

# Draft Report On Comparative Study On Innovation Hubs Across Africa

Draft Report By

## \*iHub Research

K N O W L E D G E . D I S C O V E R Y . S H A R I N G

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iHub - Kenya



Hive Colab - Uganda



Activspaces - Cameroon



kLab - Rwanda



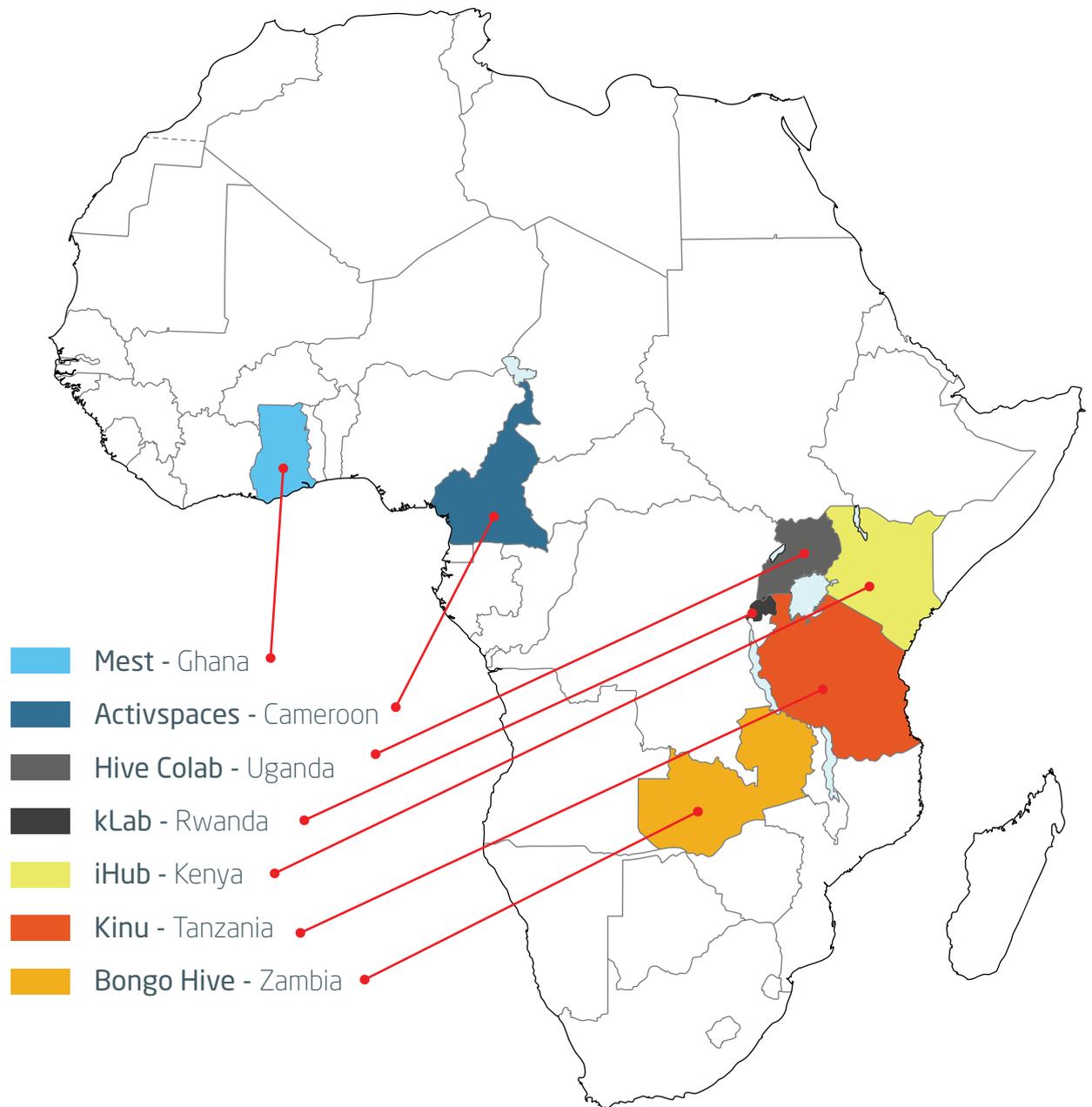
Mest - Ghana



Bongo Hive - Zambia



Kinu - Tanzania



Crowd map of tech hubs in africa

# [ Contents ]

Executive Summary .....	5
CHAPTER ONE: COUNTRY PROFILES OF ICT HUBS UNDER STUDY .....	7
1.1 EXTERNAL FACTORS AFFECTING THE HUB MODEL .....	7
1.1.1 Cameroon .....	8
1.1.2 Ghana .....	10
1.1.3 Kenya .....	11
1.1.4 Rwanda .....	12
1.1.5 Tanzania .....	14
1.1.6 Uganda .....	15
1.1.7 Zambia .....	16
CHAPTER TWO: RESEARCH METHODOLOGY .....	18
CHAPTER THREE: FINDINGS .....	19
3.1 INTERNAL FACTORS AFFECTING HUB MODEL .....	19
Table 1: Key socio-economic indicators in the study countries .....	7
Table 2: Key indicators used in the study .....	18
Figure 1: critical success factors for a hub .....	33
Figure 2: crowd map of tech hubs in africa .....	2

# [ ACRONYMS ]

AEO	African Economic Outlook
ANTIC	National Agency for Information and Communication Technologies
CAMTEL	Cameroon Telecommunication Corporations
CIPESA	Collaboration on International ICT Policy in East and Southern Africa
COSTECH	Tanzania Commission for Science and Technology
FYDP	Five Year Development Plan
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GII	Global Innovation Index
ICT	Information and Communication Technology
ICT4D	Information and Communication Technology for Accelerated Development
ITU	International Telecommunication Union
kLab	Knowledge Lab
MOICT	Ministry of Information and Communications Technology
NICI	National Information and Communication Infrastructure
NRI	Network Readiness Index
PCI	Perception Corruption Index
RDB	Rwanda Development Board
WEF	World Economic Forum

# Executive Summary

iHub Research is conducting an on-going research study to understand the unique factors that make up ICT (Information Communication Technologies) Hubs across Africa. The objective of the research is two-fold. First, to understand the factors that makes up the various operating models of the hubs. Second, to understand the hubs' entrepreneurs and their innovations in promoting socioeconomic development.

Little inquiry, if any, has been done to understand the various ICT Hub models developing across Africa, the differences and similarities in their models, and lessons they can learn from each other, including recommendations to ensure sustainable implementation of the Hub. iHub Research aims to fill this dearth of information with a phased study. This report details the first phase of understanding the external and internal factors that make up the Hubs' models, their startups and sustainability models. Above all, we highlight lessons and recommendations to learn as they implement their models. These lessons and recommendations stem from their sustainability models, ways of engaging their community of developers, partnerships, funding in running the space operations and membership tier system among others.

The African continent has largely relied on an agriculture-based economy. However, recent studies have shown that the use of Information and Communication Technologies (ICTs) have transformed many economies towards a knowledge-based economy, in which the production and dissemination of knowledge leads to economic benefits. An ICT Hub is an innovation space. "Innovation spaces are physical environments that promote community, learning, and making. They come in different flavors: Hubs, labs, libraries, hackerspaces, makerspaces, telecentres, coworking spaces. Yet all provide opportunities to... (1) engage with people, ideas, and technologies, (2) experience participatory culture, and (3) acquire the literacies and skills needed to prosper in the 21st century" (translated from: Audette - Chapdelaine, 2011). This paper explores seven ICT hubs in seven African countries: iHub-Kenya; KLab-Rwanda; MEST-Ghana; BongoHive-Zambia; KINU-Tanzania; Activspaces-Cameroon; and Hive Colab-Uganda. The individual reports can be viewed on the iHub Research website, in the resource page.

