

## FACTORS IMPACTING ON THE CURRENT LEVEL OF OPEN INNOVATION AND ICT ENTREPRENEURSHIP IN AFRICA

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**ABSTRACT:** Across Africa, Innovation and ICT entrepreneurship are increasingly recognised as important enablers of national and regional socio-economic growth. However, the level of skills capacity, indigenous entrepreneurial expertise and policy support varies considerably. This research study was informed by a semi-structured, moderated focus group involving five public and four education and research stakeholders from eight African Member States. It focused on identifying factors impacting on the current level of open innovation and ICT entrepreneurship in Africa. Organised in Lilongwe, Malawi on 08 May 2015 during IST-Africa Week 2015, a purposive approach was applied to identify the nine informants based on intensity sampling. The results highlighted six main factors: a) level of political will reflected by resource prioritisation; b) alignment with national development plans and associated funding priorities; c) level of understanding of strategic benefits by ministers and senior civil servants; d) level of awareness and sensitization of the general public, e) availability of national innovation and entrepreneurial expertise; and f) willingness and capacity to cooperate with other stakeholders to achieve common goals. Future research will capture perspectives from the private, societal and international donor sectors, and create and validate potential models/methodologies to address the challenges and opportunities identified in this study.

**Keywords:** Open Innovation, ICT Entrepreneurship, Africa, Multi-Stakeholder Cooperation

### 1. INTRODUCTION

Innovation and ICT entrepreneurship are slowly being recognised as important enablers of socio-economic growth and realising national strategic goals (e.g. Vision 2030 Namibia, Vision 2030 Kenya, Vision 2020 Malawi) in African Member States. However, traditionally innovation ecosystems in Africa tend to be quite fragmented (Cunningham et al., 2014) and the policy and practical mechanisms to support the take up of Open Innovation and ICT entrepreneurship varies significantly from country to country.

Venkataraman (1997) suggests that the scholarly field of entrepreneurship aims to understand the creation, exploitation and impact of innovative products and services. Referencing various models of entrepreneurship in developing countries proposed by Osterwalder, Rossi and Dong (2002), Lingelbach et al. (2005), Vivarelli (2012) and IEG (2013), Cunningham et al. (2014) highlight that these models do not adequately address the need for adaptation to address local, national and regional differences. In a recent study focused on ICT-related collaboration and innovation capacity in Dar es Salaam, Kampala and Nairobi, Cunningham et al. (2015b) notes the imperative (while acknowledging the strategic challenges) of building an innovation and entrepreneurial culture that leverages contributions, insight and resources from all relevant stakeholder groups, both foreign and domestic.

OECD (2005) defines innovation as the implementation of a new or improved product, service, process, marketing method or organisational method for business, the workplace or

external relations. In a developmental context, this researcher adapts the OECD definition, defining innovation as improving products, services, processes, business models or policies in an existing context or adapting them from one context to another to achieve desired impact. This researcher defines adaptation as necessary changes required to achieve desired outcomes based on the needs of target end-user communities. These can be measured through Return on Investment (ROI), Return on Objective (ROO) and/or increased engagement or productivity.

Chesbrough (2003a, 2003b, 2006) defines open innovation as the use of “*purposive inflows and outflows of knowledge*” to accelerate internal innovation, and expand markets for external use of innovation. There is a rich and long standing research literature focused on Innovation. Chesbrough et al. (2006) credit Schumpeter with stimulating the study of innovation: Schumpeter (1934) which compared entrepreneurs with established companies; and Schumpeter (1942) which acknowledged the growing influence of private sector research on the innovation process. This has influenced the study of innovation since that time, with a very strong focus (particularly in the US) on private sector innovation.

Enkel et al. (2009) acknowledge the relevance of open innovation in commercial research. In the context of addressing developing country contexts, Cunningham, et al. (2015a) provide a brief summary of research focused on open innovation, national innovation systems and the benefits of taking a multi-stakeholder approach towards co-design.

Cunningham et al. (2014) argue that globalisation and technology and social innovation has expanded the universe of contributing innovation stakeholders. This should include public, private, education and research, societal, international development and funding organisations, as well as end-user communities and innovation spaces inside and outside national borders. The African Union Commission (2014) also acknowledges the important contribution of collaborative innovation and entrepreneurship to Africa’s socio-economic development.

This strategic importance of Innovation and Entrepreneurship is also recognized by Priority Area 3: Human Development, of the Joint Africa-EU Strategy (JAES) Roadmap 2014 – 2017, agreed at the 4<sup>th</sup> EU-Africa Summit. Section 30 emphasizes the importance of reinforcing cooperation between research communities, creating joint research programmes focused on innovation and the productive sector including research infrastructures. Section 31 commits to developing a long-term, jointly funded and managed research and innovation partnership. It recognizes the cross-cutting contribution of innovation, entrepreneurship, research infrastructures and technical skills development in Africa and Europe.

Despite this policy level recognition of the strategic importance of innovation and entrepreneurship for developing countries, as already noted, most research in these domains has focused on the economic and technology adoption context of developed countries. Reichman (2005) makes the important point that it is not possible to transplant open innovation models (such as between industry and the education and research sector) into a developing country environment without modification. Scheel and Parada (2008) reinforce this concept, by suggesting that the innovation value chain is significantly different in developed countries compared to developing countries.

This emphasises the importance of literature addressing innovation and entrepreneurship in developing countries. Much of the literature addressing developing countries is focused on China [e.g. Xia et al. 2012], India [e.g. Kolaskar et al. 2007] or South Africa [e.g. Beute 1992, Biseswar et al. 2012], with limited literature focused on other parts of Africa. Foster and Heeks (2010) note gaps in the literature related to the development role and potential of ICT micro-enterprises. Tessler et al. (2003) discuss the strategic importance of

ICT literacy and capacity in developing the public and private sectors as well as attracting foreign direct investment.

This study bridges this existing knowledge gap in an African context by identifying factors impacting on the evolution of mechanisms supporting open innovation and ICT entrepreneurship in Africa. This study is part of a series of papers based on longitudinal research focused on innovation ecosystems in Africa (Cunningham et al., 2014, 2015a, 2015b). Summarised results were reported in Cunningham (2015c). The findings from this study have important practical and policy making implications for strengthening national and regional innovation ecosystems as well as providing a useful foundation for further research.

### **1.1 Research Objectives**

This study aimed to identify factors impacting on the current levels of open innovation and ICT entrepreneurship in Africa.

Research objectives included to

- Determine which stakeholder groups are currently supporting open innovation and ICT entrepreneurship in a regional cross-section of 8 of 55 (14.5%) countries across Africa
- Analyse why open innovation and ICT entrepreneurship is (or is not) being actively supported at national and regional policy and implementation levels across Africa
- Assess the current perceived benefits, challenges and opportunities associated with supporting wider adoption of open innovation and ICT entrepreneurship in Africa
- Identify good practices related to how different stakeholder groups collaborate to support open innovation and ICT entrepreneurship in Africa

### **1.2 Research Questions**

The main research question of this study was what factors impact on the current level of open innovation and ICT entrepreneurship in Africa? (RQ1).

