Tech Hubs, Innovation and Development

Abstract:

This paper critically discusses of the relationship between innovation and development by presenting as case of a Technology and Innovation Hub. It draws upon the capability approach by Amartya Sen to understand the implications of tech hubs in development. We argue that tech hubs, as collaborative spaces, may contribute to human-centred development processes in ways not directly linked to employment or market-based products. This advances a human-centred view of development which focuses on aspects of well-being and agency that people have reason to value. Conceptually the paper proposes an understanding of innovation for development as (often unequal) social processes which might contribute to human development if and when the people involved perceive value in the processes, and these values include improving their own communities and society.

*Keywords:* innovation, development, tech hubs, capability approach

# Introduction

A technology and innovation hub (sometimes referred to as a tech hub or ICT Hub) is a space where technologists, computer scientists, hackers, web developers and programmers congregate to network, share programmes and design to bring their ideas to fruition (Gathege & Moraa, 2013b). In broad terms they represent a form of co-working office space that can offer a variety of services like community building, pre-incubation, incubation and acceleration.

Tech hubs in Africa have grown consistently over recent years, and now number over 100 (Kelly & Firestone, 2016). The discourse around tech hubs in Africa has been characterized by an optimistic and promising view. International organisations, venture capitalists and other relevant actors have placed a lot of attention into these tech hubs, promoting ‘entrepreneurship’ and ‘innovation’, encouraging people to set up their own start-ups and work towards their own development. For International Organisations, the effect of these tech hub phenomena will help ‘grow successful businesses stimulating job creation and generating new sources of revenue for the mobile industry [...]’(GSMA Mobile for Development, 2014).

This view is consistent with academic literature. Many authors have concluded that innovation and entrepreneurship are crucial for poverty alleviation and long-term economic growth (Fagerberg, 2009; Hall et al., 2012). This narrative of driving development through innovation and entrepreneurship implies that individuals are considered firstly entrepreneurs and innovators, who are seen through principles of individualism and the market, and secondly as citizens involved in development processes.

Innovation as a term should be unpacked further when looking at the so-called “developing countries”, because the way it is being done does little to capture the varied types of actual innovation processes (Srinivas & Sutz 2008). In this paper we seek to contribute to the discourse of innovation and development by expanding the concept of development from industrial an economic growth to what Amartya Sen (1999) calls “the expansion of substantive freedoms”, that is, enhancing the choices for individuals to lead a life they consider valuable (Chew, et al., 2013). From this perspective, our research questions is: What could be the role of tech hubs in development through the lens of innovation? In short, the paper problematises the relationship between innovation and development argue that we should move beyond the focus on competitive advantage and economic growth.

The paper is organised as follows. We start by giving a brief overview of the mainstream discourses that have framed the vast spread of tech hubs, and present selected streams of literature on innovation and development. We then examine the concept of development and present the capability approach as an alternative view to assess the impact of innovation. The case study presents thematic analysis of findings under the guidance of the capability approach. We conclude by discussing the developmental implications of tech hubs and an alternative view of innovation for development.

# The promise of tech hubs

In an interview at the Quartz Africa Innovators Summit in 2015, Ory Okolloh, a well-renowned African entrepreneur, explains why entrepreneurship and innovation in Africa do not equate development[[1]](#footnote-1):

“*I’m concerned about what I see is the fetishisation around entrepreneurship in Africa. It’s almost like it’s the next new liberal thing. Like, don’t worry that there’s no power because hey, you’re going to do solar and innovate around that. Your schools suck, but hey there’s this new model of schooling. Your roads are terrible, but hey, Uber works in Nairobi and that’s innovation.”*

She then goes even further to explain:

“*We can’t entrepreneur our way around bad leadership. We can’t entrepreneur our way around bad policies. Those of us who have managed to entrepreneur ourselves out of it are living in a very false security in Africa. There is growth in Africa, but Africans are not growing. And we have to question why is there this big push for us to innovate ourselves around problems that our leaders, our taxes, our policymakers, ourselves, to be quite frankly, should be grappling with*.”

Tech hubs in Africa represent the dichotomy faced in the continent: a region affected by famines, corruption, poverty and civil wars, but at the same time undergoing a digital and mobile boom. In this respect, where is this ‘big push for us to innovate ourselves’ coming from? Who is ‘pushing’ this agenda in the continent? Ory Okolloh speaks from a critical view because the idea that entrepreneurship is the solution to more complex problems in development is a problematic one (Bradley, Mcmullen, Artz, & Simiyu, 2012). The promise behind hubs is that it not only constitutes a space for entrepreneurs, who cannot afford their own office spaces to work, but also to be a source of inspiration, creating collaborative possibilities for innovation (GIZ, 2013). The industry considers that young people see a future in the growing private sector economy instead of the aid industry. And hubs in Africa are filling the gap between “[…] the community of academic and private sector players that technology innovation needs to spur economic growth” (GIZ, 2013).

These ideas represented an opportunity for both development organisations and the private sector to collide and support hubs. Some partnerships were made with the aim to foster innovation, where mobile phone companies would participate with ‘private-sector’ orientation, providing technical and market expertise. These collaborations looked to ‘benefit the broader economy and society, job creation through small and medium enterprises (SMEs), as well as improved knowledge on the opportunities of business incubation and mobile apps to enhance the productivity of SMEs’ (InfoDev, 2014). In this respect, interest from development organisations concentrated on targeted growth-oriented entrepreneurs, because of their potential to be ‘the most significant contributors to overall economic growth and transformation’ (p. 18).

The underlying assumption behind these discourses demonstrates a strong link between ideas of innovation and entrepreneurship with economic growth, which is also reflected in the academic literature. Innovation is widely studied across different disciplines, but we are mainly interested in the notion of innovation in relation to development. The next session presents a review of literature of innovation concepts and how they have been framed in relation to development.

# Innovation and Development

Innovation literature indicates that it cannot be confined to any single discipline (Fagerberg, 2009; Pansera & Shanker, 2014). This area of research goes back to Schumpeter's (1934) seminal work on long run economic change, what Schumpeter called “development” (Fagerberg, 2009). Scholars from different disciplines have invested efforts in studying ways in which innovation can be improved, enhanced, encouraged and diffused (Fagerberg, 2009; Srinivas & Sutz, 2008). Most of this work highlights the contribution of innovation to making countries wealthier, firms more competitive, and markets more profitable. Innovation has been mostly observed as a catalyst of economic growth (Gitau et al., 2010; Kesidou & Romijn, 2008; Williams & Woodson, 2012), the explicit linking of innovation to economic development as a process (Gitau et al., 2010; Kesidou & Romijn, 2008; Mccormick, 2011; Sabir & Sabir, 2009); and the role of entrepreneurship and innovation as a major enhancer of a country’s competitiveness (Acs & Amoros, 2008).