This study has used various statistics such as mobile subscription and Internet penetration to assess the level of ICT usage and development in the countries under study. Respective policies developed by the Governments of these countries are also highlighted. Global indices including the Global Competitiveness Index (GCI), the International Telecommunication Union (ITU) index, the Global Innovation Index (GII), and the Global Information Technology through its Network Readiness Index (NRI) were used for comparison purposes.



The study reveals growing evidence that the ideals of openness and collaboration are often in-built in the architecture of these hubs through their events and activities. The African Innovation hubs studied provide open working spaces that actualize the concept of co-working and serve as spaces for knowledge exchange and community building. Innovation hubs can be most effective when they harness openness and community-driven approaches. This can be achieved by providing a co-working space to share ideas, collaborate, share knowledge, network and explore opportunities in creating impact in the African continent.

Hubs are challenged by inadequate funding, limited space, slow connectivity and limited skills among members. Once these challenges are addressed and with continued collaboration from all stakeholders, these hubs can have a strong impact transforming Africa through grassroots innovation and entrepreneurship.

## 1.1 EXTERNAL FACTORS AFFECTING THE HUB MODEL

External factors in this study refers to those factors that contribute to the ICT growth of the country: ICT GDP, ICT support from the government, level of corruption, good infrastructure, ICT budgetary allocation, telecommunication investments and the thirst of a country for innovation, among others.

This section briefly explains the seven countries studied with an overview of the country location, population, size, GDP, unemployment, ICT development and various global indices that can be used as a benchmark to assess the status of ICT hubs development in the respective countries. Table 1 below shows a summary of key indicators in these countries for comparison purposes.

Table 1: Key socio-economic indicators in the study countries

	Cameroon	Ghana	Kenya	Rwanda	Tanzania	Uganda	Zambia
Population	20.1m	24.6m	41.6m	10.94m	46.22m	34.5m	13.47m
Area in sq.km	472,710	328,533	580,367	26,338	947,30	241,039	752,618
GDP (in USD)	25.538b	39.20b	33.6b	6.3b GDP	23.87b	16.8b	19.21b
GDP growth rate	4.6%	8.5%	5.1%	5.8%	6.8%	6.6%	6.5%
ICT contribution to GDP (2011)	7%	10.5%	11.2%	8.5%	8%	9.6%	4.1%
Mobile Subscribers	10.5m	12m	30.4m	5.1m	20.9m	14m	5m
Mobile subscription rate (2011)	52.4%	48.7%	77%	48.1%	55%	42%	41.6%
Internet Penetration	4%	10%	34%	6%	4.8%	9.6%	6%
Global Competitiveness index rank (2012)	112/144	103/144	106/144	63/144	120/144	123/144	102/144
Network Readiness Index rank (2012)	125/141	97/141	93/141	82/141	123/141	110/141	109/141
Global Innovation Index rank (2012)	121/141	92/141	96/141	102/141	128/141	117/141	107/141

	Cameroon	Ghana	Kenya	Rwanda	Tanzania	Uganda	Zambia
International Telecommunication Union rank (2012)	138/155	117/141	114/155	133/155	139/155	132/155	135/155
Corruption Perception Index (PCI) (2012)	144/174	64/174	139/174	50/174	102/174	130/174	88/174

**Note:**

- Population is given in million; GDP in billion; mobile subscribers in million; internet penetration as percentage of total population as at 2011.
- From the above figures, it can be observed that most of all the countries under study have some work to do in virtually all areas towards improving ICT usage.
- Internet usage is very low with exception of Kenya, yet internet is a vital component in communication, information flow and knowledge sharing in the Hub model.
- The mobile subscriptions have been on the rise in most of these countries and should be encouraged due to increased mobile applications that have been developed for mass markets.
- In addition, more emphasis need to be stressed on improvement of ICT competitiveness, network readiness, innovation and communication as illustrated by the four indices of GCI, NRI, GII and ITU respectively to achieve knowledge-based and information-rich economies characterized by techpreneurs, innovation hubs, creativity and information sharing.

### 1.1.1 Cameroon

Cameroon is located in central Africa bordering Nigeria, Equatorial Guinea, Gabon, Republic of Congo, Central African Republic and Chad (CIA, World Factbook, 2013). In 2012, the Cameroonian population was estimated at nearly 20,129,878 (Jul 2012). The population growth rate is close to 2.8%. The country total surface area is about 472,710 square kilometers and has her capital city at Yaoundé (Index Muindi, 2012).

Economically, Cameroon's GDP per capita income is US\$ 25.538 billion, as of 2011. Economic growth is projected to reach 4.6% in 2013, sustained by a recovery in the oil sector.

Unemployment rate stands at 30% (CIA, World Factbook, 2013). In ICT sector, it is worth noting that currently the telecommunication industry contributes almost 7% towards the GDP of the country as at 2011 (African Economic Outlook, 2012).

There are institutions in place such as the Ministry of Communication, the National Agency for Information and Communication Technologies (ANTIC), the Cameroon Telecommunications Corporation (CAMTEL) amongst others, all established to harness ICT growth and development. In addition, the Government of Cameroon has developed a comprehensive ICT legal framework and Policies, which when fully implemented will significantly impact the socio-economic development of the country. Key highlights include: Internet penetration as at 2012 was 4% according to BuddeComm (2013); Mobile telephone subscription/100 population was 52.4% at 2011 (World Economic Forum, 2011); fixed telephone lines/100 population was 3.3% as at 2011 (WEF) Mobile teledensity as at 2008 was 34.53% (Poverty Reduction and Economic Management Unit Africa Region, 2011); Corruption Perception Index (CPI) rank 144/174 with a score of 26% (2012); GCI rank 112/144 countries (2012-2013); NRI rank 125/142 countries (2012); GII, rank 121/141 countries (2012) and ITU index rank 138/155 (2012).

There is a clear openness to collaboration with the private sector and development partnerships, which is likely to have a significant, positive impact on rolling out initiatives. It also seems clear that addressing some problems at a cross-border level would offer significant advantages including potential cost savings when rolling out solutions at a national level. This is particularly the case for countries addressing common problems (IST-Africa, 2012).

In summary, the Cameroon government has given special attention to the potential impact of ICT as it noted that:

*ICT is not an end in itself for Cameroon, but a powerful tool to help increase productivity, competitiveness to stimulate growth, create employment opportunities and as such improve the wellbeing of Cameroonians (National ICT policy, 2003).*

## 1.1.2 Ghana

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Ghana is a West African country that has her capital city at Accra and a total population of 24.6 million people. Ghana occupies a total surface area of 328, 533 sq km and is bordered by the Gulf of Guinea, Cote D'Ivoire, Burkina Faso and Togo (World Bank, 2012).

Economically, Ghana is West Africa's second largest economy after Nigeria, and Africa's twelve largest. The country has continued to consolidate good governance, and also recently discovered petroleum in commercial quantities, and started producing oil and gas towards the end of 2010. As a result, GDP growth for 2012 was 8.5% aided by oil revenues and strong export performance of cocoa and gold (Republic of Ghana, Country Strategy Paper, 2012). The total GDP in US dollars was 39.20 billion in 2011 (World Bank, 2012). ICT itself contributed to 10.5% of the total GDP growth as at 2011 according to African Economic Outlook (2012).

Recent gains in Ghana's economic growth have not translated adequately into job opportunities in the formal sector. An estimated 54 % of the labour force is engaged in informal economic activities with only 11.5 % working in the formal sector. The youth account for only 14% of the regular wage earners in formal sector employment, an indication that young people are unable to find formal sector employment and hence must create economic opportunities for themselves in the informal sector as own-account workers, domestic employees, apprentices or unpaid family workers. The informal sector employs an estimated 22 % of youth (African Economic Outlook (AEO), 2012).