Sub-questions included:

- Which stakeholder groups are currently supporting open innovation and ICT entrepreneurship in Africa? (RQ2)
- What are the primary reasons why open innovation and ICT entrepreneurship is being actively supported at national and regional policy and implementation levels in some African Member States? (RQ3)
- What are the primary reasons why open innovation and ICT entrepreneurship is not being actively supported at national and regional policy and implementation levels in other African Member States? (RQ4)
- What are the perceived benefits, challenges and opportunities associated with supporting wider adoption of open innovation and ICT entrepreneurship in Africa? (RQ5)
- What good practices can be shared among innovation stakeholders based in or working in Africa? (RQ6)

## **2. METHODOLOGY**

### **2.1 Data Collection**

Based on the study aims, objectives and research questions, a qualitative approach to data collection was selected based on the possibility to achieve deeper understanding of the current situation, with a face to face survey selected as the research strategy (Denscombe, 2010).

As the purpose of this study was to capture insight from different contexts across Africa, an interview based data collection method was selected. Interviews can be carried out one-on-one, as a group and face to face or remotely (Denscombe, 2010). Having reviewed the different options, a semi-structured, moderated focus group was selected as the most appropriate data collection method. Focus groups typically consist of 6 – 9 people exploring attitudes, perceptions, feelings and ideas about a topic through moderated discussion (Denscombe, 2010). When it is possible to get appropriate experts together, a focus group is very useful in identifying and assessing any shared views on the issue being researched.

Firstly, it provides some degree of structure to facilitate comparative analysis, while offering the opportunity to collect richer data based on the insight and experience of informants and their interaction with one another (Denscombe, 2010). By facilitating reactions from informants to other contributions, this can enrich discussion as well as the data captured. Secondly, it was the most feasible research strategy based on availability of the researcher's contacts to participate in face-to-face meetings and the limited timeframe available in which to undertake the study. Thirdly, it was less time consuming than one-on-one interviews and offered the opportunity to make use of group dynamics and group interaction to elicit information (Denscombe, 2010).

IST-Africa Week 2015 (04 – 08 May, Lilongwe, Malawi) provided an excellent opportunity for face-to-face engagement with experts from the public and education and research sectors from across Africa. The selection of informants is discussed in 2.2 Sampling Strategy.

The focus group was held in a private meeting room in the Bingu International Conference Centre. Audio recording facilities were put in place to supplement contemporaneous notes taken by the researcher. After welcoming and thanking all informants, each informant was given two copies of the Informed Consent Form which they read and sign. The primary researcher presented a summary of the research study objectives and contextualised the focus group by presenting some definitions of open innovation and ICT entrepreneurship.

## **2.2 Sampling Strategy**

In the case of this study, an *exploratory sample* was selected, driven by the need to capture new insight and leveraging *non-probability sampling* based on expertise and experience (Denscombe, 2010). Purposive sampling offers the advantage of targeting informants based on their relevance and domain specific knowledge (Denscombe, 2010).

Based on use of purposive sampling techniques, the most appropriate approach for this study was intensity sampling (Creswell, 2007, Collins et al., 2007). Informants were selected for their capacity to share insight and experience based on their intense (but not extreme) experience of the phenomenon of interest. It was important to ensure good geographic coverage as well as balance in terms of both gender and sectoral representation.

For this study, the sampling frame was based on identification of senior representatives from the public and education and research sectors, with expert knowledge of open innovation and ICT entrepreneurship in an African content. The shortlist of potential informants was designed to ensure geographic and gender balance within the target sectors. Potential informants were invited to participate, with a brief explanation of the study research aims and objectives. They were informed that the focus group would be carried out in English and recorded. Each informant was assured that participation was entirely voluntary and that there would be no consequences of not participating. The sample of nine informants (5 females and 4 males; 5 public sector and 4 education and research sector) with geographic

coverage of Cameroon, Egypt, Kenya, Malawi, Mozambique, South Africa, Tanzania and Uganda was achieved with ten invitations.

### **2.3 Data Analysis**

Creswell's Data Analysis Spiral (2007) outlines five steps of data analysis and report writing which he considers to be “*interrelated and often go on simultaneously in a research project*”. These steps are: (1) data management; (2) reading and memoing; (3) describing, classifying and interpreting; (4) data representation; and (5) write up one or more versions of the research report (Randolph, 2008). This study leverages this model as outlined in section 3.1 Data Collection and Analysis.

Atlas.ti was used as the qualitative analysis tool for managing, coding, annotating and analysing the transcripts. The codes were grouped into code families focused on types of stakeholders supporting Open Innovation and ICT Entrepreneurship (section 3.2.1, figure 1), rationale for supporting Open Innovation and ICT Entrepreneurship (section 3.2.2, figure 2), barriers to supporting Open Innovation and ICT Entrepreneurship (section 3.2.2, figure 3), perceived benefits (section 3.2.3, figure 4), perceived challenges (section 3.2.4, figure 5), perceived opportunities (section 3.2.5, figure 6), good practices (section 3.2.6, figure 7) and incentives (section 3.2.7, figure 8). The tool facilitated quotations to be extracted related to the codes and code families which were then paraphrased for the purpose of presenting results. Figures 1 – 8 provide an overview of the codes per code family related to the specific research questions, and the number of times that each code appears in the transcripts.

### **2.4 Research Ethics**

There were no risks to informants based on participation in this study, which was voluntary. Informants were all adults, university graduates and fluent in English, and no vulnerable people were targeted. The informants all read and signed two copies of an identical Informed Consent form which were co-signed by the researcher (one retained by the researcher, one retained by each informant). All informants agreed that data collected could be used for the purpose of research, informing policy and associated publications (Appendix A). To ensure anonymity, each individual transcript was allocated a unique numerical code, with the original recordings and transcripts kept securely in Dublin, Ireland, only accessible to the researcher.

## **3. RESULTS**

### **3.1 Data Collection and Analysis**

The data was collecting using a moderated, semi-structured focus group. Following the focus group, the full transcript based on the audio recording was created in MS Word, and then segmented into individual transcripts to provide raw data for analysis. Each informant was allocated a code to ensure that data was sufficiently anonymised prior to being imported into Atlas.ti. Leveraging Creswell's model, as outlined in section 2.3, the data was prepared and divided into units of analysis, with meaningful statements identified, and memos, annotations and codes marked on the transcripts.

### **3.2 Results**

The results presented in the following sub-sections summarise contributions from informants in relation to: which stakeholder groups support open innovation and ICT entrepreneurship; primary reasons why open innovation and ICT entrepreneurship is and is not currently being supported; perceived benefits, challenges and opportunities; good practices; mechanisms to incentivise stakeholder collaboration; and issues related to intellectual property rights.

### 3.2.1 Stakeholders Supporting Open Innovation and ICT Entrepreneurship

There was strong agreement amongst the informants that a number of different stakeholder groups support open innovation and ICT entrepreneurship in Africa. These stakeholder groups include public, private, education and research and societal sector institutions, innovation spaces, foundations and international donors (Table 1). National funding agencies are included in the public sector. The variations in stakeholder emphasis from different informants' perspectives are interesting.

Figure 1 below provides an overview of the types of stakeholder groups articulated by the informants.