To elaborate, we present three streams of literature that takes various positions with regard to the relationship between innovation and development: National Innovation Systems literature (Chaminade et al., 2010; Freeman, 2002; Nelson, 1993), the Diffusion of Innovation (DoI) (Rogers, 1995) and Technology Acceptance Model (TAM) (Davis et al., 1989) and Inclusive Innovation (Altenburg, 2009; Foster & Heeks, 2013). Although not exhaustive, this list of concepts has been extensively applied to help explain how innovation has an impact the development of a particular region, community or individual. These concepts have also been widely applied to explain phenomena in the so-called “developing countries”[[2]](#footnote-2), which is why we considered them most appropriate for illustration.

## *Innovation as Institution Building*

A noteworthy stream of literature has focused on the concept of National Innovation Systems (NIS). Even though there is no agreement on the definition (for further review on the concept see (Lundvall, 1992), the OECD reviewed all existing definitions and explains that the concept of NIS “[…] rests on the premise that understanding the linkages among the actors involved in innovation is key to improving technology performance (OECD, 1997, p. 9)”.

The concept of NIS is considered a key framework for analysing technological change because of its well-renowned impact of the long-term economic development of a nation (Kayal, 2008). Some authors have focused on looking at what works in already existing NIS, coming normally from the Global North, to see how it can be applied to countries in the Global South. For instance, Bartels et al. (2012) conducted a study for identifying, standardising and analysing which factors are determinant for NIS in “developed economies and emerging markets” to see how these can provide valuable insights for the “developing countries with not so high-performing economies (p. 2)”.

For Lundvall (2007), when applied to the South, the concept of NIS should change its focus to a “catching up” paradigm and, as such, should look at building a system and promoting it. He explains that “borrowing” and adapting technologies, as well as inviting foreign firms and experts are things that need to be considered for building strong NIS (p, 112). Furthermore, Lundvall also considers that NIS are important because it is believed to expand learning and knowledge capacities in the global south. Concepts like “information divides”, or “digital divide” focus on the wrong issues. They should in fact focus on the enhancing opportunities for agents to engage in learning and competence building, what he terms as the “learning divide”. Lundvall states that “[I]n economic terms development depends on technical and organizational change brought about by continued processes of innovation (p, 114)”. Innovation, then, brings technical and organisational knowledge which typically stems from advanced industrial economies that is supposed to be conducive for economic growth.

However, there is limited evidence of success in relation to building NIS in the Global South, because the assumed impact on economic growth has been proven unsuccessful many times due to weaker legal systems, informality, deficient infrastructure, weaker education systems and many other issues found in the literature (Altenburg, 2009). Only a relatively small number of success stories are reported from the global south where government action has been instrumental to spur new or to strengthen knowledge-based activities, which are fundamental for NIS (Ibid). Furthermore, trying to replicate a model from the Global North to the Global South could create a path dependence that only enhances differences and inequalities between both regions. Like many other concepts about innovation which stemmed from a western context, NIS seems to reproduce a dichotomy that is not only limited, but is also problematic in our understanding of how innovation can have a beneficial impact in people.

## *Innovation as Diffusion of Technology*

Diffusion of innovation is the body of literature that has been mainly concerned with explaining how a new idea or innovation propagates in a social system. In this respect, the Diffusion of Innovation (DoI) (Rogers, 1995) and the Technology Acceptance model (TAM) (Davis, 1989) have been widely used in information systems research and consequently constitute the dominant theories in studies looking at the role of ICTs for development (ICT4D) in the last two decades (Annika & Hatakka, 2013; Zheng, 2015).

DoI offers an insight into how new ideas spread within populations. According to Rogers (1995), there are four elements that influence the spread of a new idea: innovation, communication channels, time, and a social system. Furthermore, he proposes five different stages (knowledge, persuasion, decision, implementation and confirmation) that the innovation has to go through for it to be spread via different communication channels. In this way, Rogers’ model describes the innovation decision process.

The diffusion model is relevant to studies of innovation; however, the fixed and simplistic aspects of the model offer some methodological limitations, noticeably when different flows of information alter the innovation cycle (Agarwal et al., 1998). From this model, the diffusion seems to be almost automatic and mechanical and does not consider the social dynamics of how and why an innovation is actually adopted.

TAM attempts to explain and predict how users come to accept and use a technology. According to TAM, the effects of external variables on intention to use depend on the perceived usefulness and perceived ease of use (Venkatesh & Davis, 2000). Studies applying this model seek to identify these aspects to explain or predict whether users will indeed use a particular technology.

Several scholars have pointed out that both DoI and TAM present some shortcomings given how they seek to predict or explain phenomena which is conceptualised in a narrow manner. This genre of research tends to take for granted different aspects of context and structure that shape the innovation, sometimes considering people as passive social groups that exist independent of the object (Akrich et al., 2002; Rye, 2009). There is inadequate attention to issues of power, politics and culture, which affect users’ interaction with innovation, or the embedded values in the design of innovations (Zheng, 2015).

Apart from its methodological and theoretical limitations, it has been pointed out that despite the attempts to improve the model by numerous publications which gives the impression that an accumulation of knowledge is occurring (Benbasat & Barki, 2007), TAM has reached saturation level (Chuttur, 2009). Furthermore, a strong influence of TAM on information systems research has rendered concepts like perceived usefulness and perceived ease of use to be treated as ‘black boxes’ without any questioning of their usefulness in the understanding the complexity of technological adoption in various social contexts.

Information systems research generally shares the view that ICT innovation should be pursued mainly to foster economic growth and to enhance productivity, with very little discussion on what kind of growth is more inclusive and holistic (Xiao et al., 2013). The focus is on the adoption and diffusion of innovations, rather than the emergence of innovations. In fact, the adoption and diffusion of technology itself are considered to be development, as equivalent of modernisation and improvement of productivity. Behind the simplistic and fixed view of these theories is an underlying assumption that innovation automatically represents progress, without asking who is innovating, for whom and what, and under what circumstances. Furthermore, there is a need to go beyond an understanding of innovation or technologies as merely a set of tools and techniques, as opposed to socio-technical assemblage that is embedded in ideologies, social norms and power structures (Zheng and Yu, 2016).

