

INVESTIGATING THE POTENTIAL FOR DIGITAL JOB CREATION IN KENYA'S INFORMATION AND COMMUNICATION TECHNOLOGY INNOVATION LANDSCAPE

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EXECUTIVE SUMMARY

This report aims to investigate the current and future role of the Information and Communication Technology (ICT) sector in creating jobs for Kenyan youth. Although Kenya's economy is one of the fastest growing in Africa, its growth has not been sufficient to absorb its increasing labor force. Kenya's unemployment rate stands at 40 per cent (**Trading Economics, 2014**). Seventy per cent of unemployed are between the age of 16 to 35, meaning they are defined as the Kenyan youth (**Safari Africa, 2013**).

Kenya's ICT sector is contributing an estimated 12 per cent to national GDP, and is expected to grow further in the coming years (Mwenesi, 2013). This report therefore focuses on the potential of the ICT sector and particularly jobs requiring digital skills in alleviating youth unemployment. A total of 95 respondents, affiliated with ICT hubs, ICT training institutes, ICT growth entrepreneurs, or public institutions, were interviewed in two Kenyan cities, Nairobi and Mombasa. This report presents three key insights: (1) Although ICT startups and growth ICT enterprises expect digital skills from their employees, the scale of digital job creation is currently moderate. ICT hubs and training institutes play a supporting rather than a job-creating role. (2) The employability of youth in digital jobs is particularly hindered by a gap between theoretical skills, attained by youth through various programs, and practical skills, sought after by employers. (3) Online work, a growing mobile applications industry, and a movement towards big data are the main trends suggesting that digital skills will become crucial to youth employability. However, youth currently lack the appropriate training and mindset.

SUMMARY OF KEY FINDINGS

1. CREATING DIGITAL JOBS: ICT STARTUPS AND ICT GROWTH PRIVATE ENTERPRISES

The majority of ICT startups and growth private enterprises included in this study claimed to be creating digital jobs: 90 per cent in the ICT sector, 73 per cent in the finance sector, 52 per cent in retail services, 44 per cent in the tourism industry, and 40 per cent in social work. ICT startups employed a median of 4 persons (avg: 9), growth private enterprises 13 (avg: 25) persons. Their current potential for job creation is therefore small. ICT startups' average growth rate of zero to 1 per cent suggests that their potential will remain small, whereas growth private enterprises (growth rate of 33 per cent) may hold the potential for medium-scale digital job creation in the future. ICT hubs and ICT training institutes play a facilitating role, as they provide platforms for learning and exchange regarding digital skills.

2. OVERCOMING CURRENT CHALLENGES: DIGITAL SKILL GAP

Despite the significant number of youth attending ICT training programs and relevant university courses, most employers find that applicants lack the practical skill set necessary for digital jobs. The key skills and experience that were seen to be lacking are presentation and business skills (64 per cent), personal financial management skills and soft skills (72 per cent). Secondly, startups (75 per cent), growth private enterprises (68 per cent) and ICT Hubs (78 per cent) perceive that it is too expensive to hire qualified experts. Recommendations to address these challenges that are discussed in this report include the re-development of curricula to include more practical training, the creation of internship and apprenticeship programs, and the facilitation of mentorship.

3. FUTURE TRENDS AND FUTURE CHALLENGES: ONLINE WORK, BIG DATA, AND MOBILE APPLICATIONS

This report identifies three trends with the potential for large-scale digital job creation in the future: online work, big data analytics, and the mobile applications sector. We propose that online work has the potential for medium-scale digital job creation. Big data analytics have small-scale potential, as the sector primarily targets employees with high competence digital skills. The mobile application sector equally has medium-scale potential for job creation both for high and low competence digital skills.

However, for these emerging trends to become opportunities for digital job creation, the challenges mentioned above regarding the digital skills gap must be addressed. In addition, a change in mindset among youth may be necessary.

INTRODUCTION

Although Kenya's economy is one of the fastest growing in Africa, its growth has not been sufficient to absorb its increasing labor force. Kenya's real GDP growth was 4.4 percent in 2013 and is expected to reach between 4.7 percent (World Bank, 2013) and 5.7 percent (African Development Bank, 2014) in 2014.

This growth, however, has primarily been "jobless" (CNN, 2012). The service sector is the primary driver for the Kenyan economy – contributing 50 percent to the country's GDP – but employs only approximately 25 percent of the national workforce. The remaining 75 percent work in the agricultural sector, which contributes only roughly 30 percent to the GDP (World Factbook, 2014). According to the National Bureau of Statistics, Kenya's unemployment rate increased to 40 percent in December 2011 (from 12.70 percent in 2006) (Trading Economics, 2014). This is a major concern since only 11.4 million Kenyans have jobs of which 80 percent work in the informal sector (UNDP, 2013). The World Bank details that Kenya's economy has particularly failed to generate jobs for its youth, pushing them into "vulnerable, insecure, low paying jobs" (World Bank, 2013: 29). Youth unemployment makes up 70 percent of the total unemployment population in Kenya (Safari Africa, 2012).