Figure 1: Types of Stakeholders Supporting Open Innovation and ICT Entrepreneurship

According to one of the informants, the President of Tanzania is personally involved in promoting entrepreneurship as a national strategic priority. Universities in Tanzania have been instructed to actively support students considering establishing their own business. Informant 6 noted the coordinated approach by the public, private and education and research sectors in Kenya to open innovation and entrepreneurship. While the government of Cameroon established a special fund to support ICT research and development, this is 80% funded by the telecoms sector, and civil society are actively involved in managing Innovation Spaces (Informant 8). Informant 5 discussed the integration of an ICT focused Innovation Space in the Science Park established north of Maputo by the Mozambican Ministry of Science and Technology. IST-Africa was recognised as actively supporting ICT innovation and entrepreneurship across the continent. Informant 9 focused on highlighting the engagement of the Malawi private sector (particularly telecom operators) in supporting ICT entrepreneurship. Informant 4 gave the example of their own university in South Africa having Innovation Spaces, a dedicated technology transfer office and open innovation and ICT entrepreneurship friendly policies.

Table 1 summarises some of the examples of different stakeholder groups identified by informants as supporting open innovation and ICT entrepreneurship. Some were mentioned generically by organisational type, while others were mentioned by name.

Table 1: Examples of Stakeholders Supporting Open Innovation and ICT Entrepreneurship

Organisational Type	Stakeholders
<b>Education and Research</b>	Universities in Cameroon; Universities in Egypt; Kenyatta University, Strathmore University, University of Nairobi, Kenya; Chancellor College, University of Malawi; Eduardo Mondlane University, Mozambique; NMMU, South Africa; Universities in Tanzania; Makerere University, Uganda
<b>Public Sector</b>	ANTIC (Cameroon); Academy of Scientific Research, ITIDA, Ministry of Communication and Information Technology, Ministry of Higher Education, Ministry of Scientific Research,

	Technology Innovation Entrepreneurship Centre ( <i>Egypt</i> ); Ministry of Education Science and Technology, National Commission for Science and Technology, ( <i>Kenya</i> ); eGovernment Department, Malawi Regulatory Authority, Ministry of Health, National Commission for Science and Technology ( <i>Malawi</i> ); UTICT, Ministry of Science and Technology ( <i>Mozambique</i> ); Department of Science and Technology, Department of Trade and Industry, eSkills CoLabs, Medical Research Council, National Research Foundation, National Youth Development Agency, Small Enterprise Development Agency, Technology Innovation Agency ( <i>South Africa</i> ); Uganda Communications Commission, National Information Technology Authority of Uganda (NITAU), National Council for Science and Technology ( <i>Uganda</i> ); African Union Commission; SADC; COMESA
<b>Private Sector</b>	Google; HP; IBM; Microsoft, Nokia; SA Breweries; Telecoms Companies, Press Trust in Malawi, Malawi Chamber of Commerce
<b>Innovation Spaces</b>	University hosted Incubation centres; ICT Incubators; Cameroon Innovation Hub, Centre for Entrepreneurship, Research and Innovation ( <i>Cameroon</i> ), Technology Innovation & Entrepreneurship Center & Smart Village ( <i>Egypt</i> ), Chandaria Business Incubation Centre, C4DLab, FabLab, @iLabAfrica, iHub, NaiLab ( <i>Kenya</i> ), Maputo Living Lab & Science Park ( <i>Mozambique</i> ), Centre for Community Technologies (NMMU), eSkills Co-Labs, Raizcorp, South Africa Institute for Entrepreneurship, The Innovation Hub ( <i>South Africa</i> ), BuniHub, KINU (Tanzania); HiveCoLabs, iLab@MAK, Outbox ( <i>Uganda</i> )
<b>International Donors</b>	African Development Bank; European Union; Ministry of Foreign Affairs of Finland; Japan, NORAD (Norway), SIDA (Sweden), DFID (UK), Newton Trust (UK); USAID, World Bank; Foundations.

### 3.2.2 Reasons why Open Innovation and ICT Entrepreneurship is and is not currently supported

Figure 2 below provides an overview of the rationale for supporting Open Innovation and ICT Entrepreneurship articulated by the informants.

Name	Grounded	Families
✦ Job creation potential	5	Rationale for Supporting Open Innovation and ICT Entrepreneurship
✦ Alignment with National Strategies	5	Rationale for Supporting Open Innovation and ICT Entrepreneurship
✦ Socio-economic growth potential	5	Rationale for Supporting Open Innovation and ICT Entrepreneurship
✦ Strengthen Innovation Capacity	4	Rationale for Supporting Open Innovation and ICT Entrepreneurship

Figure 2: Rationale for Supporting Open Innovation and ICT Entrepreneurship

There was general consensus around two main rationales for supporting open innovation and ICT entrepreneurship at national and regional policy and implementation levels across Africa.

Firstly, the informants shared a perception that in general, public sector leadership in the eight countries represented believed that supporting open innovation and ICT entrepreneurship was well aligned with national development strategies. There is a clear expectation that they have the potential to strengthen capacity and reduce youth unemployment and poverty.

Informant 3 emphasised the socio-economic growth potential of youth capacity building and potential benefits of poverty reduction as a rationale for addressing youth unemployment. Informant 7 noted that supporting ICT and entrepreneurship is part of Kenya's Vision 2030, based on the Government's appreciation that these areas have significant potential for job creation. In Cameroon, the primary objective of the national development strategy is to reduce unemployment (Informant 8). The Government has demonstrated its appreciation of the critical role ICT can play, based on the number of policies leveraging ICT as an enabler. Informant 4 believed there is a realisation in many African governments that entrepreneurship and innovation are key to growing African gross domestic product (GDP). The challenge is that despite political will, there is often insufficient enabling expertise, financial capacity or necessary infrastructure.

The second common rationale for supporting innovation and ICT entrepreneurship relates to the policy goal of strengthening innovation capacity. The objective is to encourage the establishment of new enterprises as well as import substitution by local enterprises creating solutions tailored to local societal challenges.

Mozambique is supporting innovation and ICT entrepreneurship because the country wants to develop domestic ICT capacity to address national needs and strengthen the formal economy (Informant 5). Informant 1 had the perception from Tanzania in particular, and Africa in general, that the key issue for most governments is youth unemployment. Supporting innovation and ICT entrepreneurship is an investment in future job creation and creating "*local solutions to societal problems instead of having to source everything internationally*". Informant 6 discussed the commitment of the Egyptian Government to continue investing in platforms such as Egypt Innovate and sustain programmes previously funded by UNDP due to their perceived impact potential. The public and education and research sector are working closely together to address societal problems, leveraging the relatively good ICT infrastructure that exists in the country.

Three main explanations were identified in relation to why open innovation and ICT entrepreneurship are not currently being sufficiently supported in African member states. Figure 3 below provides an overview of barriers identified to supporting Open Innovation and ICT Entrepreneurship:

Name	Grounded	Families
✘ Prioritisation of resources to other areas	4	Barriers to Supporting Open Innovation and ICT Entrepreneurship
✘ Limited availability of relevant expertise	3	Barriers to Supporting Open Innovation and ICT Entrepreneurship
✘ Lack of understanding of strategic benefits	3	Barriers to Supporting Open Innovation and ICT Entrepreneurship

Figure 3: Barriers to Supporting Open Innovation and ICT Entrepreneurship

A significant common challenge identified by informants was the lack of prioritisation for ICT, innovation and entrepreneurship when allocating available resources. Informant 2 discussed the impact of competing public sector economic interest, with ICT given lower priority compared to other sectors, particularly agriculture, defence and education. Informant 5 considered that the relative poverty of Mozambique was a key reason why funds were prioritised to other areas. This has resulted in inadequate national public sector investment to date in innovation and entrepreneurship. The limited availability of relevant expertise and lack

of understanding of strategic benefits are direct corollaries of the lack of prioritisation noted above.

