connecting all these tech hubs in Africa is a pan African innovation hub network called AfriLabs. AfriLabs currently is an expanding network of 36 technology innovation hubs in 18 countries across Africa. It aims to build an innovation infrastructure by supporting the development of startups, technology, and innovation that will encourage the growth of Africa's knowledge economy. According to AfriLab's Executive Director, Tayo Akinyemi, the network's contribution to Africa's startup ecosystem is in "investing in building tech hubs, their infrastructure and ensuring the efficient distribution of resources."⁵¹ AfriLabs also provides best practices, mentoring, networking opportunities and other resources for hub managers and entrepreneurs. With more than 200

hubs springing across the continent, it is fast becoming the stamp of recognition for tech hubs in Africa.

In addition to the hubs, the main agents of high growth financial investment in Africa's startup ecosystem are Venture Capitals (VCs) and Angel investors. Venture capitals operate by owning equity in the startups in which they invest. This helps them generate economic returns for themselves and their investors. For instance, 88mph, invests up to US\$ 100,000 per startup in early stage mobile web tech startups targeting the African market.⁵¹ Other noted Venture Capitals on the continent include IntelCapital, Sawari ventures, Adlevo Capital, Jacana Partners, and Gold Venture Capital Limited. Many of the venture capitals on the continent have come together to form the continent's largest online community of investors called VC4Africa. Angel investors, usually referred to as angels, are high-net worth individuals who provide capital for startups in exchange for convertible debt or ownership equity. Angel investing is rising on the continent with VC4Africa reporting that angel investors have invested more than \$27 million through its network on the continent. Governments recognizing the important role finance plays in developing an effective startup ecosystem have also established venture capitals and other financing mechanisms to boost the activities of tech startups. In Ghana, the government established Venture Capital Trust Fund to provide low cost financing to SMEs which then went on to set up the Ghana Angel Investment Network (GAIN) – a network to provide a formalized way to attract investors to invest in startups. The government also launched the Ghana Alternative Market, a sort of stock exchange market for startups, which seeks to provide an alternative exit route for VCs and then enable startups and SMEs to raise capital to support growth and expansion. Since the venture capital industry in Africa is still nascent and a lot of the affluent do not yet trust the tech startup model, many tech startups seek funding from abroad. For instance, a Silicon Valley based venture capital firm EchoVC, which has invested in Facebook, LinkedIn and Bit.ly, has committed around \$30 million to tech startups in Sub-Saharan Africa.⁵²

Another component of Africa's startup ecosystem is that big technology companies are increasingly establishing offices on the continent. Although this trend is attributable to governments becoming

more stable, increasing urbanization and the rise of mobile computing, their influx is leading to technological transfers and infrastructural investments that are essential for the startup ecosystem. For instance, in terms of infrastructure, Google has initiated Project Link which seeks to build a super-fast, high-capacity fiber network to enable any local mobile operator and Internet Service Provider to “connect more people to faster, more reliable Internet.”⁵³ It has already launched this in Kampala and is set to launch in Accra very soon. In addition, Microsoft has rolled out white spaces pilots in Kenya, South Africa, Tanzania, Ghana and Namibia meant to enable the delivery of broadband internet using dynamic spectrum access with unused spectrum usually used to deliver Television channels.⁵⁴ In addition to building infrastructures that creates opportunities for entrepreneurial pursuits, these big technology companies also invest directly in the startup ecosystem. For instance, IBM has established innovation centers in Lagos and Casablanca which give entrepreneurs of tech startups access to IBM technology and expertise as well as sales training and business and marketing support.⁵⁵ Additionally, in 2013, Microsoft launched its 4Afrika program which gives grant directly to tech startups and partners with tech hubs and startup incubators.⁵⁶