Simultaneously, the ICT sector is expected to become a major driver for economic growth in the coming decades. This trend is already visible: in 2006, the ICT sector contributed an estimated 9 percent to the national GDP; in 2013, it was 12 percent (Mwenesi, 2013). This report investigates the current and future role of the ICT innovation landscape in creating jobs for youth. In particular, the analysis emphasizes how the large-scale creation of digital jobs, i.e. jobs requiring digital skills, may alleviate Kenya's youth unemployment problem. Drawing on 95 in-depth interviews with various stakeholders in Kenya's ICT ecosystem as well as insights from focus group discussions, this report presents three key insights. (1) Although ICT startups and growth ICT enterprises expect digital skills from their employees, the scale of digital job creation is currently moderate. ICT hubs and training institutes play a supporting rather than a job-creating role. (2) The employability of youth in digital jobs is particularly hindered by a gap between theoretical skills, attained by youth through various programs, and practical skills, sought after by employers. (3) Online work, a growing mobile applications industry, and a movement towards big data are the main trends suggesting that digital skills will become crucial to youth employability. However, youth currently lack the appropriate training and mindset. In addition to these three key findings, the report offers an overview of Kenya's ICT landscape by not only identifying current and future trends in the sector, but also exploring the extant initiatives attempting to create jobs for youth.

The next section of the report details the data collection and analysis process. We then define the term 'digital job' before presenting existing opportunities for youth employment and highlights associated challenges. This is followed by a detailed discussion of the three key findings and recommendations to overcome the challenges.

DATA COLLECTION AND ANALYSIS

The aim of this study is to investigate how various stakeholders perceive the role and potential of digital jobs in alleviating youth unemployment. A qualitative study was conducted since qualitative methods enable a nuanced understanding of actors' perceptions and allow for questions and topics to emerge from the respondents themselves. In-depth semi-structured interviews, focus group discussions, and participant observations allowed for a respondent-driven analysis of Kenya's digital jobs landscape (**Miles and Huberman, 1994**). An initial interview schedule was drafted and amended to target the five types of stakeholders identified (**see Appendix I**). The interview schedule assured a consistency of themes across all 95 interviews while simultaneously enabling enough flexibility to investigate themes as they emerged from the respondents themselves.

The study was conducted in two sites: Nairobi and Mombasa, since the two cities are the ICT centers of Kenya. A total of 95 interviews were conducted as well as two focus-group discussions in Nairobi and Mombasa (see Table 1 and 2). Most interviews were conducted in Nairobi since most of Kenya’s ICT companies and innovation hubs are located in the capital city. Most ICT firms in Mombasa are still in their nascent stages. This may mean that they have been less exposed to media and research interviews, making them more hesitant to respond to our inquiry. We contacted our respondents via email first and followed up via telephone if there was no response.

TABLE 1: INTERVIEW RESPONSE RATE

	Nairobi	Mombasa	Total
Invitations Sent	103	46	149
Confirmation	65	30	95
Response Rate (in percent)	63	65	64

We targeted ICT hubs, ICT training institutions, ICT startups, growth ICT entrepreneurs and public institutions based on the following characteristics:

- *Have been in operation for more than a year*
- *ICT innovation is a key component integrated in their work*
- *Support or create youth employment*
- *Have more than one innovative product/program targeting youth*
- *Have more than two employees or team members*

NAIROBI

	ICT Hubs	ICT growth Private Enterprises	ICT Startups	Training Institutes	Other Stakeholders (Public institutions)	Total
Contacted	14	18	42	21	8	103
Interviewed	11	11	29	11	2	65

MOMBASA:

	ICT Hubs	ICT growth Private Enterprises	ICT Startups	Training Institutes	Other Stakeholders (Public institutions)	Total
Contacted	1	8	17	17	3	46
Interviewed	1	5	10	12	3	30

Six researchers conducted the in-depth interviews at the respondent location between April and July 2014. All of the interviews were audio recorded and later transcribed. The average length of the interview was 45 minutes. The two focus-group discussions were managed by a total of five researchers. In Nairobi, the focus-group discussion included 25 attendees affiliated to startups, academic institutions, research organizations, and ICT Hubs. In Mombasa, the focus-group discussions included 8 stakeholders affiliated with startups, ICT growth private enterprises and ICT training institutes (see Table 2).

All data was compiled in an online data collection tool. This allowed for a broad overview of the major themes that emerged from the data. The data was then analyzed and coded independently by four researchers, with three of the researchers having collected the data and one researcher analyzing the data without prior involvement in the data collection process. This assured the reduction of biases that may emerge when researchers analyze data that they collected while simultaneously maintaining the non-verbal insights generated during data collection (Miles and Huberman, 1994). The four analyses were then compared, discussed and triangulated to achieve a final analysis that all four researchers agreed most accurately reflected respondents' insights.