There are policies in Ghana that have placed a strong emphasis on the role of ICT in contributing to the country's economy. The country's medium-term development plan captured in the [Ghana Poverty Reduction Strategy Paper \(GPRS I&II\)](#) and the [Education Strategic Plan 2010-2020](#) all suggest the use of ICT as a means of reaching out to the poor in Ghana (Mangesi, 2007). In addition, establishment of the [Ministry of Communications](#) to manage the convergence of communications and technologies to promote a viable integrated national development process within a global setting further emphasis the determination of Ghana government in ICT sector development. Other key highlights include: 6 mobile phone service providers with over 12 million subscribers; internet penetration of 10% as at 2012; Corruption Perception Index (CPI) rank 64/174 with a score of 45% (2012); GCI rank 103/144 countries (2012-2013); NRI rank 97/142 countries (2012); GII, rank 92/141 countries (2012) and ITU index rank 117/155 (2012).

In summary, the country's Information and Communication Technology for Accelerated Development (ICT4AD) policy of 2003 mission in Ghana is:

*"To improve the quality of life of the people of Ghana by significantly enriching their social, economic and cultural well-being through the rapid development and modernization of the economy and society using information and communication technologies as the main engine for accelerated and sustainable economic and social development"* ( Republic of Ghana ICT4AD Policy, 2003 p.21).

### 1.1.3 Kenya

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Kenya is located in Eastern Africa with a population of about 41.6 million people as at 2011 with its capital city at Nairobi and occupying total surface area of about 580,367 square kilometers. The population growth rate is at 2.44% as at 2011 (World Bank, 2013). Kenya borders the Indian Ocean, between Somali (East) and Tanzania (South), Uganda to the west and Ethiopia and South Sudan to the north (CIA World Factbook, 2013).

Economically, the World Bank (2013) observes that the country total GDP was recorded at 33.6 billion USD as at 2011 with GDP growth rate at 2012 recorded as 5.1 % (Index Mundi, 2012). The major contributors to the GDP sector-wise are service industry with 61%, followed by agriculture at 24.2% while industry contributes 14.8 %. However, labour force by sector contribution; agriculture leads by 75% while industry and services employ the remaining 25% (CIA, World Factbook, 2013). According to AEO (2012), ICT sector contributed 11.2% to GDP growth in 2011.

Youth unemployment is a growing problem in Kenya. According to the 2009 population and housing census, 34% of the Kenyan population is aged between 15 and 34. This is a substantial workforce that could contribute significantly to economic growth. However, much of this labour force is under-utilized. According to the Kenya Household Integrated Budget Survey (KIHBS) of 2005/06, unemployment stood at 25% for the age group 15-19, 24.2% for 20-24-year-olds, 15.7% for those aged 25-29 and 7.5% for the age group 30-34. It is devastating to note that youth unemployment constitutes 70% of total unemployment in Kenya (AEO, 2012).

Kenya, through **Vision 2030** recognizes ICT as a foundation for a knowledge economy. Developing affordable information and communication network infrastructure and applications is central to building the information economy. The Kenya government has been instrumental in developing ICT sector towards transforming the country into a knowledge-based economy through digital empowerment which last year (2012) culminated with the launch of the first National ICT Masterplan. A five-year plan that seeks to drive citizen adoption of the Vision 2030 priorities through ICT policies and initiatives, 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 have created around 500 new tier-1 ICT companies and over 50,000 jobs (Kenya ICT Board, 2012). CIPESA (2012) observes that the Kenyan government budgetary allocation to the ICT sector the financial year 2012/2013 was 0.5 % of the total budget.

Key highlights include: mobile subscribers of over 30.4 million (about 77% penetration) from 4 service providers; internet users of about 13.5 million translating to about 34% of the total population; mobile tele-density of 71.3% as at 2012 (CIPESA, 2012); Corruption Perception Index (CPI) rank 139/174 with a score of 27% (2012) GCI rank 106/144 countries (2012-2013); NRI rank 93/142 countries (2012); GII, rank 96/141 countries (2012) and ITU index rank 114/155 (2012).

### 1.1.4 Rwanda

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Rwanda is a small, landlocked country in Eastern Africa region with 10.94 million people and a population growth rate of 2.87% per annum-one of the highest in Africa. The total surface area in square kilometres is 26,338. Rwanda borders Democratic of Congo, Uganda, Tanzania and Burundi.

Rwanda is one of the fastest growing economies in Africa. Economic growth rates have averaged 5.8% per annum over the past ten years. Between 1980 and 2007, Rwanda's Human Development Index (HDI) rose by 0.94% annually from 0.357 to 0.460 in 2010, which clearly indicates the country's accelerated development progress over this period. Rwanda's total GDP in 2011 was US \$ 6.3billions (World Bank, 2012). Agriculture currently accounts for approximately 33% of Gross Domestic Product (GDP), and more than 90% of the Rwandan labour force (industry 14% and services 53%). ICT sector contributed 8.5% to GDP in 2011 according to AEO (2012).

According to the Rwanda Development Board (RDB)<sup>1</sup>, Information and Communication Technology is a central engine to driving Rwanda's transformation to knowledge-based economy. Rwanda continues to be one of the fastest growing African countries in ICT and there are several avenues for growth for the ICT sector - from e-commerce and e-services, mobile technologies, applications development and automation to becoming a regional center for the training of top quality ICT professionals and research.

Rwanda's ICT for Development (ICT4D) are anchored in the national development blueprint of Vision 2020 and the National Information and Communication Infrastructure (NICI) plan that is divided into four phases. Vision 2020 aims to transform Rwanda into a middle-income country and transition her agrarian economy to an information-rich, knowledge-based one by 2020.

The NICI process, which coincides with Vision 2020, began with the first of four five-year rolling plans. NICI I (NICI-2005 Plan) focused on creating the necessary enabling environment that would enable the establishment and growth of Rwanda's ICT sector. NICI II (NICI-2010 Plan), focused on providing world-class communications infrastructure that will serve as the backbone for current and future communications requirements. The third plan, NICI III (NICI-2015 Plan), is currently underway focuses on the development of services by leveraging ICTs to improve service delivery to citizens. The final phase of the NICI process (NICI-2020 Plan) is anticipated that it will propel Rwanda to achieve Vision 2020 goals.

Other key highlights include: Most favorable business environment in the Region (3th best place to do business in the sub-Saharan 2012); low levels of corruption - Zero tolerance (Transparency international Bribery index 2012 ranked Rwanda as least bribery prone in the EAC); the network coverage accounts for 99.79% of the country and the current subscriber base is at 48.1% (5,155,697 subscribers September 2012) (RDB, 2013); 6% internet penetration as at 2010; mobile tele-density of 42% as at 2012 (CIPESA, 2012); Corruption Perception Index (CPI) rank 50/174 with a score of 53% (2012); GCI rank 63/144 countries (2012-2013); NRI rank 82/142 countries (2012); GII, rank 102/141 countries (2012) and ITU index rank 133/155 (2012).

<sup>1</sup> <http://www.rdb.rw/rdb/ict.html>

## 1.1.5 Tanzania

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The United Republic of Tanzania is a union of Tanganyika and the off-shore island of Zanzibar and Pemba located in East Africa and has a total population of 46.22 million as at 2011. It borders Kenya and Uganda to the North, Democratic Republic of Congo, Rwanda and Burundi to the west, Malawi, Zambia and Mozambique to the South and Indian Ocean to the East. It covers an area of approximately 947, 300 sq km (CIA World Factbook, 2012).

Tanzania's GDP in US \$ was 23.87 billion in 2011 and GDP growth rate of 6.8 % in 2012 according to African Economic Outlook (2012). Dodoma is the official capital city and the seat of the parliament, while Dar es Salaam is the commercial capital and home to many government institutions and diplomatic missions. The national language is Kiswahili, which is the most widely spoken. English is used for international communication and as a medium of instructions for secondary and higher education (Behista & Diyamett, 2010). CIPESA (2012) observes that the Tanzania government budgetary allocation to the ICT sector in the financial year 2012/2013 was TShs 4 billion (\$ 2.5m) representing 0.03 % of the total budget. ICT sector contributed 8% to GDP growth in 2011 according to African Economic Outlook (2012).