Informant 3 noted the key challenges in their country of lack of capacity in those public sector institutions responsible for supporting enterprise creation and corruption and mismanagement of funds. Informant 6 suggested that a key challenge in Egypt was the lack of real world practical experience of those responsible for delivering innovation and ICT entrepreneurship programmes. Entrepreneurs supported by Innovation Spaces often note they learnt many things on their own, because those leading training programmes have "*never been there*". Informant 2 considered a key challenge in Uganda to be that ICT policies are not well articulated and formulated in a piecemeal way. While training is being provided, general skills levels are still low and they have fewer skilled people to develop and implement innovative ideas.

The weak understanding among many policy makers (sometimes at Ministerial level) and lack of public awareness of the strategic benefits of innovation and ICT entrepreneurship was the final common challenge identified. Informant 1 noted the difficulties many organisations have in understanding and identifying potential benefits. In Cameroon, leadership commitment is a problem in several ministries because responsible ministers do not understand the concept of ICT as an enabler (Informant 8). Informant 9 suggested a similar challenge in Malawi, where benefits are often not properly articulated and there is limited public advocacy of ICT entrepreneurship. As a result, ICT adoption and skills capacity building is not given appropriate attention or allocated necessary resources.

### 3.2.3 Perceived Benefits

It was interesting that the perceived benefits on which informants focused were intrinsically interlinked. There was clear alignment with the rationales described for why the African public sector actively support open innovation and ICT entrepreneurship. Figure 4 below provides an overview of perceived benefits of supporting Open Innovation and ICT Entrepreneurship.

Name	Grounded	Families
Employment Creation	7	Perceived Benefits
Higher Standard of Living	4	Perceived Benefits
Creation of Local Solutions	4	Perceived Benefits
Economic Development	4	Perceived Benefits
Inclusiveness	3	Perceived Benefits
Business Creation	2	Perceived Benefits
Tax Revenues	2	Perceived Benefits
Poverty Reduction	2	Perceived Benefits
Improving Transparency	2	Perceived Benefits
Addressing Societal Challenges	1	Perceived Benefits
Bridging Digital Divide	1	Perceived Benefits
Skills Development	1	Perceived Benefits
Preserving Indigenous Knowledge	1	Perceived Benefits
Export Potential	1	Perceived Benefits

Figure 4: Perceived Benefits of Supporting Open Innovation and ICT Entrepreneurship

Firstly, there was strong agreement about the significant potential for stimulating job creation. Informant 1 articulated that the biggest perceived benefits of ICT entrepreneurship by the public sector are "*more jobs, more business, potentially exportable products ... and*

*more tax money*". Informant 8 and Informant 4 were in general agreement, with Informant 8 adding that the perceived benefits for the *"man on the street"* was to address basic needs related to income and employment. Informant 5 and Informant 7 both focused on job creation opportunities in general, while Informant 2 focused on employment opportunities for youth. Informant 9 focused on opportunities for self-employment.

Secondly, there was also strong agreement about the perceived potential to contribute towards better quality of life by improving service delivery and reducing corruption. Informant 7 and Informant 9 discussed potential opportunities to improve service delivery. Informant 3 focused on how bridging the digital divide and the potential of ICT to preserve indigenous knowledge and reduce poverty. Informant 8 and Informant 9 also saw considerable potential for using ICT (supported by appropriate policies and enforcement) to increase public sector transparency and reduce corruption.

Thirdly, it was perceived that a major benefit was the creation of local solutions designed around local requirements, reinforcing the secondary rationale for supporting innovation. Informant 9, Informant 5 and Informant 6 in particular foresaw considerable potential benefits in creating local solutions addressing societal challenges in a variety of areas. Other perceived benefits included tax revenues, inclusiveness and export potential.

### 3.2.4 Perceived Challenges

Figure 5 below provides an overview of perceived challenges associated with supporting Open Innovation and ICT Entrepreneurship.

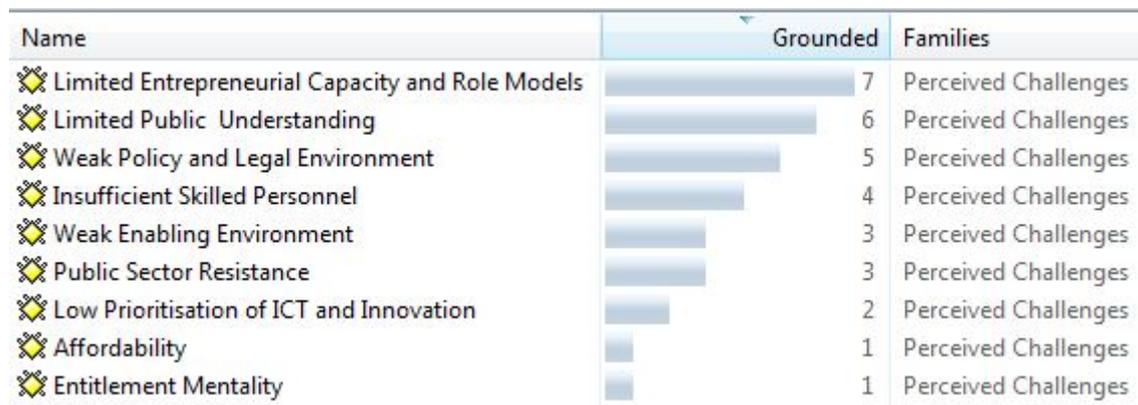


Figure 5: Perceived Challenges Associated with Supporting Open Innovation and ICT Entrepreneurship

The informants articulated a number of interrelated perceived challenges. The primary challenge identified was the limited pool of African entrepreneurial role models around which to build an open innovation and ICT entrepreneur friendly culture. While very successful entrepreneurship models exist, Informant 6 and Informant 1 agreed that there is a limited pool of experts in Africa who really understand entrepreneurship and open innovation. Putting it in the words of Informant 6; *"we don't want theoretical entrepreneurship, we want practical people who got their hands dirty"*.

Secondly, there were a variety of different reasons identified for why African governments tend not to prioritise supporting open innovation and ICT entrepreneurship. These range from resistance from government officials, afraid that wider ICT adoption by the public sector might expose inefficiencies, bad practices or corruption (Informant 8) to a perception that innovation and entrepreneurship is not core to changing or transforming society (Informant 6). Informant 6 also made the point that when funds are available, the public sector will apply them to address societal problems – ignoring that ICT can act as a

multiplier in this regard. Informant 1 also argued that from the public sector perspective, if the government supports ICT entrepreneurship, they may be perceived to be supporting people who are already doing relatively well compared to the general population in terms of education etc. There is also the challenge that ICT companies require a minimum level of skills, which requires public sector investment before it can solve “*the problem of uneducated, unemployed masses*”. Finally, Informant 5 discussed the need to develop a business model for supporting innovation and entrepreneurship to achieve some degree of sustainability for the day when support is no longer available.