The most important component of the startup ecosystem is the tech entrepreneur or startup founder. For technology startups, entrepreneurs are usually referred to as founders and it is common to find a startup with two or more co-founders. Although it does not apply in most cases, the founders are expected to have complementary skills with the norm being one having technical skills and the other business skills. An important determinant of an ecosystem’s success depends on the talent of its entrepreneurs and developers. That is to say, tech startups need software engineers in order to realize their ideas. Although the supply and quality of software developers on the continent is low, there is a lot of emphasis on the acquisition of ICT skills in Africa with states inculcating ICT in their educational curricula and numerous private IT institutions springing up around the continent to meet the demand.⁵⁷ In Africa, the higher education system has been expanding at almost twice the global rate over the past 40 years. Even more importantly, about half of the students enrolled are studying social scienc-

es, business and law, which are fundamentally skills for entrepreneurs seeking to build a business. In addition, increasingly there are Africans who go abroad and return with skills relevant for the startup ecosystem. The number of Ghanaian students studying abroad more than quadrupled from 1900 students in 2007 to 9100 in 2012, and this is providing a big pool of talents from which entrepreneurs emerge.⁵⁸ In addition, institutions such as the Meltwater Entrepreneurial School of Technology (MEST) in Ghana have structured programs solely to produce tech entrepreneurs and have graduated over 200 students since 2008.⁵⁹ These initiatives have led to the belief that Africa has the right pool of talent to support the startup ecosystem and to boost a healthy generation of innovative startups which will help promote the development agenda of the continent.

Governments also form a huge part of the startup ecosystem since organizations and institutions require a stable and good political environment to function effectively. Although governments in most African states are often associated with corruption, lack of vision and poor regulation which often tend to stifle entrepreneurship, there are signs that they are recognizing the increasing importance of tech startups and taking concrete steps to encourage their development. Kenya has been lauded as the most innovative country in technology by far because of good regulations and Governmental support.⁶⁰ In addition, the Kenyan government is planning a development known as Konza Techno City which will be a special economic zone aimed at attracting tech startups and other technological companies. In Ghana, the government cut sods for the establishment of tech parks, similar to Silicon Valley, in Tema and Cape Coast.

Universities are also ecosystem enablers. In the U.S., a survey done on Stanford Alumni Network revealed how former students help create jobs, revenues and social impact through enterprise, in particular startups.⁶¹ Universities also run entrepreneurial programs and sometimes provide funding to students with the best ideas to establish their ventures. Although this is not a big part of the operations of startup ecosystems in Africa, some universities are beginning to take note of global trends and are initiating programs to support the advancement of tech startups. For instance, in Ghana, the Kwame Nkrumah University of

Science and Technology has established a tech hub meant to foster an innovative and entrepreneurial community building tech startups.

Mobile operators perform two crucial roles in the startup ecosystem. First, since most of the products and services by tech startups are mobile, they rely heavily on mobile operators to distribute their products and services to customers. Mobile operators provide their own direct app stores where consumers can access the apps and pay locally for the apps because they lack local payment options for applications on major app stores like the Android Play Store. Second, mobile operators are increasingly supporting the tech startup ecosystem by directly investing and supporting their activities. For instance, Airtel run an app challenge across some countries on the continent, where winners who brought about innovative ideas were given funding and mentorship to develop their ideas into tech startups.

5. Tech Startups and Africa's Economic Security

States have long recognized the important role that technology plays (technological change) in helping them achieve their developmental goals. Particularly, with the introduction of the Information Communication Technology for Development (ICT4D) in the early 2000s, there was optimism in the role of technology to help countries attain the Millennium Development Goals (MDGs) and the related multiplier effect on the general growth and socio-economic development of states. To this end governments, international donors and multinational corporations have focused attention on developing the ICT sector to accelerate the level of development on the continent.

Added to this appears to be the growing shift in development cooperation towards private sector development where entrepreneurship is seen as a key factor. Here, the creation of new business firms is widely held as a panacea for the ills of the current structure of the global economy. In fact, in 2009, President Obama elevated entrepreneurship as a critical pillar of U.S. global engagement and as a means to deepen the partnership between the United States and the international

community.⁶² Emphasizing this, President Obama at the Global Entrepreneurship Summit held in Kenya expressed that:

Everywhere I go, across the United States and around the world, I hear from people, but especially young people, who are ready to start something of their own...to lift up people's lives and shape their own destinies. And that's entrepreneurship. Entrepreneurship creates new jobs and businesses; new ways to deliver basic services; new ways of seeing the world...it's the spark of prosperity. It helps citizens stand up for their rights and push back against corruption. Entrepreneurship offers a positive alternative to the ideologies of violence and division that can all too often fill the void when young people don't see a future for themselves...⁶³