The Tanzania government in her latest Five Year Development Plan (FYDP) 2011/2012-2014/2015, it recognizes the critical role played by Science, Technology and Innovation (STI) that positively affect economic growth via raising the productivity of labour and other factors of production, increasing efficiency, and lowering transaction costs. Therefore, establishing a well functioning STI infrastructure and particularly harnessing information communication technology (ICT) will be necessary to foster efficient and high yielding production processes. In addition, the [National ICT Policy \(2003\)](#) is a reflection of national goals, objectives and aspirations as expressed in the [Development Vision 2025](#), setting out digital opportunities that Tanzania can exploit towards meeting the Vision 2025. There are necessary policies and regulation in the ICT sector in Tanzania. For instance, the Communication Act of 1993 paved the way for liberalization of the telecommunication sector, while the National Telecommunication Policy (NTP) of 1997 continues to provide the framework for further reforms while the private sector also engages in this sector.

In 2003, Telecommunication Regulatory Authority (TCRA) was established as an independent agency for the regulating and licensing of postal, broadcast and communication industries. Institutions mandated to harness ICT development have also been established such as the Ministry of Communication and the Tanzania Commission for Science and Technology (COSTECH).

Other key highlights include: mobile subscriber increased from 20.9 million as at 2010 to 25.6million at the end of 2011; there are 7 mobile service providers and internet penetration of about 4.8% and mobile tele-density of 50% (CIPESA, 2012); Corruption Perception Index (CPI) rank 102/174 with a score of 35% (2012); GCI rank 120/144 countries (2012-2013); NRI rank 123/142 countries (2012); GII, rank 128/141 countries (2012) and ITU index rank 139/155 (2012).

### 1.1.6 Uganda

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Uganda, officially the Republic of Uganda is a landlocked country in East Africa covering an area of about 241,039 sq. km lying astride the equator. Uganda is bordered by Kenya, South Sudan, Democratic Republic of the Congo, Rwanda, and Tanzania. The southern part of the country includes a substantial portion of Lake Victoria, which is also shared by Kenya and Tanzania. Uganda has population estimated to be in the region of 34.5 million in 2011 (World Bank, 2012) with a population growth rate of 3.2 % as at 2011 according to Uganda Bureau of Statistics (UBOS, 2012). English and Swahili are the main languages. The total GDP in 2011 was 16.8 billion US dollars with GDP growth rate of 6.6%.

Economically, Uganda is reported to have substantial natural resources, including fertile soils, regular rainfall, deposits of copper, gold and other minerals and recently discovered oil. Agriculture remains the backbone of the economy. Labour force employment by sector 65.4% agriculture; 26.8 % service and 7.6 % industry, however youth unemployment and underemployment trends in Uganda are driven by a variety of factors; among these include the lack of employable skills, limited access to financial and technical resources, insufficient emphasis on vocational training and a mismatch between graduate skills and skills requirements in the job market but the Uganda government is putting some interventions policies. CIPESA (2012) observes that the Ugandan government budgetary allocation to the ICT sector in the financial year 2012/2013 was 0.13 % of the total budget. Total contribution to GDP growth by ICT sector in 2011 was 9.6% (AEO, 2012).

In Uganda, ICT4D are anchored in the ICT4D National Policy of 2003 under the Ministry of Works, Housing and Communication (MoWHC) and the National Development Plan (NDP) (2010/11-2014/15). Further to these, the Ministry of Information and Communications Technology (MOICT) was established in 2006 with a mandate of providing strategic and technical leadership, overall coordination, support and advocacy on all matters of policy, laws, regulation and strategy for the ICT sector.

One way that the government of Uganda has promoted youth employment is through ICT. The government, in partnership with the private sector, is embracing the culture of knowledge sharing and information management of local content using ICT methods that include weekly SMS, an annual Knowledge Fair, radio and informational brochures and newsletters, and e-governance portals among others. The vibrant telecommunication industry in Uganda is projected to employ an extra 2 million employees from 2008-2015 (Uganda Investment Authority, 2009).

Other key highlights include: Over 14 million mobile subscribers representing about 42% of the total population, internet penetration of 9.6% as at 2010; mobile tele-density 50% (CIPESA, 2012); Corruption Perception Index (CPI) rank 130/174 with a score of 29% (2012); GCI rank 123/144 countries (2012-2013); NRI rank 110/142 countries (2012); GII, rank 117/141 countries (2012) and ITU index rank 132/155 (2012).

### 1.1.7 Zambia

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The Republic of Zambia is a landlocked country in Southern Africa. Zambia neighbors DRC Congo, Tanzania, Malawi, Mozambique, Zimbabwe, Botswana and Namibia and Angola. It had a population of 13.47 million as at 2011 with a population growth rate of 2.89% (CIA World Factbook, 2012). Zambia occupies total surface area of 752,618 square kilometers. The capital city is Lusaka.

In 2011, the total GDP in US \$ was 19.21 billion GDP real growth rate of 6.5% in 2012 (World Bank, 2013). Privatization of government-owned copper mines in the 1990s relieved the government from covering mammoth losses generated by the industry and greatly increased copper mining output and profitability to spur economic growth. Zambia's dependency on copper makes it vulnerable to depressed commodity prices, but record high copper prices and a bumper maize crop in 2010 helped Zambia rebound quickly from the world economic slowdown that began in 2008 (CIA, World Factbook, 2013). ICT sector contributed 4.1% in to GDP growth rate in 2011 owing to Zamtel privatization according to AEO (2012).

Zambia faces the challenges of unemployment among the youth, which poses significant policy challenges to the country's long-term growth, with nearly half of its 14 million people under the age of 15. A 2008 survey showed that in the urban areas 63% of the 15-19 age groups were out of work while the rate of unemployment for those in the 20-24 age categories was 48%. In rural areas 16% of the 15-19 age group and 7% of those aged 20-24 were unemployed although these figures mainly reflect informal agricultural employment. Significant gender disparities are also prevalent (AEO, 2012). About 300,000 young people enter the labour market each year and with few employment opportunities the large number of unemployed youth is creating political and economic tensions in the country. Obstacles to youth employment include the inability of the educational system to equip people with relevant skills required by the job market, high school dropout rates, a lack of entrepreneurial opportunities and poor access to labour market information for job seekers and employees (AEO, 2012).

In Zambia, ICT4D are anchored in the [Zambia Telecommunications Act](#) of 1994 which led to the liberalization and increased participation by the private sector of the telecommunication industry and the establishment of the Communications Authority (CAZ) in 1994; the Zambia Science and Technology Policy (1996); the [Zambia Vision 2030](#) (in 2005); the [Zambia National ICT Policy](#) (Launched 2007); the Ministry of Education ICT Policy; the Zambia ICT Act of 2009; the Computer Crimes and misuse Act and other policy and regulatory framework documents. Through these documents, the Zambian government and stakeholders recognizes the need for ICT in the development of the country and set out to address challenges. Other key highlights include: 4 mobile operators with about 5 million subscribers; fixed telephone lines is 0.6%; mobile broadband subscription 0.4%; 6% internet users as at 2010; Corruption Perception Index (CPI) rank 88/174 with a score of 37% (2012); GCI rank 102/144 countries (2012-2013); NRI rank 109/142 countries (2012); GII, rank 107/141 countries (2012) and ITU index rank 135/155 (2012).