Thirdly, barriers associated with ICT adoption and building an open innovation and ICT entrepreneur friendly culture were both socio-cultural, resource and skills related in nature. Informant 8 and Informant 4 talked about lack of confidence (particularly related to cybersecurity), lack of awareness and poor understanding of the strategic importance of using ICT. Informant 7 made the point that lack of confidence affects acceptance, which in turn slows the level and speed of adoption. Informant 4 also discussed issues related to affordability and accessibility as barriers to wider adoption of innovation and ICT. Informant 2 and Informant 4 both highlighted the critical barrier of lacking sufficient human resources with the appropriate skills to adequately support innovation and ICT entrepreneurship and the skills required to develop applications and be an entrepreneur.

While it is important to remember that some of these barriers may vary in intensity in the eight countries represented, none of the informants indicated that these issues do not reflect the reality on the ground in their country.

Finally, there were particular challenges associated with supporting adoption of open innovation and ICT entrepreneurship in rural communities, where the majority of Africans still live. Informant 7 talked about the lack of infrastructure in rural areas in Kenya and the fact that most available resources seem to be used in Nairobi. Informant 3 made the point that the people who can provide technical support for ICT work for big businesses in cities, leaving rural community based enterprises at a disadvantage. Furthermore, most of the ambitious entrepreneurs tend to leave for urban areas. Informant 3 also highlighted the need for education and training for prospective entrepreneurs because “*people do not understand the responsibilities that come with self-employment*”. One informant also discussed the risks of an entitlement mentality develop with over dependence on development aid.

### 3.2.5 Perceived Opportunities

Figure 6 below provides an overview of perceived opportunities as a result of supporting Open Innovation and ICT Entrepreneurship.

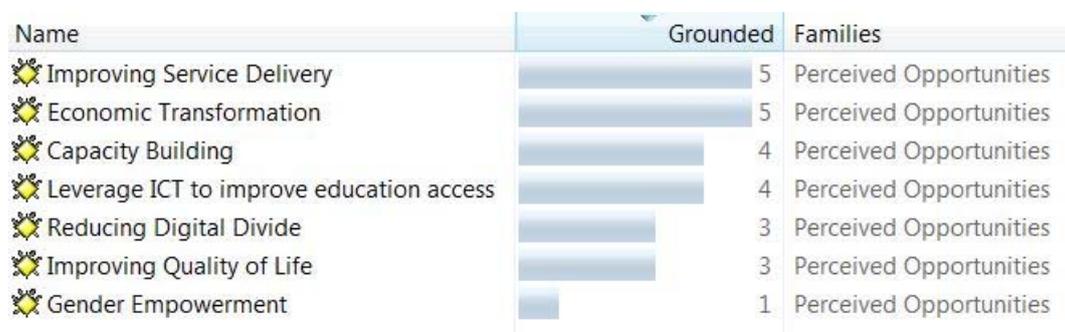


Figure 6: Perceived Opportunities as a result of supporting Open Innovation and ICT Entrepreneurship

Informants input in relation to perceived opportunities focused around four main areas. Firstly, improving service delivery was identified as a prime opportunity by many of

the informants, particularly for rural and other disenfranchised constituencies. Informant 1 described how using ICT to improve service delivery to poor people and rural areas is a long term objective of governments and international donors. The reality is that ICT has a key role to play, particularly in poor countries dealing with long term challenges associated with delivering services to large populations. This point was reinforced by Informant 7 who saw opportunities for ICT based services to improve quality of life and help achieve inclusiveness of disadvantaged groups, especially in rural areas. Informant 3 believed that rural areas in Southern Africa are badly underserved, and that supporting innovation and ICT entrepreneurship will help improve service delivery. Informant 2 saw clear opportunities to leverage ICT to help deliver innovative solutions in education, agriculture and health.

Secondly, economic transformation was also identified as an important opportunity. Informant 6 explained the widely held perception that due to Egypt's cultural background and language, it can access an enormous market across EMEA (Europe, Middle East, Africa). A combination of good capacity and relatively cheap labour in Egypt provide a foundation for innovation and entrepreneurship to act as a catalyst to transform the national economy. Informant 8 considered that innovation and entrepreneurship can improve production and increase economic growth. Informant 3 suggested that innovation can facilitate virtual incubation, which can be a good tool to support start up enterprises.

Thirdly, capacity building was seen as offering an exciting opportunity. Informant 4 focused on the transformational potential of open innovation and ICT entrepreneurship across Africa, particularly in the areas of skills capacity building and improved service delivery. Informant 5 agreed, emphasising the opportunity for national capacity building in the areas of skills, software and technology development. Informant 9 reinforced that consensus, emphasising the opportunities that mobile technology adoption presents to change lives by addressing social needs in the areas of education, healthcare and agriculture.

Finally, leveraging ICT to improve access to education, reducing the digital divide, research and gender empowerment were also identified as important opportunities. While Informant 2 focused on ICT solutions, Informant 8 discussed the opportunity to reduce the knowledge gap between urban and rural areas. Informant 3 and Informant 9 both focused on education, the former - educational and vocational training opportunities for young people through distance learning, the latter – researching innovation. Informant 4 discussed the opportunities that open innovation and ICT entrepreneurship offer to “*generate a whole new energized generation of women on the continent*”.

### 3.2.6 Good Practices

Figure 7 below provides an overview of good practices articulated by the informants.

Name	Grounded	Families
Multi-Stakeholder Collaboration	7	Good Practices
Living Labs	6	Good Practices
Supporting Capacity Building	5	Good Practices
Co-Creation	5	Good Practices
Skills Transfer	4	Good Practices
Innovation Programmes	3	Good Practices
Local Adaptation	2	Good Practices
Identify Synergies	1	Good Practices

Figure 7: Good Practices

The informants identified a number of good practices that could strengthen open innovation and ICT entrepreneurship capacity in Africa. First, informants highlighted the strategic importance of activities that actively encourage stakeholders to engage and cooperate, in creating a solid, sustainable foundation for open innovation and ICT entrepreneurship. Informant 9 talked about the potential benefits of coordinated collaboration between different stakeholders to create a single integrated solution achieving different impacts for participating stakeholders and maximising return on investment and objective by sharing costs. In Malawi for example, the ICT regulator, Ministry of Health and University of Malawi are working together to leverage skills in electronics, computer science and health. Informant 8 described an example of good practice from Cameroon, based on identifying innovative ideas through a public competition. Having shortlisted the most potentially impactful ideas, different stakeholders from the societal, education and research and private sector were invited to collaborate in deciding how to transform ideas into employment creating businesses.

Informant 6 discussed the benefits of collaboration with multinationals such as Intel and IBM and targeting students and recent graduates through hackathons and maker hackathons. These are potential good practices that can be used to simultaneously harvest good ideas and sensitise the public about innovation and entrepreneurship. Hackathons and maker hackathons are used to select the most suitable candidates to support through incubators or accelerators.

Informant 2 discussed the importance of avoiding duplication of effort and mechanisms to achieve that objective. These included stakeholder meetings oriented around creating synergies and workshops and seminars bringing together different stakeholders to discuss existing regional ICT Policy.