Added to this, the World Bank, the United Nations, donor states and other developmental partners have joined the bandwagon in promoting entrepreneurship as part of the panacea to development ills of developing countries. The *Economist* described this effectively, in its assertion that entrepreneurship is "an idea whose time has come."⁶⁴

It makes sense then for the intersection of ICT4D and entrepreneurship to be perceived as being important to the developmental agenda of African states. In fact, three pillars of the fourteen pillars of Ghana's ICT4D strategy are aimed at enhancing the operations of entrepreneurs and the private sector: facilitating the development of the private sector, developing export oriented ICT products and services industry, and developing a globally competitive value-added services sector as a regional business service and ICT hub.⁶⁵ For Kenya, a key pillar of their Vision 2030 development strategy, which aims to maintain a sustained economic growth of at least 10 percent per annum from 2012 and beyond, is Informational Technology Enabled Services (ITES). Konza Technology City, the flagship project under ITES pillar, aims to create more than 20,000 direct jobs and increase its contribution to the Kenyan GDP by ksh10 billion.⁶⁶

Tech Startups are right at the center of this intersection. As we saw in the previous section, they are built around a vibrant ecosystem that seeks to champion their cause and spread their goodwill. Tech entrepreneurs, developers and other stakeholders meet regularly in events across African cities where they discuss how their activities could promote development. An example of such events is Barcamps. Barcamps, a global phenomenon of “tech un-conference” originating from Silicon Valley, has been the launch pad of some of the successful technology innovations on the continent. For example, Barcamp Nairobi was very instrumental in developing the idea of Ushahidi and bringing its founders together. It also eventually led to the creation of the iHub, one of the biggest tech hubs on the continent.⁶⁷

Wennekers and Thurik⁶⁸ offer a systemized way to look at the contribution of entrepreneurs to the economic development of states. To analyze the contribution of tech Startups to the economic security of African countries, we will apply Wennekers and Thurik’s division mainly for its explanatory ease. Wennekers and Thurik attribute economic development through entrepreneurship to three main processes or entrepreneurial activities: enhanced competition (productivity), innovations, and job creation. It is important to note that these processes or activities might have overlapping properties and as such might not be mutually exclusive.

Innovation is often cited as the most important contribution of tech startups to economic security in Africa. Innovation involves the translation of an idea into one or multiple applications. Quite often a lot of technology entrepreneurs claim to be innovative, which usually involves bringing new-to-the-world ideas into technical, market or business model domains. It also involves the entrepreneurs’ awareness to build a competitive advantage based on the capabilities to utilize resources and doing something distinctive with them – what Schumpeter calls “new combinations.”⁶⁹ Technology, business processes and business models are some of the various ways in which innovations are manifested. This is to suggest that it is not only by producing a particular technology that innovation is born. Variations in the process and business models can also lead to innovation.

According to Wim Naude,⁷⁰ entrepreneurs in developing countries have a “much greater propensity for innovation than is often recognized in the literature or by policy makers.” This can be attributed to the fact that technology entrepreneurs on the continent often try to use technology to find localized solutions to localized problems and attempt to solve problems of global proportions. The often-cited story of MPE-SA (known popularly in other parts of the continent as mobile money) is still very relevant in this context. MPESA — a SMS based money transfer system that allows individuals to deposit, send and withdraw funds using their mobile phones — could not have taken off or started in the West. This is because they have a well-structured formal financial sector unlike that of Africa where a majority of the population is in the informal sector. As such, it makes sense that such a solution will come from the continent since the problem of safe cash transfers was peculiar to African economies. Currently, more than 45 percent of Kenya's GDP flows through MPESA and since 2009, the country has increased access to formal financial services to 67 percent from just about 41 percent of adults.⁷¹ Most people refer to this development when they emphasize the potential for economic development by tech Startups. Its ability to have rippling effects on other industries and create indirect employment to other sectors has been marked as the main reason to promote the activities of tech entrepreneurs.