## *Innovation as Social Inclusion*

Inclusive innovation is certainly more sensitive to social inequalities. It is defined as “the development and implementation of new ideas which aspire to create opportunities that enhance social and economic wellbeing for disenfranchised members of society” (George et al., 2012, p. 663). Even though there have been attempts to more succinctly define and study inclusive innovation, the topic is still relatively under researched and under conceptualised (Foster & Heeks, 2013). Although somewhat subtle, in this stream we gather all studies that focus on innovation in the non-business context, including innovation at the grassroots level (‘grassroots innovation); innovation at the Bottom of the Pyramid (BoP) (Pansera, 2013), and inclusive innovation (Foster & Heeks, 2013; George et al., 2012). In contrast, the marginal but emerging stream of research on frugal innovation (Bhatti, 2012; Zeschky et al., 2011) shows how innovation could take place in resource-deprived environments. These concepts are able to demonstrate that even in the most deprived environments innovation could be found, and organisations that wish to deploy innovations should overcome existing biases about the poor (London, 2008).

A key common trend in this work seems to be on the structures and processes required to develop and deliver innovative (goods and services) for poor consumers (Foster & Heeks, 2013). The focus then, seems to be on the impact of innovation on users/consumers (Foster, 2014). With regard to the impact of innovation on development, authors writing about inclusive innovation conceive development in terms of an active inclusion of those already excluded, such as people living with lowest incomes, women, youth, disabled and ethnic minorities (Foster & Heeks, 2013). For example, some studies have looked at how innovation can help improve the livelihoods of people in the informal economy (Utz & Dahlman, 2007).

Development then, is seen in terms of expanding the inclusion of the most disadvantaged population in the benefit of economic development. Innovation is evaluated in its relevance to the excluded, on whether the excluded are involved in the development of innovation, on whether the excluded are able to adopt innovations and whether innovation has a beneficial effect in the livelihoods of those excluded. Compared to mainstream innovation literature, this stream of literature is inspiring in that it pays more attention to the *who* question, i.e. who innovates or who benefits from the innovation, while leaving the *what* question open. As we will discuss next, people is often the inviable element in studies of innovation and development.

## *The Invisibility of People in Innovation*

Studies on innovation are characterised by what is presented as the invisibility of “people” in innovation (Agnete Alsos et al., 2013) meaning that most studies fail to focus on who is innovating, that is, the individual level of innovation. Blake & Hanson (2005) argue that innovations do not result in a vacuum and are products of people who are embedded in particular socio-cultural contexts. This suggests the need for a wider understanding of innovation, one that does not confine innovation with purely economic and technological understanding (Steyaert & Katz, 2004).

While the entrepreneurship literature does focus on entrepreneurs as individuals, they are usually conceptualised as a *homo œconomicus*, that is, rational, risk-taking individuals seeking profit maximisation, leaving little considerations to social, cultural and institutional contexts of entrepreneurship. According to Read (2009), Foucault mentions that “Homo œconomicus is an entrepreneur, an entrepreneur of him-self […] being for himself his own capital, being for himself his own producer, being for himself the source of [his] earnings (p, 26).” Entrepreneurs are people who need to respond to market changes and bear the associated risks (Dejaeghere & Baxter, 2014).

In the Global South, entrepreneurs are believed to not only seek to maximise their own wealth, but also empowerment and agency. This form of empowerment has an emphasis on individual rationalities and self-sufficiency (Altan-Olcay, 2014). Individuals therefore are expected to bear the responsibility to get themselves out of poverty, notwithstanding broader structural and institutional constraints. They are therefore either absent or treated as self-interested economical rational being, a ‘one-dimensional’ view of the individual grounded in neoliberalism. We argue that a different conception of individual agency is needed to understand innovation and development.

In the next section, we draw upon Sen’s capability approach to reconceptualise innovation as holistic processes to expand individuals’ capability set. The capability approach considers the well-being and agency freedom of individuals as the basis of evaluating development.

# *Innovation as Expanding Capabilities*

The capability approach (CA) developed by Amartya Sen (1999, 2002) is rooted on the idea that the quality of human lives can and should be taken into account when assessing human progress (Wells, 2012). It has become in the past years one of the most adopted development theories, both as a critical perspective and an evaluative framework with a specific definition of development as expansion of substantive freedom (Zheng, 2009).

More explicitly, Sen’s definition of development is “a process of expanding the real freedoms that people enjoy” as well as “the removal of major sources of unfreedom: poverty as well as tyranny, poor economic opportunities as well as systematic deprivation, neglect of public facilities as well as intolerance or overeactivity of repressive states (Sen, 1999, p. 3)”. The concept of freedom is used in a broad sense to refer to the effective opportunities an individual has to effectively lead a life that he or she has reason to value (Sen, 1999). In that respect, the CA separates the achieved “beings and doings”, i.e. *functionings* of a person, from *capabilities*: “the various combinations of functionings that a person can achieve (Sen 1992, p. 40)”. According to Sen, from a human development perspective, “[...] the creation of social opportunities makes a direct contribution to the expansion of human capabilities and the quality of life [...] (1999, p: 144)”.

The CA has been widely operationalised and applied in ICT4D (e.g. Zheng and Walsham, 2008, Andersson et al., 2012; Hatakka & Lagsten, 2012; Kleine et al., 2012). If innovation does in fact contributes to social progress, then it is reasonable to apply the capability approach as an evaluative framework to conceptualize and evaluate these phenomena.

The CA embraces “ethical individualism”, which “postulates that individuals, and only individuals, are the units of moral concern” (Robeyns, 2005, p. 107). However, it does not imply an a-structural or a-political position. As Kleine (2013) explains, “ [by] putting the individual first and positing that the role of the economy is to serve individuals in their quest to lead the lives they have reason to value, Sen merely redefines the focus of attention (p, 28).” While there has been a focus on the well-being aspect of individual freedom in the application of the CA, the idea of “agency” is also fundamental in the CA (Crocker & Robeyns, 2009) and critical to challenge the perception of people in the global south as merely passive receivers of innovations (Zheng & Stahl, 2011). Sen (1999), when referring to the “agency aspect of the individual” explains that “individuals can effectively shape their own destiny and help each other (p. 11).” People are actively involved in their development and; in fact, their need and aspirations are the ones that matter. This idea of agency in the CA differs greatly from the idea of agency in the innovation and entrepreneurship literature, in that agency is defined as the freedom to set and pursue one’s own goals and interests, which is much broader than pursuing employment and wealth. Thus development is evaluated in terms of the capability set based on individual values.

By using the CA to evaluate innovation processes, we are taking into account the needs and aspirations of those whose interests are affected by the innovations. What this means is that the impact of the creation, adoption or diffusion of the particular innovation should not be seen merely in economic terms; but also in terms of the extent to which it expands people’s well-being and agency, opportunities and choices. In this respect, what makes it relevant to the CA is the fact that the processes or work are valued by the innovator.