Secondly, the informants emphasised the role of Living Labs and the contribution of education, training and mentoring. Informant 1 and Informant 5 discussed good practices in the context of Living Labs, highlighting RLabs from South Africa and Maputo Living Lab from Mozambique. RLabs and Maputo are both focused on skills capacity building and the use of open innovation. However, RLabs is more oriented around engagement with local communities and community driven innovation, while Maputo Living Lab is developing software for public institutions responsible for agriculture and facilitating skills transfer between entrepreneurs and students.

Informant 1 gave the examples of an ICT-enabled entrepreneurship programme for women and Team Academy funded by the Finnish government. Based on experience in South Africa, the FEMTANZ Programme has proven successful in Tanzania and been replicated across Southern Africa. Focused on general entrepreneurship training, the TEAM Academy model originated in Finland and subsequently replicated in Tanzania. Informant 3 made the critical point that innovation change must be driven by end-user communities. Mentoring and hand holding were required hand in hand with good change management practices.

Thirdly, the informants noted difficulties associated with supporting ICT entrepreneurship, including issues related to incubation, and made some interesting observations. Informant 7 discussed the relative isolation in which some Innovation Spaces in Nairobi tend to work. Closer collaboration with the education and research sector would benefit everyone as well as providing access to mentors with a range of different skills. Informant 1 discussed the challenges associated with incubation and ICT entrepreneurship support mechanisms and made the point that it will take more time to determine the most successful approaches. This opens the door to exploring whether replicating existing models

or developing new one is more appropriate, as well as the opportunity to explore what works best in different contexts.

Finally, the informants made some recommendations of their own in terms of good practices. Informant 3 took a pragmatic, almost philosophical oriented approach, focusing on the necessity to understand and address the real needs of the public, the need for flexibility and adaptation reflecting the fact that each community is different and the strategic importance of guiding rather than leading innovation. Informant 7 recommended a coordinated multi-stakeholder approach, ensuring different stakeholder groups work together to solve problems and develop innovations. This approach ensures that the outputs of such collaboration are supported by other stakeholders and that no one is left behind. Informant 4 suggested that the most significant good practice that the rest of the world can learn from Africa is “*the use of mobile technology in innovation and entrepreneurship*”.

### 3.2.7 Incentives for Stakeholder Collaboration

Figure 8 below provides an overview of potential incentives articulated by the informants to promote multi-stakeholder and ideally multi-sectoral collaboration. Informant 2 made the important point that incentives are not limited to economic benefits – they could also be philosophical or humanitarian, depending on the drivers for the stakeholders involved. Informant 1 gave an international example of public sector good practice in this area, focusing on a strategic policy decision by TEKES, the national innovation and technology funding agency of Finland. 10 – 15 years ago, TEKES made it significantly easier for the education and research sector to access national research and innovation grant funding if they made a joint application with industry partners. Today this collaborative multi-stakeholder model is recognised as a success, creating an open innovation research culture in Finland.

Name	Grounded	Families
Financial and Economic	7	Incentives to Collaborate
Sensitization and Awareness Raising	7	Incentives to Collaborate
Non-Financial Advantages	7	Incentives to Collaborate
Opportunities for Mutual Benefit	4	Incentives to Collaborate
Multi-Stakeholder Engagement	3	Incentives to Collaborate
Public Sector Leadership	3	Incentives to Collaborate
Knowledge Sharing Opportunities	2	Incentives to Collaborate
Opportunities for Shared Ownership	1	Incentives to Collaborate

Figure 8: Potential Incentives to Promote Stakeholder Collaborations

Despite this, it is hardly surprising that in resource-constrained environments, financial incentives were a common response. Informant 4 focused on the critical nature of “*solutions for Africa, by Africa, in Africa*” in supporting open innovation and ICT entrepreneurship. The most relevant incentives for start-ups were the provision of experience, expertise and seed funding. Reflecting differences in national economic realities and expectations across Africa, Informant 9 recommended tax incentives to encourage multi-stakeholder collaboration of up to one and a half times the investment in open innovation and naming rights of labs for organisations sponsoring research facilities - a common phenomenon in developed countries.

Going beyond economic and social incentives, informants placed considerable emphasis on awareness raising and sensitization as critical to encouraging greater levels of collaborative research and innovation. Informant 2 stressed the need for stakeholders to be sensitized to the benefits of supporting innovation. Informant 3 focused on the contribution

that collaboration can make to strengthening teams and creating further innovation opportunities. Informant 3 noted the contributions of academia to increasing the body of knowledge and the need for entrepreneurs to be shown how collaboration benefits them. Informant 4 emphasised that sharing knowledge and skills capacity building was a key incentive to collaborate.

The informants noted the strategic importance of stakeholder engagement and a strong sense of common ownership. Informant 7 raised the issues of incentives and keeping the education and research and private sectors up to date with public sector plans. Informant 7 also raised the idea of participation of industry in public sector management boards. Informant 8 noted the important of shared IP ownership between collaborating stakeholders, balancing potential benefits with clearly defined rules for each shareholder. Informant 8 placed considerable weight on knowledge sharing between stakeholders.

The informants also emphasised the critical facilitating role of the public sector. For example, Informant 5 discussed the responsibility of the public sector in terms of capacity building programmes and policy leadership to encourage greater collaboration between different sectors. Informant 6 acknowledged that the current level of support for innovation was insufficient to strength the innovation ecosystem, suggesting that the public sector must also intervene to help universities build commercial spin-offs.

### 3.2.8 *Other Issues*

In concluding this Focus Group on Open Innovation and ICT Entrepreneurship, many of the informants identified Intellectual Property (IP) rights as a critical issue that had to be addressed. With the exception of South Africa, it was identified as a key weakness in many African countries, partially for cultural reasons which require active public sensitization.

While the existence of IP related legislation was noted by Informant 4, the challenges this creates for experimenting with open innovation was raised as an issue. This contrasts with the situation in other African countries where IP legislation does not currently exist, as is the case in Malawi (Informant 9). When discussing Tanzania Informant 1 noted that culturally it was acceptable to copy content, as the concept of copyright and IP ownership was either unknown or not well understood. Informant 9 noted difficulties when considering legislation in Cameroon, due to confusion about whether copyright protection should be for source code, the name of software or core functionality. The consequences for open innovation were noted by Informant 1. People are afraid that their creations will be copied as there are essentially no legal consequences of IPR theft. Informant 1 stressed the necessity in many African countries of informing legislation, and sensitizing and educating the public before open innovation can be more widely adopted.

## 4. DISCUSSION

It was obvious that all the informants believe it is beneficial to support open innovation and ICT entrepreneurship in an African context, despite the challenges and barriers identified. Considering the geographic diversity of the informants, this suggests that the results of this study may warrant further investigation in terms of broader geographic implications.

In relation to **Research Question One**, a number of key factors impacting on current level of open innovation and ICT entrepreneurship in Africa were identified by the informants. These include: level of political will reflected by resource prioritisation; alignment with national development plans and associated funding priorities, level of understanding of strategic benefits by ministers and senior civil servants, level of awareness and sensitization of the general public, availability of national innovation and entrepreneurial

expertise, and willingness and capacity to cooperate with other stakeholders to achieve common goals.