This type of localized solutions to localized problems can be found in other sectors of the economy. A famous example in the entertainment sector is the solution by IROKOTv. IROKOTv, a Nigerian-based startup often called the “NetFlix of Africa,” is a web platform that provides paid-for Nigerian and Ghanaian films. Charging a subscription fee as low as US \$3 per month, it has proved popular with people in the Diaspora and has become a medium for filmmakers to get dividends from their toils by helping to ease the effect of piracy on their revenues.⁷⁰ Another innovative tech startup in the entertainment industry is Leti Arts, based in Ghana and Kenya. In the CEO's own words:

We are in a very unique spot in terms of entertainment, especially in video games. We want to use technology to make entertainment fun. In that way, we leverage on African history

and folklore and use technology to present it in a format that younger generations of today can relate [with]. We are creating an industry too, since it's a new space, we want more people to dive in...what we are trying to do is what the Japanese did with their culture, Naruto games and comics.⁷³

In agriculture, there is Farmerline based in Ghana and expanding across West Africa, which uses voice SMS to provide agricultural extension services to farmers using mobile phones. Then there is eSo-ko, another Ghanaian startup that provides a market place for farm produce, making farmers and customers know the current price of a commodity before going to the market. In health, the tech Startup, Gifted-Mom uses low cost technology to help mothers and pregnant women access medical advice in rural communities. This Startup has set itself the ambitious goal of solving one of Africa's biggest and oldest problems – that of maternal and infant mortality – starting from Cameroun.

We can go on and on about how widespread the reach and how grand some of the problems are that the Startups are attempting to solve. What we see from this, however, is that their solutions inevitably increase the welfare of many people. By solving a problem unique to the African geography, which will have most likely remain unsolved, Tech Startups have claimed a recognition of being at the threshold of bringing increased development to the African continent.

Critics argue that some of the products put forward by technology startups cannot be classified as being innovative. They posit that those startups mostly replicate innovations from developed countries that have worked and as such are not coming out with anything original. They explain that this is because of two main factors. First, unlike developed startup ecosystems like Silicon Valley, many of the innovations developed here are not based on research and development. Very few technology hubs, not to mention Startups, have research facilities. As such, no serious research is done to address the myriad of challenges facing the continent. This could probably lead to half-baked ideas and prevent the solution or innovation from having the desired impact. Second, there appears to be a disconnect between tech Startups and the Universities. Whereas universities like Stanford and MIT play a huge

role in the Startup ecosystem in the United States or other developed countries, the idea of technology entrepreneurship in African universities are yet to be established. However, this appears to be improving as some universities are having tech hubs of their own. Kwame Nkrumah University of Science and Technology (KNUST) in Ghana and Strathmore University in Kenya all have very functional tech hubs that are helping in building tech Startups right from the universities.

In spite of these criticisms, others are of the view that the act of adapting innovations from other parts of the world to suit the local context is in itself an innovation. This is because certain solutions although available in the developed countries might not be readily available in developing regions like Africa. However, since such software's appeal and tendency to enhance productivity is universal, it becomes necessary for African Startups to create local versions that can be easily accessed. For example, the Startup called Rocket Internet has been very successful in replicating and adapting innovations from the developed countries that have worked in the African context and have been operating with offices in Nigeria and Ghana. Some of their products are Jumia, which is adapted from Amazon, and Kaymu, adapted from E-bay.

With regard to job creation, a study by Vosloo lists the general advantages of small firms in developing countries as having a higher propensity of innovations per employee, greater flexibility, higher growth, and job creation rates as well as being better suited to serving limited or specialized market niches.⁷⁴ Further, studies by Audretsch et al. have concluded that countries that have gained a greater share of smaller firms often tend to experience higher economic growth and development.⁷⁵ Even more, a study of job creation in Sweden by Anderson and Delmar define Startups as the top ten percent of job creators in absolute numbers. Enrico Moretti in the *New Geography of Jobs* posits, "attracting a software engineer triggers a multiplier effect, increasing employment and salaries for those that provide local services...research shows that for each high tech job, five additional jobs are created outside the high tech sector."⁷⁶ Inferring from these studies, it is expected that startups on the continent will report a similar level of job creation in Africa. Evidence found on the continent and opinions from interviews point to a similar trend.