A similar line of thought has been followed with the concept of entrepreneurship. People can value being entrepreneurial for various reasons apart from it being a vehicle for material gains (Naudé, 2013). For instance, Gries & Naudé (2011) propose a model in which human development is associated with a higher degree of entrepreneurial functioning. Entrepreneurship is both a resource and a process, so that it contributes towards expanding other human capabilities and means, such as providing the ability to work, to earn income, and to accumulate knowledge. However, being entrepreneurial may or may not itself be a valued choice. This is of particular relevance when entrepreneurship has long been considered a mechanism to development without considering the fact that many people take up entrepreneurship because they are deprived of other choices.

Therefore, the potential of innovation for development should not be over-sold only in terms of its economic potential and should not be over-estimated in terms of its social impact. From a CA perspective, we propose an understanding of innovation for development as a multifaceted process, meaning that the impact can be plural and diverse, and it can in some cases, not lead directly to economic growth, but lead to other positive aspects which are equally important for human development, such as identity, social capital, or personal goals. In this respect, when people are immersed in innovation processes, there can be an impact not only on their revenue intake but also on how they perceive themselves, on what they want to achieve. It is in this sense that innovation may contribute to human development if the people involved perceive value in the processes and outcome, and if they feel their capability sets have been expanded.

This approach helps reduce the risk of imposing a specific developmental program or more precisely a discourse on innovation at people without understanding what they truly need and value (Kleine et al., 2012). We should peel back the layers of the conditions individual's experience to understand the multiple influences it has in people’s life choices, not just economic outputs. It starts with the focus on the individual and the different effects that innovation processes may have on a life he or she has reason to value.

To illustrate, the next section will present a study conducted in a tech hub in Zambia. We aim to understand more about the work being done in the hub and the impact it has on member’s work and life in general. Instead of examining the potential contribution of the tech hub to employment and economic development, we seek to understand to what extent the innovation processes in which members are involved help to expand their capability set.

#  A Technology and Innovation Hub

The objective of this paper is to explore the role of tech hubs in development by taking an alternative perspective (the CA) on development. Empirically we present a case study of a technology and innovation hub in Zambia.

## *Research Methodology*

An ethnographically informed approach was developed by immersion in the research setting for over 3 months. Data collection methods included semi-structured interviews and participant observation (Atkinson & Hammersley, 1994; Bryman, 2004; Yin, 2004). The data collection was conducted by the first author of this paper as part of her doctoral thesis.

Purposive sampling was applied while collecting the data (Ritchie & Lewis 2003). Participants were selected in a way to ensure that there was a representation of members of the hubs, so different perspectives can be included. Individuals were selected based on how often they attended the hub to have different perceptions of the hub based on level of engagement. Participant observation allowed us to see which members attended more frequently than others. This followed with a demographic criterion based on gender and age. The aim was to have an equal number of males and females, as well as people from all age ranges. To achieve this, participants were asked to identify other people that fitted the demographic and level of attendance criteria, assimilating a snowball sampling approach.

Participant observation was applied by visiting the hub for a period of three months. The goal of this method was to see the dynamics within the hub on a daily bases, to have a better understanding of how the hub operates and how members interact with each other. This was the first method used to identify those members that attended regularly the hubs, and later interview them. Furthermore, this method was useful to cross-reference with semi-structured interviews to see whether what is promoted and incentivized by the managers is applied and/or used by the members.

In-depth interviews should combine structure with flexibility, be interactive in nature and to some extent, achieve both breadth of coverage across key issues, and depth of coverage within each Ritchie & Lewis (2003). To achieve this, the interview questions were elaborated based on the Capability Approach literature, but these serve more as a reference than a fixed guide of questions. The questions differed depending on whether the participant was strongly associated with the hub or not strongly associated with the hub. This was to get a clearer understanding of the impact that the hub had in member’s lives depending on their exposure to the hub.

Semi-structured interviews were conducted two weeks after the participant observation phase. 31 Interviews were conducted and lasted an average of 30 minutes. These were done in situ to members of the hub as well as the managers during their time at the hub, seeking to have a better understanding of the organisation's own framing and self-description, as well as the underlying assumptions, goals, and practices of various actors.

The starting point of inquiry was therefore focused on what people valued (Kleine, 2013), followed by more specific questions related to the hub. Examples of these questions are: ‘how has your experience at the hub been?’ ‘What has changed since your time at the hub?’, ‘What do you value of the hub?’. Where relevant, participants were asked why their interest evolved around the social impact or the economic one. Questions also evolved around the day-to-day practices around the hub and whether there was any difference with previous work experiences. These set of questions were designed as a general guidance prior to the interviews. They served more as examples rather than a fixed set of questions:

**Table 1 Basic questions for semi-structured interviews.**

|  |  |
| --- | --- |
| Participants strongly associated with the hub (i.e. attend on a daily bases, are somehow working with or for the hub; are part of the management team) | Participants not strongly associated with the hub (attend the hub on a fortnight; attend only events; used to attend the hub) |
| What things are most valuable to you in life?What were you doing before you decided to join the hub?Have there been any changes in the context? If so, what sort of changes?Has there been any changes in your personal life? If so, how?What was your first impression of the hub?Why do you attend the hub so often?What things do you value most of the hub?Has been achieved so far? Were there any challenges throughout the process?How many innovations have been designed within the hub? Can you describe to me one of these? From its invention to its development? | Tell me about yourselfWhat things are most valuable to you in life?How long have you been part of the hub?What were you doing before you came here? Why did you decided to become a member?What was your first impression of the hub?And how has been your experience at the hub so far?What things do you like of the hub?Has the hub impacted your life? If so, in what way?How is your relation with other members of the hub? Have you developed any projects with any other members of the hub? What things don’t you like of the hub?Has your business/project benefitted in any way by being part of this hub? How?Have your benefited in any way by being part of this hub? |

Participant observation was used to cross-reference, provide some triangulation and to understand the context and observe people’s behaviour within the space. A research diary was kept to clarify the topics and identify new ones. This allowed the researcher to see what people perceived and said about the space and its impact, and also observe interactions and dynamics within the space that allowed the construction of a more complete analysis. Of special interest was to be able to describe what happens inside a hub on a daily basis, which are the common dynamics and practices observed and whether these reflect what participants respond during in the interviews. So, for example, if members would be seen working together on specific projects, the researcher would follow up to see this happened often, between who and for what purposes.