This study used two methods to collect the data in order to fully comprehend how the selected hubs models work: first, in-depth interviews conducted virtually and physically, e.g. Skype calls, webinars and face-to-face interviews (in the cases of ActivSpaces and iHub) with hubs managers in the seven countries. Second, a thorough literature review was conducted looking at the ICT markets and hubs models through online materials and available secondary documents.

The study used several indicators in choosing the 7 hubs, as given in the table 2 below so as to help us develop a critical success factors framework that can be used by future hubs.

Table 2: Indicators descriptions

- 
- Number of years they have been in existence
  - Number of events/activities that happen in the space
  - Number of partners/supporters up to date
  - Number of channels they use to remain sustainable
  - Number of challenges they have faced since they began
  - Number of startups/members since their existence

A criterion was used in selecting the 7 Hubs under this study. The Hubs had to match at least 5 of the criteria metrics used as indicated below:

**Criteria:**

- In existence at least for one year
- The Hub has to be an ICT Hub or have a component of IT
- Has a membership structure (or a way to distinguish their members)
- Has a physical open space
- Has more than one type of event/activity that happens in the space
- Has more than one partner/supporters
- Has more than one way of generating revenue to sustain the space
- Has faced at least two challenges while running the space
- Has more than one startup/member that works from the physical space

### 3.1 INTERNAL FACTORS AFFECTING HUB MODEL

While all of these hubs are managed locally and based on different business models, most have a number of things in common. The most important factor is that they are community based and serve as a point of entry for people working on creative and innovative technological ideas. They encourage developer community building and engagement by hosting regular events that range mostly from training and mentoring their members. The idea of creating a hub for the growing technology and blogger community was first born at BarCamp Nairobi 2008. It was agreed that it would be good to have a physical space to meet and work. Through [Ushahidi](#) funding, the idea was put into practice by opening iHub in Nairobi, Kenya in 2010. Since then the iHub has become the center of attention for technological innovation and the Kenyan start-up scene as other new Hubs learn from its model.

Nevertheless, most of the hubs are often faced with funding problems. Venture capitalists are seldom seen in Africa. Getting seed funding is nearly impossible for young start-ups germinating from these hubs since the investors are still trying to understand the market potential.

In addition, the state and private sector support systems are not sufficient to foster creativity and business creation in most African countries. A number of factors, such as improvements in Internet infrastructure, training of young graduates to equip them with right skills, government and private sector support especially through funding can further catalyze these hubs to play their rightful role of spurring economic growth and development in not only the urban centres but the rural development by extending the same physical services. This can be achieved through identifying the feasibility of virtual incubation and effective tools and mechanisms that can be used to promote entrepreneurship and innovation that will lead to impact through jobs creation for the youth, poverty reduction and access to local content.

ICT Hubs also vary based on country context and modes of operation depending on the existing structure and management in place. However a number of common features stand out as underpinning the development of successful innovation spaces throughout Africa. Common factors range from 'softer' elements of co-working such as networks and institutional development, financial access through 'harder' aspects, such as physical infrastructure or the presence of large firms, to more intangible elements, such as the presence of leadership or an entrepreneurial culture.

Central to this study is that, generic hub model seems to be the case. There are some outstanding similar aspects across all hubs and they include:

- They are community based and serve as a point of entry for people working on creative and innovative technological ideas.
- The theme of open innovation being practiced across the hubs. Open innovation in the hubs context means the use of purposive inflows and outflows of knowledge transfer and collaboration to accelerate innovation.
- Collaboration and partnership in daily activities of the hubs are common aspects through events, resources, exchange programs and daily running of these hubs.
- The hubs works in open space rather than traditional enclosed offices- a departure from companies and organization.
- The hubs have been in operational in a period of more than one year

However, there are other differences within these hubs such as governance structure, visions, guiding principles and membership tier that defines the uniqueness of the hub from the other. Table 3 below summarizes the difference in factors for all the hubs under study.

Table 3: Key internal factors affecting the hubs

Component	Activspace Cameroon	MEST Ghana	iHub Kenya	kLab Rwanda	KINU Tanzania	Hive Colab Uganda	Bongo Hive Zambia
<b>Genesis</b>	Founded in 2010.	Founded in 2008.	Founded in 2010.	Founded in 2012.	Founded in 2011.	Founded in 2010.	Founded in 2011.
<b>Vision</b>	To catch up with the world and usher Cameroon to the ICT concepts of the 21st century.	To create wealth and jobs locally in Africa	"The iHub's vision is to catalyze and grow Africa's tech community. They do this by connecting people, supporting startups and surfacing valuable information to the community, whether they're engineers, web designers, investors, government or academia.	To promote, facilitate and support the development of innovative ICT solutions by nurturing a vivid community of entrepreneurs and mentors.	to be an open tech space by building local capacity and nurture soft skills	To enable techies and anyone interested in IT to come together and share ideas that lead to new development and contribute to enhancing a sustainable growth in the ICT sector.	To be a nexus for different stakeholders by interfacing with government, policy makers and universities so that when ideas come to them, they get the right visibility.
<b>Guiding principles</b>	Collaboration, openness and community development through co-working, volunteerism and knowledge sharing.	Desire to learn, dedication, motivation & independent mind.	Innovation, community development, entrepreneurship & research	Openness and collaboration, community spirit & self-learning	Community, collaboration, idea sharing, flexibility, honesty & responsibility.	Collaboration, openness, community development & knowledge sharing	Passion and community development
<b>Governance structure</b>	5 advisory board members	Currently does not have an official advisory board	5 advisory board members	9 Advisory board who doubles up as founders	6 advisory board members	4 advisory board members	No Advisory board In place at the moment but working to develop it

Component	Activspace Cameroon	MEST Ghana	iHub Kenya	kLab Rwanda	KINU Tanzania	Hive Colab Uganda	Bongo Hive Zambia
<b>Open innovation culture</b>	Knowledge transfer to members and in-house problem solving solutions	Collaboration among schools & exchange programs	Technology community, industry, academia, investors and venture capitalists meet to share ideas, knowledge and skills	Share knowledge through various events such as "demo nights"	Collaboration and networking, brainstorming with community members & mentorship programs	Collaboration through events and activities, exchange program and working on community projects	Various events such as hackthons and crowd-sourcing platforms for putting Hubs on the Map and women in IT initiatives
<b>Membership tier system</b>	No membership at this stage . its free and open but working with the members to identify need	No membership tier system as its based on an entrepreneurship training program (training, incubation, mentorship)	Has a membership 3 tier system (Red, Green and White) Red- pays usd 170 per month for a dedicated space White- virtual members Green- 6-months physical member	Has a membership tier of Physical and virtual members	No membership tier as its free and open for everyone	Has a membership tier system: virtual members, brown members, orange members, non-members Virtual: online members Orange: free membership, need to be working on a project Brown members: usd 100 per month for dedicated desk. Non-members: pay usd 5 per day to use the space.	Has a membership tier system: divided into member and startup. Member: designed for those who want to be part of the community Startup: pay usd 20 membership fee. Designed to cultivate / nature and develop individuals or groups who have the necessary skills and existing Business ideas