High levels of unemployment remain a chronic problem in the development efforts of most developing countries. In the particular case of Africa, this is compounded by the continents burgeoning youthful population accounting for more than 60 percent of the continent's population and approximately 45 percent of the total labor force.⁷⁷ In spite of this trend, most African countries in complying with the conditions imposed by the Structural Adjustment Policies of the Bretton Woods institutions have retrenched large numbers of public sector workers. For instance, in early 1995, the Zimbabwean cabinet ordered all government ministries to reduce their staff by 40 percent, which translated to approximately 10,000 people losing their jobs by the middle of the year.⁷⁸ Currently, in complying with directives from the IMF, there has been a freeze on employment in the public sector in Ghana. These developments have compounded the unemployment situation in the country with the result being mass graduate unemployment.

This has led African governments to look for ways to enhance employment and job creation. In Ghana, on April 15, 2015, the government launched the National Employment Policy that puts the onus of job creation on the private sector.⁷⁹ It states, "Government policy on employment generation will emphasize the provision of a favorable environment for private investment and job creation. Government will continue to maintain stable and favorable macroeconomic policies, pursue vigorous human resource development, and provide basic infrastructure and additional incentives to support a vibrant private sector as the engine of economic growth and job creation in Ghana." The National Employment Policy also goes on to acknowledge tech Startup as the fastest job creators in the country. It states, "Information Technology/Business Process Outsourcing firms (Tech Startups) are the fastest employment generators in Ghana today. Affiliated Computer Services (ACS) which was established in the country in November 2000 with 85 workers employed 1400 persons in early 2004 with an end of year projection of 2000 persons."⁸⁰

Also, since Startups are young firms, they do not directly employ many people but indirectly have been a 10-fold multiplier. Explaining further, Cecilia Guilford of the World Bank intimated that,

“they need people, they need services, they create services and there's employment attached to that.”⁸¹

However, although tech Startups are among the fastest growing employers on the continent due to their high-growth nature, traditional large companies, agriculture, and the government remain the largest employers on the continent.

Beyond the above, one of the ways that innovative entrepreneurship promotes economic growth and development is through increased competition. A study by Geroski concludes that, “... competition plays a significant role in stimulating productivity, with both new firms and new ideas provoking movements to, and outwards movements of, the production frontier which, the data suggest, would not have occurred in their absence.”⁸² This is to suggest that the activities of innovative firms often tend to enhance productivity and efficiency among their firms and other industries. Gort and Sung, in an econometric study of the U.S. telephone industry, concluded that increased competition led to greater efficiency within that industry.⁸³ They highlighted that greater efficiency of “firm-specific organization capital” and rivalry often led to the stimulation of innovation and thereby increasing economic growth and development. A classic example of this phenomenon can be found in the 2015 annual letter to shareholders of America's biggest bank, JP Morgan Chase. In the annual letter, the CEO, Jamie Dimon, warned: “there are hundreds of Startups with a lot of brains and money working on various alternatives to traditional banking” and assured the shareholders, however, that they should be “rest assured, we analyze all of our competitors in excruciating detail – so we can learn what they are doing and develop our own strategies accordingly.”⁸⁴ Across some other industries there appears to be technology Startups that are attempting to disrupt the very nature of the industry and forcing the incumbents to innovate in order to maintain or enhance their competitiveness.

This tendency for tech Startups to disrupt industries and increase competition among firms is believed to be resonating in Africa, too. The mobile money services are attracting a lot of attention from the traditional banks. In Kenya, Equity Bank has also gone on to acquire a license from the Kenya Communications Authority to use SIM overlay

technology to give it reliable access to the mobile channel through which it will directly serve customers without relying on mobile operators like Safaricom.⁸⁵

Furthermore, competition among Startups on the continent is usually to prove the viability of the market as very few Startups have managed to be overwhelming successes. In the ecommerce space especially, there have been many Startups competing for market shares. In just Ghana alone, there are Tonaton, OLX, TISU, Kaymu and Jumia. These competitive trends have led to enhanced innovative strategies with some competitors enabling home delivery of bought goods, payment on pick-up and promoting the adoption of online payment platforms. It is believed that this would increase the productivity of the entire production spectrum, as the ease of transacting in an online market place will release resources for other productive ventures.