Our analysis did not include specific frameworks to operationalise the CA, like the Choice Framework or conversion factors. Instead, we applied an inductive process that was informed by the underlying theoretical lenses of the CA. Given its commitment to ethical individualism, methodologically, the capability approach often starts with investigation on the values, functionings and choices available to individuals, which is crucially considered alongside an understanding of social structures and their constraint on individual agency.

Using the capability approach as a sensitising device (Giddens, 1987; Walsham, 2001), the data was organised and coded in Nvivo. Transcripts from interviews, as well as the research diaries were uploaded into NVivo to facilitate the coding process. Data was visualised in textual chunks that were gathered in codes (or nodes in Nvivo). We followed the capability approach by looking at what members had to say with regards to what they value about their experience in the hub, and whether and how their life opportunities or quality have been enhanced. Codes are created, and later categorized in a grounded manner until no new relevant codes emerged. Similar or repetitive codes were merged.

Please note that pseudonyms are used in the case study where interviewees are cited.

## *Case Study: Tech Hub in Lusaka*

The tech hub was founded in 2011 as part of a project that consisted of fixing old computers to deliver to colleges in Lusaka. It was started by a group of 3 male computer scientists who were concerned with the lack of knowledge that computer science students had after finishing their studies. It began as an informal group of young people wanting to improve their skills and learn coding languages. Soon, their community got bigger and with that, they had to move from a small room part of an NGO to their own space. With this change, they also adapted their organisation model, by developing organisational values and vision strategy. This led to changing the hub from just a community of technologists and programmers to including entrepreneurs. The hub presents itself as an organisation that fosters a ‘community’ and holds values of ‘collaboration’, and ‘sustainability’. In alignment with this, the hub was established as ‘a social enterprise that contributes to local social and economic development.’ It has approximately 300 members registered on their mailing list and approximately 30-40 members using the physical workspace on a daily basis.

The ‘hybrid format’ of the hub as an organisation allows members to have the option to visit the space in a format they choose. Members can visit the space on a daily basis or every fortnight. They can focus on their own work or on group projects, network with others and in some cases make use of the space to play video games. They can initiate projects freely, which in some cases lead to an application, a business idea or a learning experience.

The majority of members are young Zambians aged between 16-35 years old. We identified three main profiles of hub members: the tech enthusiasts, the tech experts and the entrepreneur-oriented ones. The first group visit the hub every fortnight to learn coding languages or other things related to tech. These enthusiasts tend to be relatively new to the hub, and those who stay for longer tend to become tech experts/mentors. In the majority of cases these enthusiasts visit the hub purely for interest, not because they want to obtain something more tangible out of the hub like a job or a degree.

The tech experts, who already have a certain level of knowledge on technology and want to apply it to create positive change in their community, have studied computer science or some sort of tech-related subject. They have been part of the hub community for longer than the tech-enthusiasts and have learned several coding languages as well as software for web design. These young experts are creating mobile applications and websites, and in some cases are mentoring others in their own work. The majority of the innovations they were developing had a strong social focus (e.g. a mobile application of the Zambian Constitution; a language application that translates from English to local languages; a Women’s Rights application). In other cases they organised communities of interest (e.g. people interested in robotics; people interested in developing game applications; for people interested in learning Java code and use it to create websites for NGOs). The majority of the products created at the hub were ICT-based (i.e. mobile applications and websites), though in some cases they were experimenting with robotics (i.e. Raspberry Pi). Most of these were created within the hub from scratch, and in some cases they led to the creation of a start-up or a community of interest.

The entrepreneur-oriented group is characterised by members with a strong interest in implementing and turning an idea into a business. This group was the smallest in number. These members were not specifically working on a tech-based product or idea, but were more interested in working on a project or a business. There were different stages of these identified, as there were people who only had an idea and were testing it, and there were also those who had created a small start-up and were developing it from the hub premises, and those who had a more established business and were getting revenue from it and were using the hub as a co-working space. For these, the hub also provides with incubation and mentoring services. They have also benefited from collaborating with the tech experts within the hub, who have helped them design their website or mobile application for their business.

As mentioned previously, most of the hub members had never had previous work experience and in some cases some had not had a university or college education. This implied that members lacked knowledge and skills relevant for their work at the hub. We observed that members, including the entrepreneur-oriented ones, lacked knowledge and skills in starting a business, or to register a company in Zambia. It was also observed that they lacked information on legal aspects for investment and issues of copyright, registering a company, etc. This lack of knowledge and skills meant that the hub, more than providing a space for incubation of businesses at first hand, represented a learning space. Even for the more advanced entrepreneur-oriented ones, the hub was the first place where they learned the necessary skills to set up their business.

Even though the hub provided incubation services, our interviews and observation led us to see that most of the learning processes happened between peers or in the form of mentoring. In some cases members looked for the information online or they consulted the more experienced members. Because a lot of the work evolved around programming, one of the most mentioned problems was finding bugs in their codes. A strong sense of collaboration was observed when members were helping each other out in debugging codes which was often a learning processes for the participants. This echoed with previous authors who explain how knowledge is tacitly distributed among people and mutual teaching and learning are fundamental for the solution (Duguid, 2005; Fischer, 2001).

The same year the hub was founded, three female members raised their concerns about the lack of women working on technology and decided to form a network of women in ICT, to both empower and encourage more women to work in technology (Roberts, 2016). One of the co-founders mentioned the need to have more women in technology was related to wider societal imbalances:

*“[…] because our culture teaches women to be quiet and be passive and not to be rowdy. If you talk too much then you’re perceived to be proud. So I would say, I’m speaking mostly in the workplace, but then in general, our culture is very oppressive of women*.” (Cindy, 27)

This women’s network is going against these parameters and trying to empower women and educate them so they can make their own choices about their careers. They soon started organising workshops, training and events for women in technology, as well as women interested in technology. As a result of this participants learned digital skills, developed mobile applications for women’s rights, made training videos to discuss women’s issues and organised workshops before bigger events to target specifically women.

In the rest of this section, we will present 5 themes that were extracted from the findings about expansion of capabilities that were identified. These themes were analytically constructed and inevitably interactive and overlapping.

###  ***Creative thinking***

Following this idea with the notion of capabilities being a space of opportunities and choices for people to do or be, the analysis of the data shows that there were some dynamics within the hub that promoted creative thinking between the members. This in consequence enhanced the member’s ability to be creative and act creatively, an important capability for innovation. Creativity is academically conceived as an activity consisting of three main components: expertise, motivation and creative thinking skills. The latter of these three is presented as “how people approach problems and solutions their capacity to put existing ideas together in new combinations (Amabile, 1998, p. 79)”.