Component	Activspace Cameroon	MEST Ghana	iHub Kenya	kLab Rwanda	KINU Tanzania	Hive Colab Uganda	Bongo Hive Zambia
Events & members engagement activities	Activ insights, SubCMR, Scratch club, skills development workshops, Tech Thursday, fellow program	MEST48 product challenge, bar camp startup weekend & guest lectures	Test drive development, fire side chats, show and tell events, Nairobi research buzz etc	Open house session, meet the market, project idea development, demo nights etc	Start-up Saturday, venture capital & market sizing, open source repositories workshop etc	Seminars, talks from experts, peer to peer learning and sharing (big entrepreneur initiative etc	Mobile Monday Lusaka, game development workshop, Asikana network women right mobile app initiative & insaka events
Startups	Zinger systems, TopUpDesk, Bisou, Makonjoh, Pade.me, Agro-hub, Gosabi and King Maker	ClaimSync, Leti games, Nandi mobile, Retail tower, Saya mobile, Streemio, Dropifi, Ad brooks	Kopo Kopo, Mlab, Mhasibu, Elimu, NikoHapa, Weza Tele, M-Prep, Pesapal, Capefield, Sprint Interactive	Zilencio Creativo, Sail Ltd, M-Ahwiii Ltd, Osca connect, Torque, Spider bit Ltd	In the process of choosing the startups	The Wash Reporter, Brain Share, Clinical Master, BETOtm, Plotus ,Mai solutions , Appit, inforex	In the process of choosing the startups
Partnership	University of Buea, Harambee, Bar camp, VC4Africa, Sagana ventures Humanipo, Apptech, alumni's graduated from space, Google	No partners at the present	Intel, Nokia, Omidyar network, Ark Africa, Ushahidi, Nation Media, Google, Zuku & Hivos	Rwanda Development Board (RDB), Japanese International Cooperation Agency (JICA), Carnegie Mellon University (CMU) & Private Sector Federation of Rwanda (PSF)	Google, Indigo Trust, Raha, Smile, Uhuru one, SeaCom & Samsung	SMS media Uganda, Digital solutions Uganda, Enterprise Uganda, Mobile Monday Kampala, Telecoms	Indigo trust, Dr. Brenda Davis, Spark Man, Google, I-Connect & Flemish Association for Development and Technical Assistance (VVOB).

Component	Activspace Cameroon	MEST Ghana	iHub Kenya	kLab Rwanda	KINU Tanzania	Hive Colab Uganda	Bongo Hive Zambia
Challenges	Slow connections, difficult in managing the members due to limited management capacity, limited space capacity, lack of seed capital, lack of direct mentorship and counseling	Difficult in running the hub, infrastructural challenges, lack of exposure etc	Difficulty in running the space, inadequate funding, meeting the expectations of the growing member base, lack of investors in ICT hubs, measuring impact and success, making the initiatives integrated, quality assurance of members work	Lack of skills from members, withdrawal of members, coordination of students is hard etc	Few women in the space, few developers, inadequate capacity, lack of partners, inadequate funding, lack of skills from members	Inadequate funding, slow internet access, inconsistency, procrastination etc	Managing the hub is hard, inadequate capacity, lack of synergies in the hub, lack of investors, inadequate funding,

## 3.2 LESSONS THAT CAN BE LEARNED FROM THE HUBS

Existing and future hubs can learn from each other to establish, manage, sustain and cope with challenges that may affect the hub in the short and long term. The ICT Hubs can learn a lot from each other based on their differences in their models; mostly this learning can be cultivated from the different sustainability models, membership tier system, and ways of engaging the local developer community among others.

Some of the lessons the Hubs can learn from each other include but not limited to:

### **Development of Human Skills/Capacity**

Development of human skills in managing the hubs is very critical in order to survive and thrive in today's organization. Skilled members provide quality, facilitates rise in skills and enhances motivation among members working from the space. This kind of development is already taking place at **MEST**, where an intensive training is undertaken. Other hubs can borrow from MEST in the way they have structured their training program in developing members' skills that in turn can end up being recruited as talent in to help in managing the space. If training programs can be inculcated in the Hub model, the problem of unskilled developers is solved.

### **Government, private, NGOs, academia involvement among other stakeholders**

It is necessary for the ICT Hubs to consider working together with the other stakeholders that may include the government, academia, private partners, Non-governmental organizations and civil society as part of the ecosystem with each of the partners injecting a unique value. Academia, e.g. local universities and research institutes, can help in providing market research and useful trends. Private partners can help provide incubation services, marketing and other skills that are missing. NGOs and civil society can help in finance and outreach programmes to develop members' skills and innovations.

The government has a role to play as an innovation facilitator-not only on providing an enabling environment through which hubs will operate in terms of policies and regulatory framework, but also injection of funding and provision of infrastructure. The Rwanda government is an example; it has offered kLab a space through Rwanda Development Board. In addition, the Rwandan government, through Rwanda Innovation Endowment Fund (**RIEF**) has helped upcoming innovators.

### Sustainability Initiatives

Most hubs in Africa are in nascent stage and as such their self-sustainability in the long-term is not guaranteed. These hubs may learn from hubs such as iHub that has developed jobs board for listing tech jobs, for a fee of USD 10 per month, as well as other initiatives such as [iHub Research](#) - a research arm through which iHub generates up to 50% of iHub revenues. In addition, iHub has developed several initiatives such as [iHub Consulting](#), [iHub UX Lab](#) and [iHub Cluster](#), which are expected to also become sources of revenue in the foreseeable future. These initiatives have been formed as a result of a need out of the community. iHub UX Lab-Need for user experience and testing developer community products before they go to market. iHub Cluster- aims to provide a sandbox for developers and academia to engage with. iHub Research- aims to conduct market research on technology and innovation within the community and ihub consult aims to pool together top talent from the community to develop and implement technological solutions. Most important, the Hubs need to plan for the long term and secure strategic partnerships to help them accelerate their growth and success. Other Hubs can also borrow from MEST's model in their approach of acquiring funding opportunities to build talent through entrepreneurship training program then incubating the successful startups with the option of taking the minority equity from them in the companies that are incubated.

### Enhanced Collaboration and Participation

Involving the community of members, business partner and private sectors to create synergies within all the stakeholders is a key ingredient contributing the success of a Hub. Most of these hubs are creating synergies through collaboration with community of members among other key stakeholders e.g. through thematic focused hackathons in water sector as demonstrated by iHub. KINU, which also started as a result of boot camps in Tanzania, focused on thematic focus on social issues and accountability that brought the tech community together to hack possible solutions. Hive Colab has also facilitated successful seminars/workshops by providing a fertile ground for novice members to interact with the experts and create partnerships with organizations in Uganda through lasting relationships.

### Membership Tier System

Most of these hubs are in nascent stage of growth, with not more than 200 members apart from iHub, which has more than 10,000 members. As the community of members continue to grow, operational management becomes difficult. Hubs such as iHub have solved this through a membership tier system to ensure better management, diversification of resources in a more efficient manner and more so an opportunity to charge subsidized fees based on the resources or services provided to the different tiers. The names of the different [tier system](#) (Red, Green and Black) were coincidentally picked from the colors of the Kenyan

flag. Most important is also to strategically cluster and define the membership tier with the help and for the benefit of the members as the approach Activespaces has decided to take by first testing the membership model before fully implementing it.

### **Incubation Centres Initiatives**

A well-established incubation program increases the likelihood that a startup company will stay in business for the long term. Incubators also provide entrepreneurs with access to critical information, education, contacts, capital and other resources crucial to the growth of ventures that may otherwise be unaffordable, inaccessible, or unknown. Although some of the countries have established plans to have incubation centres, many of these plans are still on paper. These Hubs can learn from incubation centres such as **Mlab**. Mlab is also a clear example that shows that iHub has fostered innovation. Mlab offers mentorship, training and support of mobile applications developed by young entrepreneurs who majority has graduated from iHub to Mlab E.g. Zege, M-Farm, Uhasibu, Kopo Kopo, and Mprep. Mlab has so far conducted 5 training programs that have seen a total of 80 students graduate from the program.

**MEST** is another clear example whereby a three-phase entrepreneurial program involving training, incubation and mentorship has been used with much success. A structured training program is hence recommended to provide rich knowledge, skills, networking and mentorship before startup formation.

### **Managing of the Hub**

In addition, to running a hub, operation managers can work to have high academic qualifications with at least a degree level. The hubs can learn from other in how they have hired successful talent. More so, the job descriptions should be shared openly in matching what are the basic minimum skills/resources needed in managing a Hub. This will also help in ensuring the hub management are also contributing to the development of the community of developers be it in providing skills, knowledge, mentorship and guidance.