6. Conclusion

Despite all these positive economic development prospects and the hype surrounding the technology Startup scene in Africa, the troubling reality is that they encounter many challenges that will make any critical observer doubt their potential. One of the most significant challenges in this regard is the supply and access to capital. Currently, the main sources of capital for new entrants and growing Startups are retained earnings, credit cards, and investments from family and friends. Sometimes technology startups also get funding by winning competitions and by pitching their ideas at technology events. Access to capital from the formal avenues – banks, venture capitals, angel investors, incubators and big corporations – have proved the most difficult. For banks, the entrepreneurs complained that they charged a high interest rate such that it impeded their profitability. Additionally, some banks require 150 percent of the borrowed amount as collateral, which effectively rules out many technology Startups from being eligible for funding.

Furthermore, startups face severe competition from well-established corporations with the means and security to hire those talents. While 86 percent of tertiary institutions in Sub-Saharan Africa offer

a course in entrepreneurship, only seven percent have an entrepreneurship center dedicated to entrepreneurial development; 28 percent offer courses specializing in entrepreneurship; and 10 percent offer a course in innovation and technology.⁸⁶ This has led to the situation where the culture of innovation is lacking in schools on the continent. For technology startups, the level of technical skills on the continent is said to be inadequate. Neal Hansch, the managing director of the Meltwater Entrepreneurial School of Technology (MEST) asserts “not having enough software developers in the ecosystem that when our companies are growing they can hire” is a major challenge.⁸⁷ The quality of the technical skills is also an issue of contention: Osborn, the CEO of Pay-Sail, argues that there is not “enough talent here. People can code, build stuff, etc., but looking at what people are building in the West and you use and feel good about them, it’s not happening here but we are trying.”⁸⁸

For technology entrepreneurs, the poor state of infrastructure in Africa is also a big hurdle to the growth of their startups and their subsequent contribution to the growth of their local economies. This severely affects the entrepreneurs’ cost, market access and efficiencies. The biggest of these infrastructural challenges to technology startups are access to constant electricity power and the high cost and low Internet speed. Excluding South Africa, the rest of the three countries surveyed – Ghana, Nigeria and Kenya – have serious challenges relating to adequate and reliable supply of electricity. This is, however, more prominent in Nigeria and Ghana, where the use of diesel generators to supplement the national grid has become a necessity and adding to the already burdensome cost of running a startup. In addition, although the internet situation is improving across the continent, Africa still has some of the lowest speed in the world. Compounding this is its cost to the technology entrepreneur and the average user. A 2014 Alliance for Affordable Internet (A4AI) report that surveyed 51 emerging and developing countries found “not a single country can claim to meet the affordability benchmark set by the United Nations Broadband Commission of broadband priced at less than five percent of monthly income for those potential users surviving on less than \$2 a day.”⁸⁹ The high

cost of the Internet presents another undesirable situation to the tech entrepreneur, because some of their products rely on the Internet to function or be downloaded. The high cost of the Internet discourages its adoption among users. Furthermore, there have been investments in the Internet infrastructure by governments and the private sector meant to make the Internet more affordable. However, many technology entrepreneurs and users of the Internet complain of not noticing any drastic reduction in the cost of broadband as anticipated. In explaining the reasons for this from their understanding of investing in high-speed fiber optics network in Kampala, the country manager of Google Ghana, Sowah (2015), confided: “whereas the network cost must have come down due to our investments, most of [the] other operating costs for African businesses continue to go up. And for many of the ISPs [Internet Service Providers], this does not necessarily translate to profit just because they are saving on some costs.”⁹⁰

Despite the challenges faced by technology startups on the continent, there are more technology startups springing up every day. In this regard, it is important that African governments and private stakeholders be deliberate about solving these challenges to enhance the competitiveness and appeal of startup ecosystems on the continent. More specifically, governments in Africa can create a more conducive environment for startups to flourish by providing tax incentives, building infrastructures and opening up the regional market so that innovations and capital can freely flow to other areas. For private stakeholders such as universities and technology entrepreneurs, there is the need to undertake research to develop feasible solutions to the problems of building successful companies. For investors, particularly foreign investors, there is the need for them to make more effort to understand the context within which startups in Africa operate so that they can have realistic expectations of their investments and Africa’s startup culture. As innovation and the creation of jobs are necessary conditions for every country’s development, technology startups could prove to be the lynchpin for Africa’s economic security.

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