During the fieldwork, it was observed that members were encouraged by the hub managers to observe, experiment, implement, research and discuss, as illustrated in Table 2.

|  |  |  |
| --- | --- | --- |
| **Action**  | **Description** | **Intensity** |
| Observe | -What other members of the hub were doing and how they were doing it | Medium |
| Experiment | -With different coding languages as well as software-With devices such as mobile phones, computers, and game applications | StrongMedium |
| Implement | -Their ideas and develop prototypes and drafts of their designs | Strong |
| Research | -What people in other countries have been doing in relation to the same innovations they are working on | Weak |
| Discuss | -With peers about their projects and bounce ideas around.  | Strong |

 **Table 2: Creative activities in the hub**

Members were encouraged to practice these and they did at different levels. Overall, hub managers were keen in helping members to be creative and curious of the things they were learning. There was a strong sense that a good way of learning how to code or create a website was by working together and looking for ways to solve things collaboratively. Because resources were scarce or not everyone within the space had the answer to things, members undertook joint searches online to be able to find solutions. They looked at online forums and communities and then shared the learning within the people at the hub.

*“ […]even though we didn't have many tools to work with, we decided to teach ourselves how to do it and start up a community of people who make such projects.” (Dr, 25).*

Hub managers often made use of brainstorming sessions to work on ideas. Whiteboards were used were members wrote ideas down, and it was seen that they wrote questions like ‘what is the social problem?’ or ‘what is the need?’. In one workshop, the facilitator asked participants to think of a mobile application idea by talking to people in the streets about their issues and problems, to create a more need-base/demand-base idea. The task involved participants speaking to bus drivers, fruit sellers, street-workers and various people to see what were their main issues in their work and whether a mobile application could solve their problems.

### ***Collaboration and Learning***

A strong sense of collaboration and trust was observed during the fieldwork. This form of collaboration increased members’ capabilities in the form of doing ICT applications, as well as analysing and solving problems. Members either exchanged information and resources or worked together to develop their projects. For example, an entrepreneur-oriented member would work together with a tech-enthusiast to develop a website for her business idea. In exchange, the tech-enthusiast would benefit from the learning process, as well as increase his set of work experience that improves his potential to get further work. When both members were asked about the process, they mentioned that this was beneficial for both, and it was possible because the hub is a space where people trusted each other.

In the literature, collaboration is seen as a process where people usually know each other, work together and have opportunities to give feedback to each other’s ideas and work (Mamykina, Candy, & Edmonds, 2002). As a pre-requisite, trust is presented as an important element that enhances the quality of collaborations, because it improves communication between the people collaborating (Hardwick, Anderson, & Cruickshank, 2013; Ling, 2011).

This open and collaborative approach did not involve any conversations on intellectual property or copyright issues. Members did not show any concern that their ideas, by being shared in front of other members, would be stolen from them. When asked why this was the case, interviewees referred to trust as the main reason.

Another form of collaboration observed was in the form of learning and problem-solving. Some members mentioned how before they were part of the hub they preferred to work by themselves, but learned the benefits of working with others by being part of it:

*“[…] before I used to prefer to work alone because I felt like other people, they just can’t keep up with the thought process, or is just frustrating because they could put bugs on the code. But then I learned that you learn so much from other people. Even though just the way they think, the way they write their coding”. (Cindy, 27)*

In a similar line, another form of collaboration was visible in the form of mentoring, where text-experts would share their expertise and knowledge with tech-enthusiasts and provide feedback and help to them. A tech-enthusiast shared his experience:

*“[…] So you find people around here could really help you like [name of a tech expert] has been of great help. If I ask him how do I go about with this because sometimes I am stuck so he comes and helps me. In a cafeteria I don't think I would meet such people. So it's really a good opportunity for me to have these guys around and just talk and they help you out*.”(Je, 26)

### ***A Sense of Community***

Respondents mentioned repeated times that what they valued the most of the hub was being part of the community. The type of community that has been formed at the hub is one based on a common identity and set of practices (e.g. Radcliffe, 1999). However, we also identified that this community had a strong focus on ‘working together and solving problems’. Therefore, we partly adopt Fischer’s definition of communities a composition of “[…] individuals who have unique experiences, different interests and perspectives about problems and who use different knowledge systems in their work.” This conceptualisation allows us to understand that communities are not necessarily homogeneous in character and practices. The common shared trend of this definition is that these communities of interest engage in problem-solving practices, something that was visible in the hub community. But we also see communities as a live experiences rather than static organisations, which are configured and reconfigured by its members and the context in which they are embedded.

Hub managers mentioned that their strongest asset was the community that was build from the bottom-up and in an organic manner:

*“ Anytime you go to an event or something, everybody already knows the organisation and its reputation. And I think the most amazing thing is that... so back in the day a lot of people knew about [the hub] but they didn't know what they did. And it's pretty amazing to have such strong brand recognition when nobody knows what you do. I thought that was pretty compelling.” (Kendrick, 24).*

Being part of a collective led member to be entrepreneurial and collaborative in their work. Interviewees were asked about the motivations for their work and the impact the hub has had on them. The majority of the respondents said they liked being part of the community of the hub, because they felt it was a space for people with ‘out of the box’ thinking in their country:

 *“-I liked the environment, how people think, we are all like in the same mind set.*

 *I: what kind of mindset is that?*

 *- Driven, I feel like we’re driven.”* (Pippa, 30)

The hub was a place where members found different kinds of people with a driven mindset. But also, it was repeated by respondents that the hub was a special place because it was difficult to find such a space in Zambia. And so this reflected the uniqueness of the organisation in their context:

 “*This innovation hub is pretty much the only one and people still do not understand what an innovation hub is because we don't have an innovation hub in Zambia. If you go to someone and ask them about an innovation hub they wouldn't know what it is so I will explain to people what [hub] is about what it does*” (Gabriel, 24).

The uniqueness of the hub encouraged people to feel comfortable to open up and share their ideas and projects. The freedom to experiment and share their ideas was substantial for the creative process that members were immersing themselves in.

*“The great thing about [the hub] when I first came here and even now is that if you want to try something you just do it. And if that doesn't work, well it didn't work, what do we learn from that?”* (Mich, 34).

### ***Enhancing Agency***

Some tech experts mentioned that they were able to find jobs outside the hub, but in most cases decided to stay and work on their own projects. Even those who found jobs were still linked to the hub, by attending networking events or by visiting the hub after working hours. When asked why they kept on returning they mentioned that it was because the hub had given them a sense of identity and direction, which they did not have before because of social structures that undermine their choices, namely their society and educational system. Some mentioned that the careers they have decided to work in are still not understood within their society, and so being part of the hub helped them overcome a sense of rejection from their social circle, which fails to consider a career in entrepreneurship or in technology as a productive one.