Findings and policy recommendations in the literature are generally consistent with the findings of this study, suggesting wider potential applicability and relevance across Africa. In a comparative analysis of factors influencing the development of different national innovation ecosystems, Al-Abd et al. (2012) noted the strategic policy and funding priority allocated to innovation by the US, France and Taiwan. While significant public research funding was available in each country, the private sector carried out much of that research. This strengthens national innovation and entrepreneurial expertise, while promoting cooperation between innovation stakeholders. In the context of applying these lessons to United Arab Emirates Al-Abd et al. (2012) focused on the strategic importance of public sector commitment, investing in innovation and skills development of local engineers and entrepreneurs and supporting the establishment of local businesses.

Naude et al. (2011) made the point that innovation requires highly knowledgeable, experienced and skilled entrepreneurs and highly-skilled labour. Public policies and investment in capability-building are key to fostering entrepreneurial innovation. James et al. (2011) found that collaboration between the public, private and societal sectors was critical in promoting innovation, and offering the key benefits of maximising impact and saving time and scarce resources.

The African Observatory of Science, Technology and Innovation (AOSTI) published an assessment of science, technology and innovation capacity needs and priorities in 2013. AOSTI (2013) recommended actions to address a key finding that most African policy makers did not adequately understand concepts related to innovation and innovation policy. NEPAD (2014) highlighted that many innovation-active companies in Africa collaborate with partners. Most collaboration partners were domestic and ranged from members of the supply chain to public and education and research sector organisations. The main barriers to innovation were research related costs and risks and lack of financial resources. The key recommendations presented in the Review are centred on four main themes: (a) improving the leadership, coordination and management of STI; (b) developing programmes that encourage innovation and technology adoption by the private sector; (c) growing the science, engineering and technical work force; and (d) creating incentives to align the public technology providers with the needs of the private sector.

In relation to **Research Question Two**, the results suggest that across the eight countries represented, there is generally a greater level of engagement by the public sector, Innovation Spaces and international donors in supporting open innovation and ICT entrepreneurship. (Table 1, Figure 1). In the case of private sector organisations, international firms, telecom operators and chambers of commerce are most active. There may be some correlation between perceived challenges associated with availability of national innovation and entrepreneurial expertise, but it is equally likely to relate to existing mandates and priority areas across different sectors. There is a significant opportunity for the public sector and international donors to mobilise greater engagement by the private, education and research and societal sectors. The public sector should consider active engagement with foundations.

In relation to **Research Question Three**, the primary reasons why open innovation and ICT entrepreneurship are being actively supported at national and regional policy and implementation levels in some African member states relate to top level government buy-in and perceived opportunities to address high levels of youth (and graduate) unemployment, which is critical to the successful implementation of African national development strategies. Addressing unemployment challenges requires a strong focus on capacity building of youth

for both employment and self-employment and supporting the creation of innovative local enterprises with the necessary skills and expertise to create solutions addressing local market needs. There is clear expectation that innovation and ICT entrepreneurship can play a critical role in enabling national solutions to pressing socio-economic and socio-cultural challenges.

The corollary is **Research Question Four**, which focused on explaining why active support for open innovation and ICT entrepreneurship was not forthcoming in some African countries. Reasons identified are both expected and unexpected. A source of considerable potential concern should be the clear potential disconnect in some countries between top level government policy buy-in and weak understanding of how policy will be implemented in practice by responsible line ministers and senior civil servants. A further source of concern should be the low priority placed on explaining to the general public how innovation and entrepreneurship can potentially have a transformational impact in their lives, and that investment in innovation and entrepreneurship can have a multiplier effect in key sectors such as education, health and agriculture. Without a minimum level of public understanding, it is easy to understand why available resources often ends up being allocated to other sectors of the economy. The perception that necessary government capacity to support enterprises and potential corruption are reasons for lack of prioritisation should result in countermeasures being put in place. Capacity building, strong local ownership and sensitization of both the general public and policy makers are critical to address these identified weaknesses.

**Research Question Five** is focused on perceived benefits, challenges and opportunities associated with supporting wider adoption of open innovation and ICT entrepreneurship in Africa. Perceived benefits clustered around the potential for stimulating job creation, supporting better quality of life by providing a framework to reduce the potential for corruption and improve service delivery (particularly to rural areas and other disadvantaged stakeholders), and finally, the creation of local solutions addressing local requirements. Perceived challenges associated with ICT adoption and building an open innovation and ICT entrepreneur friendly culture focused on the limited pool of entrepreneurial role models and potential mentors in many African countries, limited public sector prioritisation of resources, socio-cultural, resource and skills capacity barriers associated with ICT adoption and specific challenges associated with interventions in rural communities, where the majority of Africans still live. Perceived opportunities include improving service delivery, particularly for rural and other disenfranchised constituencies, economic transformation, capacity building, addressing the digital divide, research on innovation and gender empowerment.

Good practices highlighted to be shared among Innovation Stakeholders based in or working in Africa (**Research Question Six**) included: the strategic importance of activities that actively support stakeholders to engage and cooperate to create a sustainable foundation; leveraging mentoring, training and structured programmes to support capacity building; focusing on areas of strength such as use of mobile technologies and the necessity to provide an environment that addresses actual needs on the ground.

This is particularly important in the context of adapting training programmes that have been used successfully in other African countries. Incentives to support and motivate stakeholder collaboration proposed by the informants included a range of financial, philosophical and humanitarian alternatives, but above all stress the necessity of political leadership and creating a sense of common ownership.

These findings are aligned with literature. NEPAD (2014, p 149) recommended the need to further promote investment in research and development across Africa through options such as tax incentives and support for human capacity development. The report (p13 –

14) noted that critical issues including human resource development, employment creation, financing and incentives were addressed by science, technology and innovation policies in countries including Ethiopia, Ghana, Kenya, Lesotho and Mozambique.

InfoDev/World Bank (2014, p19) emphasised the need to provide technology entrepreneurs with support to both scale activities and attract funding. The lack of management training and business skills development prevent many entrepreneurs from formulating realistic business plans and convincing potential funding sources to provide financing to support growth. James et al (2011, p87) noted that in collaborative ICT4D projects located in areas with limited availability of critical skills, incentives were recommended to keep up-skilled personnel from leaving societal impact projects for better paying private sector employment.

This is a striking cognitive dissonance associated with some of the responses received to **Research Questions Two, Three and Five**. While there was clearly a strong correlation between support for innovation and ICT entrepreneurship and increasing employment opportunities, there was also a perception of a lack of necessary awareness of associated potential benefits and opportunities, not just amongst the general public, but also more worryingly, amongst some line ministers and senior civil servants. Despite top level government recognition and clear policy alignment with long term socio-economic development policy, potential barriers to public sector support for innovation and ICT entrepreneurship included the perception that those with the capacity to become ICT Entrepreneurs were privileged compared to the general population, ICT related employment opportunities were unsuitable for the majority of the unemployed – the uneducated, and lack of leadership commitment.

Investment is required in (a) sensitizing the general public and in particular the public sector, (b) education, training and mentoring to strengthen the skills capacity of entrepreneurs, potential entrepreneurs and stakeholders (including innovation hubs) supporting open innovation and ICT entrepreneurship, and (c) community building activities and incentives (financial and otherwise) to actively encourage greater stakeholder cooperation and coordination to maximise the impact of available, scarce human and financial resources.