### **Engagement activities/events**

The ICT Hubs can learn from each other on how they engage their members. The community is at the centre of every decision. The community drives the space through their knowledge and social collaborations that are valuable to the success of the space. These collaborations happen in the events such as 'Show and Tell', which is organized by the iHub that allows the members to showcase their innovations and get feedback from their community of members. Other hubs such as Hive Colab, Bongo Hive and Activespaces have collaborated with other

local universities and African Hubs respectively to boost the swapping of ideas across the continent by providing an open platform to exploring project ideas in new markets.

Furthermore, the co-working desk exchange between Activspaces and 88mph offers a chance to meet new inspirational people and make friends who will stir up more connections and scaling opportunities for members' products.

### 3.3 RECOMMENDATIONS TO ADDRESS THE ABOVE CHALLENGES

The abovementioned challenges being experienced across the hubs might be solved depending on the nature of the problem and context of the country. The researchers provide the following recommendations, but not limited to:

- **Slow Internet connections:** The challenge of slow Internet in Hubs like faced by Hive Colab, Activspaces among others can be a big hindrance in accelerating the startups innovations. This challenge can be solved through the Hubs partnering with local Internet providers who can provide a subsidized Internet basket. In addition, there is need for the government in the respective Hubs countries to manufacture and lay out undersea fibre optic cables for faster broadband.
- **Limited staff capacity:** Currently, most of the Hubs under study have limited management capacity. Many wear multiple hats and existing staff may have limited capacity for developing new initiatives while keeping up with current responsibilities. Most do not have expertise in business development and project management. This can be attributed to the fact that most of them are operating on low budgets with limited sources of operational funding. The Hubs management can either rely on the community of members to assist them in running the hubs, by working with people who are talented in the abovementioned roles or provide training for existing staff in order to build sufficient in-house capacity to manage, administer, and deliver efficiency and value-add programs/initiatives. On the other hand, it may be necessary to hire new staff to fill the missing skills gaps.

- **Limited space capacity:** Many of the Hubs are operating in small spaces and may be limited as their community of members continues to grow. ICT Hubs can solve this by either expanding their space into 2 location sites, e.g. like what Activspaces has done (currently have 2 location sites; one in Doula the other in Buea). Alternatively, they can adopt a tier system where they have physical and virtual members who form majority of the members and can only be given access to the space on an irregular time basis.

*The advantages of tier system include:*

- » Easier to change the rules and contents of any one tier without having to make corresponding changes in any of the others;
  - » Enables parallel development of the members in the different tiers of the hubs;
  - » Easier management as the community of members grow;
  - » Flexibility and more options for the community of members in choosing how to engage with the Hub based on their time and location limitations;
  - » Ensures efficient and effective access to the Hub's resources and services easily irrespective of their geographical location.
- **Limited investment capacity:** Many of the ICT Hubs under study, lack local investors and investment capacity to support the startups and their innovations once they become proven in the market. Hence it becomes harder for them to promise the startups financial support as they help them grow their ideas to birth. The ICT hubs management needs to hire a coordinator who can help them to do financial outreach and can understand what the investors are looking for and align with the needs of the startups in the Hub.
  - **Lack of strategic partners:** For many Hubs getting the right partner has been a hard task. More so, retaining the existing partners and making sure they share in strategic growth of the Hub in meeting the needs of its members. The ICT Hubs should first identify a list of the partners and their set skills based on long-term value they aim to offer to the Hub ecosystem. This might however take time but it's necessary to ensure choosing the right partners.
  - **Quality assurance:** Ensuring that the products and services offered by the community of members are of high standards to its users is not an easy task for the hub manager/employees to achieve. More so, ensuring that the Hub itself is providing quality services to its members as the demand and number continues to grow. There is therefore need for monitoring and evaluation mechanisms in place to ensure products/service and planned activities are measured against a set of indicators

and an associated feedback loop to ensure high standards and delivery are met on a continuous level. As part of the membership application process, the hubs also need to make sure they attract talented individuals who can deliver. This can be achieved through referrals or working with academia institutions to establish the assurance process. Once they set standards then it will also be easier to attract the right people and not have to worry about growing their members base.

- **Most hubs lack seed capital and funding opportunities to carry out various projects that they initiate.** Seed capital and early venture funding seems like a high-risk proportion for many of the Hubs setting up. However, introducing investor education programs can solve these problems. This program should entail development of human capital, technological capital and financial capital. In addition, an effective investor education program should focus on investor protection, incorporate numeracy skills and undergo neutral evaluation. The government of Uganda for instance has initiated Graduate Venture Capital Fund, a joint partnership with German Development Agency (Kfw) to facilitate graduates develop bankable entrepreneurial projects.
- **Infrastructural challenges;** such as lack of adequate spaces due to increasing number of members can be solved by the government of the respective country the hub is located. The government has a role to provide roads, building (can rents its space at subsidized price to hubs), electricity, water, security and enabling environment where these hubs are operating.
- **Some members of these hubs lack adequate skills and exposure.** To address these problems, hubs should hire qualified trainers, employees, technical experts and mentors to train the members and share in the passion and vision of the Hub. Exchange programs should also be encouraged for knowledge sharing among the members through peer-to-peer learning and across different Hubs in Africa. The government has a role to play too in introducing entrepreneurship courses in schools to prepare students early enough for life ahead. The governments ought to establish institutions that train entrepreneurs and also making entrepreneurship as a course from secondary schools. The Hub management also needs to work with the right mentors who aim to advise and transfer knowledge to the community of members.
- **Sustainability models:** To sustain themselves, hubs must come up with novel schemes and initiative besides funding from partners to raise additional revenues. Many Hubs under this study have short-term sustainability models but the long term or self-sustainability models are still cooking or not in mind.

Long-term models can include but not limited to working on commissioned projects together with their members, corporate partnerships and events, offering services to external community at a fee through initiatives that add value to them. Access to high level resources and services e.g. business planning, legal and talent recruitment can form part of the potential sustainability models.

- **Fewer women in the ICT Hubs:** Its evident that the Hubs have less women running startups or even working as freelancers. Most of the Hubs have are averagely on a ratio of 80:20 men to women respectively. Hubs such as Bongo Hive and iHub have solved this by encouraging ladies to form initiatives that aim to promote more women in ICT. For example [Asikana](#) network in Bongo Hive and [Akirachix](#) in iHub.

### 3.3.1 The Critical Success Factors for hubs

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The ICTs hubs through startups firms, will contribute to jobs growth thus reducing unemployment especially among the youth. Nevertheless, these entrepreneurs face market obstacles, which limit entrepreneurship as would-be. Entrepreneurs struggle to grow their ideas through bootstrapping approaches- raise money through own personal efforts/resources.

There are therefore various components with different roles to play for a successful establishment and sustainability of the hub. This study identifies the following as critical common success factors for a strong ICT hub:

- **Government Support:** Government is needed to develop and implement policies, regulatory framework, funding and provision of infrastructure such as good roads, electricity and security. The government can provide markets access for startup products germinating from the hubs. In addition to developing the entrepreneurship culture as part of the educational curriculum from primary level.
- **Strategic Partners:** Development of strategic partners are critical to hubs in that they provide funding, advice and other resources such as skills, market research and capacity development through various platforms such as exchange programs, training, networking and mentorship.