The hub then represented a place where their work and career path was legitimised, as the hub itself had been established as a well-known organisation in Zambia. One of the oldest members of the hub mentioned in an interview:

 *“I would say it’s really grown. From 2012 we’ve had a lot of people interested. If you go on the streets there’s a high chance you will find someone who says ‘yeah I know that place’. And we’ve had a lot of events. We’ve had a lot of recognition from locals and different surrounding countries. I follow the tech news in South Africa and [the hub] the name is recognised now.”(David, 26).*

Several respondents talked about how by being part of the hub they have been able to define their career path and overall future. When they finished school they had no idea what they were going to do, as there were very few jobs in Zambia for them to apply to, and even those available required some experience, which they did not have at the time. Through such circumstances, they found the hub and started going to the space and engaging with the community. In doing so, they learned the necessary skills to be able to develop their own ICT applications. These assets opened more choices for members as they grappled with the challenges of having to deal with a lack of employment and with the stigma of pursuing entrepreneurial careers in a traditional society. This means that because of the learning in the hub, they have had greater agency to improve their lives. This freedom to explore the intrinsic value of creativity is possible because members of the hub feel a strong sense of community.

In this sense, the hub had given them the choice to pursue a career they value, and it had allowed them to develop the necessary skills for it. It had also provided them with a community that strengthened a sense of belonging, which were significant to them due to the fact that their relatives and friends preferred more traditional careers and did not seem to understand how a career in entrepreneurship and ICT can lead to success. When asked about this, respondents mentioned that becoming rich and making a lot of money were not their priorities, but that what they wanted was to ‘follow their passion’. For example, one of them said,

*"I’m very passionate about Africa, and about Zambia. So I would want to know that whatever it is that I’m working on, at whichever point, should be something that is making somebody’s life better."(Ronda, 27)*

Sen’s idea of agency freedom includes the capabilities to pursue one’s own well-being but may also include the well-being and freedom of others, as well as collective goals of communities or a nation and ‘respecting social and moral norms, or acting on personal commitments and the pursuit of a variety of values.’ (Zheng, 2009, p.71). This member of the hub was looking at the hub as the place where she could make a difference in her community. The hub thus enhanced the capability of members of the organization to develop their digital skills, as well as pursue their passions and provided with a platform for them to contribute to their wider society. It has also broadened their options to become entrepreneurs, should they wish to. In this case the freedom to be an entrepreneur or the freedom to work in technology reveals that the available functioning for hub members has been expanded, and consequently their effective freedom to live a valuable life (Robeyns, 2000).

### ***Gender Equality***

The sense of community offered some support for members, who mentioned in the interviews that they felt significant challenges in their wider society, because it still did not recognise entrepreneurship or IT as a valuable profession. This was especially evident in women. As mentioned previously, the majority of hub members are young men, with a very small number of young women. This is proportional to the overall context of Zambia, characterised by a traditional society where gender roles pressurize women to become teachers or nurses and/or work for the government. This gender inequality was evident at two levels, at society’s expectation of women to be a wives above all; and at women’s subordination in science and technology careers:

*“[…]In our culture, many women are raised to be wives. And if you're a wife in Zambia then is not that you're a servant to your husband but you have to serve the husband.” (Ronda, 27).*

“Science subject is preserved for the men…there’s many examples of how our educational system can segregate men and women. And just embedding this idea that girls should do something else. So it’s not fair. And even in terms of career choice, of course women are expected to take certain kinds of jobs, because other jobs are for men” (Wendy, 25)

Because of these pre-conceptions, the number of women working in technology is very small in comparison to the number of men. So the hub was able to congregate a significant number of women, who either worked at the hub or attended events organised by the women’s network. Several female members mentioned they found in the organisation a place where they challenged their gender stereotypes and decided to pursue entrepreneurial careers or develop digital skills. The sense of community gave them the security and confidence they needed to learn the coding languages and embrace an entrepreneurial path.

However, the picture was not so simple. While most of the female respondents felt the hub a welcoming space for them, a limited but significant number of women, coming from working-class backgrounds, normally born and raised in rural areas of Zambia, perceived the hub as a male-dominated space, where they were not welcomed:

*“The first time I went to (Innovation hub’s name), the only people I was seeing were men, there were no women. It’s like a separate thing. When we went there they said (the men) ‘ah your room is that side (pointing at the kitchen).’ I was like, why can’t we be together? That’s why I didn’t like it.” (Gemma, 23)*

There were other significant imbalances. There was a big difference in number between men and women using the innovation hub, with a ratio of approximately 10-3. Some of the female members of the network would attend workshops and events that were exclusively designed for women, but they did not visit the hub workspace on a daily basis as the men did. To illustrate this, the hub organised a two-day workshop for women with the objective to encourage women to take part in a later unisex global innovation event running a few days later. The preparatory workshop gathered around 15 women; however this translated into only 2 attending the main global event. This was a free event and open to all, and there had been an explicit push to get more women involved. But women preferred to attend the event targeted just to women and miss the event free to all.

Despite the hub space not being perceived as a welcoming environment for some of the female members, the women’s network based at the hub provided an opportunity for women in technology to find mentors and learn more skills as well as help more women. A respondent, when asked about the women’s network said:

*“We are discriminated most of the time, [women in technology] we are challenged. But we are getting there, I’ve noticed most of the people I met at the [women’s network] a lot of girls who are in tech and they introduced me to mentors, it was a mind-blowing experience.” (Chianah, 26)*

Overall we find that not all the female participants felt that their choices were being expanded and in fact, felt constrained within the hub. This complexity has important implications from the lens of the capability approach and leads us to think about spaces of equality (Zheng and Walsham, 2008). This innovation hub is inclusive and accessible for all, yet capabilities are not equally enhanced, contingent upon individual circumstances. We will elaborate further this point in the discussion section.#

# Discussion

As already mentioned, the discourses around technology and innovation hubs are filled with an optimistic view of how these places will contribute to the modernization of societies, by generating innovation that lead to economic growth. Young entrepreneurs working in hubs are seen as ‘inventive’ and ‘innovative’, with the energy to tackle their countries’ most significant problems (GIZ, 2013). These assumptions and expectations stem from an innovation paradigm that is mainly applied and founded in economic rationale. Following this rationale, if tech hubs fail to generate successful businesses, jobs and ultimately solve the countries’ problems through entrepreneurship, the tech hub is usually deemed as a failure of innovation, and thus failed at development.