Beute (1992) concluded that South Africa needed highly skilled technological personnel, innovation and entrepreneurship for economic development. While Biseswar et al (2012, p233) limit their concept of innovation and entrepreneurship collaboration to a triple helix model, they discussed the roles of the public, education and research and private sectors. The public sector can create an enabling environment for innovation, entrepreneurship and competitiveness through policy and legislation. education and research and private sector organisations have a key role in generating ideas, research and development, knowledge transfer and skills.

Kolaskar et al. (2007) also took a similar triple helix based conceptual approach. They noted the necessity of systematic reform of the tertiary and skills based vocational education sectors in India. The objective was to provide a framework to develop national capacity and facilitate collaboration between the public, private and education and research sectors. While Xia et al. (2012) took a game theory approach rather than an empirical approach, they found that the benefits of open collaboration were greater for all parties than semi-open or closed innovation. Reflecting the significant deficit of local entrepreneurship role models identified by this study, Ekeke (2015) noted that the creation of ecosystems fostering local champions capable of creating jobs is required to address the simultaneous growth in economic activity and youth unemployment in Africa. Foster et al. (2010) note that ICT micro-enterprises leverage both social and business networks in their day to day business operations. Tessler et

al. (2003) note the strategic importance of developing indigenous software development capacity. They emphasise the opportunities to create high value employment for engineers in software services, and educated non-engineers with appropriate language skills in ICT-enabled services businesses.

The findings of this study suggest that a high priority should be given to sensitizing and educating the general public as well as senior political and civil service leadership of the potential benefits of supporting innovation and ICT entrepreneurship.

#### **4.1 Practical, Societal and Ethical Implications**

The research findings have important practical, societal and policy making implications for African public, education and research, societal and private sector organisations. They also raise important issues that should be carefully considered by international donors including foundations in the context of considering how open innovation and ICT entrepreneurship could play an enabling role when supporting local, national and regional interventions.

The findings highlighted a number of practical issues that must be addressed to improve the wider adoption of Open Innovation and ICT Entrepreneurship. From a policy point of view, it suggests that there is a serious capacity gap to be addressed between policy objectives related to innovation and entrepreneurship and how these objectives are implemented in practice. It is not foreseen that there are ethical implications, other than consideration being given to how ICT can increase efficiency and transparency and reduce potential corruption.

#### **4.2 Verification of Data and Results**

Each individual transcript was annotated and coded incrementally. The credibility of the data has been determined based on achieving data saturation during data analysis. While each informant presented their own experiences and perspectives, it is interesting how discussion related to each research question clustered around a relative core number of common issues. The exceptions to this were related to Benefits (Figure 4) and Challenges (Figure 5) where there were a more diverse number of issues discussed. This reflects differences in the environment in different African Member States. The aggregated results were circulated to the informants following data analysis to facilitate further verification of the results presented in this paper. Informants confirmed that the aggregated results reflected their perception of the situation across the countries represented in the Focus Group.

Each step undertaken in relation to sampling (section 2.2), methods selection (section 2.1), data collection (section 2.1) and analysis (sections 2.3 and 3.1) has been clearly documented to support confirmability by other researchers. Furthermore, the coding of the transcripts was independently checked by another researcher for consistency, with a positive result.

Transferability opportunities could include checking if findings are generalizable in the context of a similar study with wider geographical (and sectoral) representation across Africa. There is a high level of dependability of the results as the same process was followed in terms of both data collection and analysis.

#### **4.3 Limitations of the Findings**

There were a number of key limitations of this study. Based on good practice, the focus group was limited to nine participants. While this number falls within the minimum sample size recommendations for the most common research designs (Collins et al, 2007, p273), this is still a relatively small sample size. A deliberate limitation of this study was to only engage

with public and education and research sector informants, with a view to gathering intelligence from policy makers and institutions with a mandate to support policy implementation as it relates to innovation and ICT entrepreneurship. The nine informants (5 women, 4 men) were selected from the public and education and research sectors (five public sector, four education and research sector) in eight African member states (Cameroon, Egypt, Kenya, Malawi, Mozambique, South Africa, Tanzania and Uganda). While this provides geographic representation from Northern, Southern, Eastern and Central Africa, the findings of this study may not be representative of the situation in other African Member States.

This approach essentially excluded gathering perspectives and insights from other relevant stakeholder groups including the societal, private and funding sectors and critically, both prospective and existing ICT entrepreneurs. It is quite likely that the perspectives of societal, private and broader funding sector stakeholders may be different to those shared by the participating informants.

The focus group was also conducted entirely in English with informants who had a high level of fluency in English, but different mother tongues. This decision was made to facilitate identification of shared or divergent views (Denscombe, 2010) in a common language, and avoid the potential confusion and significant costs associated with use of simultaneous translation and a requirement for multilingual transcription. However, it is possible that additional nuances or details may have been captured if all questions and answers were in the mother tongue of each informant. While gender balance (5 women, 4 men) and geographic diversity was addressed, because only two innovation stakeholder groups and eight countries were represented, it is possible that the results may be biased to some degree because of these study constraints.

#### **4.4 Future Research**

Given that this study focused on capturing the perspectives of key innovation stakeholders from the public and education and research sectors, a future study will undertake a focus group with representatives of the private, societal and international donor sectors. Future research will also examine (a) whether these results are generalizable in other African countries, (b) identify differences and similarities in perspective and experience from the private, societal and international donor sectors and (c) create and validate potential models/methodologies to address the challenges and opportunities identified in this study.

### **5. CONCLUSION**

This research study focused on evaluating factors impacting on the current level of Open Innovation and ICT entrepreneurship in Africa. The research questions were answered by analysing results from the Focus Group. There was strong agreement in relation to the long term benefits of supporting Open Innovation and ICT Entrepreneurship in an African context, despite the challenges and barriers identified.

Following data analysis, the results highlighted six main factors that impact on the current level of Open Innovation and ICT Entrepreneurship in Africa: a) level of political will reflected by resource prioritisation; b) alignment with National Development Plans and associated funding priorities; c) level of understanding of strategic benefits by Ministers and senior civil servants; d) level of awareness and sensitization of the general public, e) availability of national innovation and entrepreneurial expertise; and f) willingness and capacity to cooperate with other stakeholders to achieve common goals.

Based on the results, there is a greater level of engagement by public, education and research, societal and international donor sector organisations than private sector

organisations in supporting Open Innovation and ICT Entrepreneurship across the eight countries represented. While it was agreed that investment in Open Innovation and ICT Entrepreneurship can assist in addressing critical socio-economic challenges associated with unemployment and enabling national solutions, challenges to be addressed include capacity building, funding priorities and building an open innovation and ICT entrepreneur friendly culture.

Mechanisms suggested to address these challenges include: a) facilitating activities that actively encourage stakeholders to engage and cooperate, in creating a solid, sustainable foundation for Open Innovation and ICT Entrepreneurship, such as Living Labs; b) aligning grant funding with co-creation of products and services; c) awareness raising and sensitization to the associated benefits and d) capacity building to increase the availability of national innovation and entrepreneurial expertise.

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