- **Community of members:** The community of members comprises of techies, designers, and researchers, creative among others. This community of members doubles up as entrepreneurs. They develop new ideas into viable businesses through the Hub resources. Entrepreneurs are forward-looking, risk-taking, innovative and creative business managers. Their entrepreneurial spirits sparks economic activities that create business opportunities, promotes capital formation, creates employment opportunities and stimulate wealth creation and distribution.
- **Science, Technology and Innovation (STI).** STI is through which the success of hubs revolves. A rapid development and application of science, technology and innovation within hubs creates new products, services and opportunities. It enhances new ways of learning, research, production and doing business through knowledge dissemination, social interactions and business engagements.
- **Human Capital:** This is required to run the hub and provide expertise through training, mentoring and up-skilling to members within the hubs. Human capital is fundamental source of economic growth and technological advancement, without which it's hard for any hub to develop a sustainable level.
- **Research and Development:** The R&D of the hub helps with the invention of new products. Whilst this is very important, the development of existing products is of equal significance because consumer preferences are continually changing. Existing and future hubs should develop an effective and efficient R&D for the aforementioned objectives and also staying ahead in a competitive digital world.

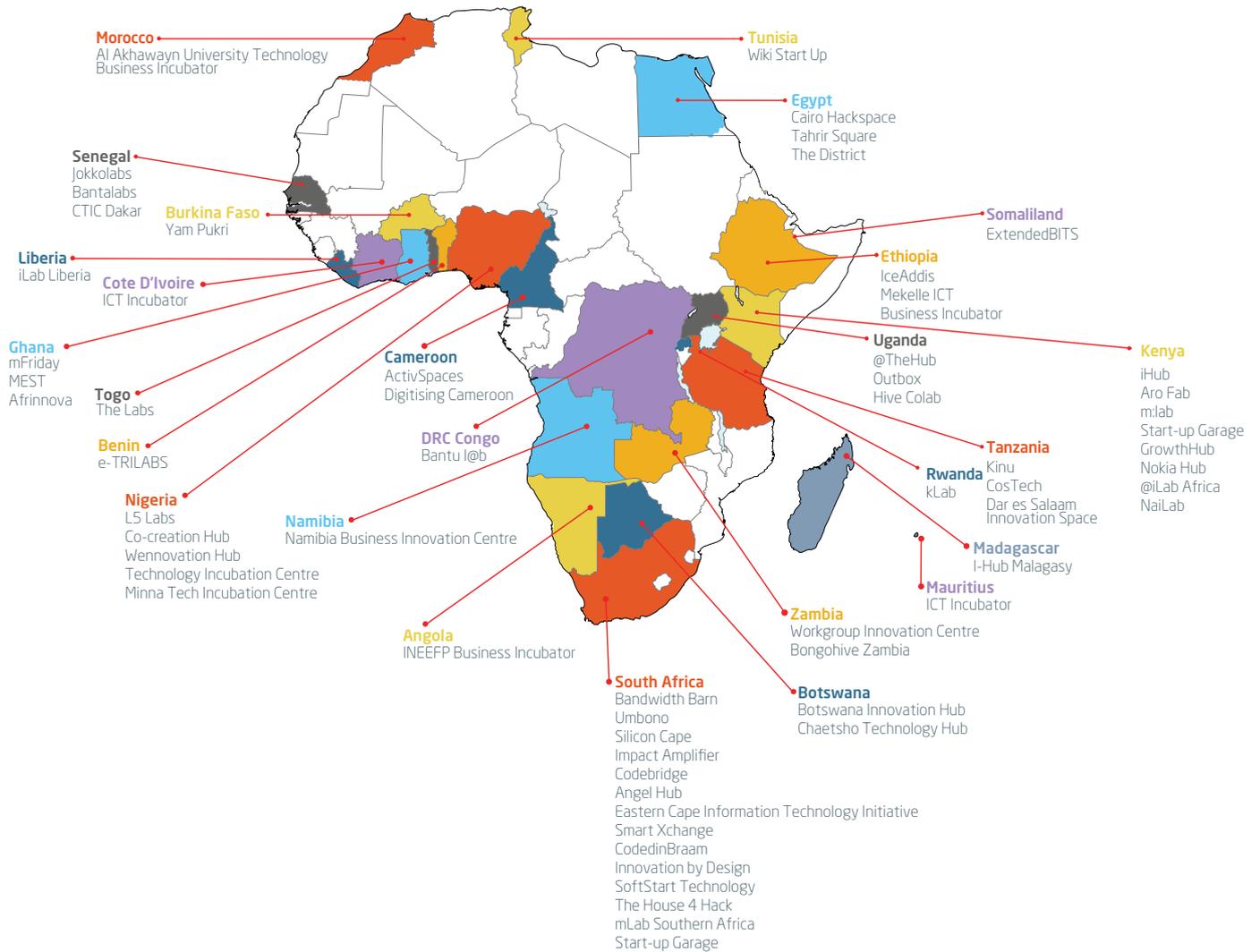
Above all there is need for monitoring and evaluation mechanisms of the activities, events, models and performance of the startups/members in the Hubs. This will be useful to ensure the Hub can be able to measure its success and growth against a set of indicators in line with the critical success factors as shown in the diagram below.

Figure 1: critical success factors for a hub



Source: Authors

From the studies that have been conducted by iHub Research, it is clear that open innovation through ICT hubs can be a nexus point for economic growth and 'techpreneurship' development in Africa. This is because, as statistics from different countries where all these hubs are based, ICT sector contribution to GDP has been increasing over the years as revealed in earlier section. Based on the numerous number of startups emerging from these hubs and the employment opportunities created, then there is no doubt that innovation Hubs presents an unprecedented opportunity for empowerment in Africa through creation of entrepreneurs, thus the hype surrounding technological hubs can be justified. According to Kalan (2013), there are estimated to be over 90 new African hubs in 20 countries since 2010. Kenya alone has currently more than 16 innovation spaces, which are centered on universities, rented spaces, banks and non-governmental organizations. Innovation technology hubs have been crowd mapped on earlier maps of the African continent by Bongo Hive via their [platform](#) for mapping the growing number of innovation spaces and hacker spaces around Africa as shown in figure 2 below.



These innovation spaces can be viewed as a catalyst for socio-economic development through creation of technology-led entrepreneurs. Entrepreneurship is often viewed as an important component in stimulating economic growth, innovation, competitiveness and alleviating poverty. The existing hubs under this study aim to achieve all these objectives in similar or different ways within their respective countries. E.g. through their activities and events, open innovation culture, guiding principles among other factors that make up their models.

Based on the finding of this study, there common evidence that the idea of openness and collaboration are often inbuilt in the architecture of these hubs especially through the theme of open innovation. Instead of small office cubicles associated with modern offices, these hubs provide open working spaces that foster the concept of co-working and serve as spaces for knowledge exchange and community building. Innovation hubs can be most effective when they harness the idea of openness and community-driven approaches through collaborative events, sharing knowledge and encouraging development of innovations that have a positive impact. Although most of the Hubs under this study are at nascent stages of development, much has been achieved and with the necessary support, their future seems bright.

The success of each Hub/Lab model also varies based on other external factors that contribute to the ICT growth of the country: ICT GDP, ICT support from the government, level of corruption, good infrastructure, ICT budgetary allocation, telecommunication investments and the innovation thirst of a country among others.

It is time Hubs (existing and new ones) realized that they are operating in different contexts: type and number of community members, culture, different support and infrastructure and different level of commitment of other useful stakeholders in their ecosystem. They should therefore work at building their community of entrepreneurs by solving an existing contextual need and nurturing budding entrepreneurs by meeting their requirements as early as they join the Hub.

With platforms such as *Afrilabs*, a network organization that builds on a common vision to promote the growth and development of the ICT Hubs around Africa by encouraging the hubs to work together. This will also increase their chances of success and creating greater opportunities for its members. Currently the network has 16 hubs. Part of the ones under this study are Activspaces, iHub, Bongo Hive and Mest.

What is more important is for the ICT hubs to work together in collective synergies and learn from each other keeping in mind if it works for one Hub, it may not work for the other. It is hard to replicate success, but by learning from other Hubs and working closely with their own community, each Hub may be able to find a 'sweet spot' to ensure their long-term sustainability by using the case studies of the existing Hubs as benchmark.

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