From an alternative perspective, we understand that efforts directed to promote innovation for economic growth are only part of what constitutes human development (Sen, 2013). At the point of the research, there were no innovations that were generating any revenue, or any start-up that was making an income. Some members were able to get jobs because they acquired knowledge from the activities of the hub, but they were still dependent of the hub for their community, and returned because they valued the relationships they had there. Members of the tech hub are not limited to business-centric perspectives of innovation and entrepreneurship but driven by social issues and a strong sense of community.

Moreover, when individuals immerse themselves in an innovation process, certain capabilities are expanded which may lead to other aspects of human development, and may have further impact on communities and society. Examples from our findings include developing creative thinking, building a sense of community, enhancing individual agency and gender equality, undertaking collaborative practices and building their individual and collective identity.

While Sen’s capability approach only focuses on individuals, scholars develop the concept of “collective capabilities” (Ibrahim, 2013, 2006a; Stewart, 2004) which is based on the assumption that formation of groups[[3]](#footnote-3) can either lead to conflict and undermine individual capabilities, or it can lead to an improvement in their wellbeing and agency freedom which cannot be achieved individually. Therefore, tech hubs as an organisation should be considered as institutional mechanisms for human development in the sense that they could expanding both individual and collective capabilities. The mainstream discourse around tech hubs would benefit from opening their scope and expectations of what tech hubs can enable.

This leads us to the broader discussion of the relationship between innovation and development. Mainstream literature often takes a one-dimensional view that seeks to transfer models from the global north to global south whether it is building national institutional systems or technological diffusion. This paper presents an alternative view which considers innovation as social processes with multi-faceted developmental impact that can be partly evaluated from the view of individual and collective capabilities. This conception is distinct from the individualistic outlook in the innovation literature. Even though the unit of analysis is the individual, it looks at this from the various aspects of innovation that lead to valued “being and doing” of participants.

The focus on individuals in the CA has often been criticised for the lack of conceptualization of the interaction between individual capabilities and social structures (Ibrahim 2006b). Other authors have noted that the CA recognizes that the social environment is what frames the individual choice (Kleine, 2013) and the “situatedness” of individual’s agency (Zheng, 2009). It is therefore important for researchers to pay attention to structural elements that may not be directly observable at the individual level. For example, to understand why some female members of the hub did not feel included we could take an intersectional perspective (Crenshaw, 1993). It is at the intersection between gender and socioeconomic class that we understand why some member’s choices were constrained. For example, some women felt discouraged from pursuing an entrepreneurial path and working in technology-related fields, yet this applies mainly to those from a working-class background more than those from a middle-class social stratus. This indicates a degree of complexity in the way social inclusion is enacted across different social groups (Zheng and Walsham, 2008). By looking beyond the individual and applying an intersectional approach, we can understand why evaluating the impact of tech hubs require us to go beyond simplistic measurements. Even when a hub is designed with the intention to be an inclusive space, it does not resolve structural inequalities that condition the extent to which participants’ capabilities could be expanded or constrained. In short, structural forces and institutional arrangements are critical “conversion factors” in promoting innovation and improving capabilities.

# Concluding remarks

It has been argued that the notion that innovation leads to development may not be as straightforward as it seems (Bradley et al., 2012). By integrating the CA view of the individual in innovation, we are expanding the conceptualisation of innovation. Even though the CA focuses on the individual, similar to the entrepreneur and innovation literature, the approach has an entirely different philosophical stance: innovation is not just a process to empower individuals to become entrepreneurial actors, but also the process by which people develop capabilities in multiple aspects of their agency and well-being. This process itself should be considered part of the innovation for development discourse.

Even though this research gave us an interesting insight from members of the hub, a few points should be considered. A member’s motivation to be part of the hub is not solely financial income, but to be part of a community of like-minded people and pursue an entrepreneurial path that the hub can facilitate. This ‘freedom’ of choice to live a life they value is linked to other kinds of freedom they have. What we derive from this is not to suggest that business development and growth are not necessary. The latter is important as means to live a valuable life. Instead, what we argue is that innovation contributes to development both in terms of process and outcome, which should be evaluated not just in economic terms. Therefore, tech hubs should be perceived as useful institutions mechanisms for human development and need to be promoted and supported by funders, international organisations and local government, but for reasons different than those dominant in the mainstream discourse. Furthermore, the developmental impact of tech hubs should be evaluated more holistically than business success. From a human development perspective, institutional and collective social support may be required to alleviate structural barriers that hinder the equitable expansion of capabilities among members of a tech hub.

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Appendix

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| --- | --- | --- | --- |
| Interviewees | Age | Gender | Type of member |
| 1 | 24 | F | Tech expert |
| 2 | 31 | M | Tech expert (co-founder) |
| 3 | 28 | M | Tech expert |
| 4 | 26 | M | Tech expert |
| 5 | 23 | F | Tech expert |
| 6 | 28 | F | Tech expert |
| 7 | 33 | M | Tech expert (co-founder) |
| 8 | 26 | M | Tech expert |
| 9 | 30 | M | Tech expert |
| 20 | 25 | M | Tech expert |
| 11  | 33 | M | Tech expert |
| 12  | 21 | F | Tech expert |
| 13 | 23 | M | Tech expert |
| 14 | 29 | M | Tech expert |
| 15 | 28 | F | Tech expert |
| 16  | 26 | F | Tech expert |
| 17 | 19 | M | Tech enthusiast |
| 18 | 24 | M | Tech enthusiast |
| 19 | 22 | M | Tech enthusiast |
| 20 | 22 | M | Tech enthusiast |
| 21 | 22 | M | Tech enthusiast |
| 22 | 25 | F | Tech enthusiast |
| 23  | 22 | F | Tech enthusiast |
| 24 | 21 | F | Tech enthusiast |
| 25 | 20 | M | Tech enthusiast |
| 26 | 19 | M | Tech enthusiast |
| 27 | 35 | F | Entrepreneur-oriented |
| 28 | 26 | M | Entrepreneur-oriented |
| 29 | 23 | M | Entrepreneur-oriented |
| 30 | 32 | M | Entrepreneur-oriented  |
| 31 | 26 | M | Entrepreneur-oriented |

1. <http://qz.com/502149/video-ory-okolloh-explains-why-africa-cant-entrepreneur-itself-out-of-its-basic-problems/> [↑](#footnote-ref-1)
2. In this paper we adopt the terminology of Global North and Global South, rather than developed and developing countries. From a human development perspective, all countries are “developing”. The Global North/South terminologies are more prevalent in the development literature. [↑](#footnote-ref-2)
3. Groups are understood as ‘ways of categorising people in ways that represent common affiliations or identities’ (Stewart, 2004, p.2). [↑](#footnote-ref-3)