TABLE 2: FOCUS GROUP DISCUSSIONS (FGDS) IN NAIROBI AND MOMBASA

FGD type	Location	Sample size	Description	Method used	Date conducted
Digital jobs workshop	iHub Research, Nairobi	25	This was an event run by iHub research that focused on bringing a different mix of stakeholders supporting or facilitating youth job creation in an open forum to discuss key thematic areas. This forum aimed to discuss the topic on digital jobs	Dual moderator focus group was used. We had 2 moderators. One moderator ensured the session progressed smoothly, while the other moderator ensured that all the topics/objectives are covered. Observation Note taking Interactive discussions	June 17, 2014: 5:00-7:00pm
Mini focus group	Mombasa	8	The group composed of 8 respondents, mainly private tech entrepreneurs	Observation Note taking Interactive discussions	June 28, 2014: 2:00-4:00pm

DEFINING DIGITAL JOBS

The definition that was provided to participants taking part in the study was that

“DIGITAL JOBS ARE CREATED THROUGH THE APPLICATION OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICT) TO A NEW OR EXISTING ACTIVITY OR PROCESS. DIGITAL JOBS GENERALLY INCLUDE PERFORMING INFORMATION-BASED TASKS THAT BUILD THE INDIVIDUAL’S CAPACITY FOR FUTURE WORK. THE CORE TOOLS FOR INFORMATION WORKERS ARE ICTS, SUCH AS COMPUTERS, DATABASES, SMART PHONES AND THE INTERNET, WHICH THEY USE TO MANIPULATE AND MANAGE INFORMATION.”

This definition captures a wide range of work tasks, including but not limited to, business process functions, content and product development, and programming.

For most respondents, “digital jobs” was a new terminology that represented pre-existing job functions. In other words, many respondents felt that they were offering jobs that require digital skills without using the terminology “digital jobs.” The respondents that disagreed with the definition provided felt that the definition was too ambiguous and did not address rural areas, which may have a less developed digital infrastructure.

With our data, we refined the definition of digital jobs to reflect the understandings and expectations of our respondents:

BASIC DEFINITION:

DIGITAL JOBS ARE A FORM OF EMPLOYMENT THAT REQUIRES TECHNICAL COMPETENCIES RANGING FROM COMPUTER LITERACY TO SOFTWARE DEVELOPMENT AND PROGRAMMING SKILLS.

Moreover, this study identifies two types of digital jobs: high-competence digital jobs and low-competence digital jobs. High-competence digital jobs require a combination of non-technical skill and technical skills. Non-technical skills include idea generation, project management and soft skills whereas technical skills include software development, IT, programming, business, marketing, and, analytical skills. High-competence digital jobs therefore tend to require digital skills training, for example at university or ICT training institutes. Low-competence digital jobs, in contrast, require a basic level of digital skills, meaning that previous ICT training or experience is not necessary. Examples of low-competence digital jobs include data entry tasks or the facilitation of digital services through customer service.

TYPES OF DIGITAL JOBS

High-competence digital jobs emphasize product development and innovation whereas low-competence digital jobs emphasize supportive functions, such as data entry. As opposed to traditional employment, digital jobs can also be performed remotely.

EXISTING DIGITAL JOB CREATION INITIATIVES FOR YOUTH

A, OPPORTUNITIES AND CHALLENGES

The information and technology sector contributes an estimated 12 percent (2013; 9 percent in 2006) to Kenya's economic growth (Mwenesi, 2013). This is in large part the result of Kenya's position as a technological hub for East and Central Africa (Kimenyi and Kibe, 2014). This is manifested in three developments. First, large multi-national corporations such as Google, Microsoft and Intel have set up regional headquarters in Nairobi. IBM maintains its first Africa-wide research lab in Kenya.

Second, the country underwent a telecommunications revolution over the past year. The World Bank attests that Kenya's mobile connectivity has reached 100 percent, and that national mobile phone calling and texting rates are among the lowest in Africa. Third, a variety of innovation spaces for the creation of ICT ventures have emerged across Nairobi. Innovation hubs, accelerator programs, and entrepreneurship training programs facilitate the creation of locally grown ICT businesses and foster the emergence of an ICT-expert community in Kenya.

Despite the positive developments in mobile and Internet connectivity as well as industry growth, significant challenges remain particularly regarding business registration, available infrastructures, and funding. First, entrepreneurs seeking to create ICT businesses are constrained by complex and costly administration procedures. Second, a survey conducted among Kenyan entrepreneurs in 2012 reveals that 60 percent see infrastructural weaknesses, such as sub-standard roads and unreliable power supply, as major barriers to business success (Omidyar Network, 2013). Although more readily available than in many other East African countries, seed funding in general remains a challenge for many entrepreneurs in the ICT industry (Omidyar Network, 2013). For instance, tools such as developer accounts on Apple or web and mobile application development programs on Google may be too costly to obtain, therefore making it impossible for many ICT entrepreneurs to benefit from enabling tools and infrastructures that facilitate product creation (Vision Mobile, 2014).

B, EXTANT INITIATIVES

Scientific and technological advancements are anticipated to be the key driver for Kenya's future economic growth (Juma, 2013). To help overcome the challenges presented above as well as Kenya's unemployment problem, the government has undertaken several initiatives, summarized in its Vision 2030 program. Vision 2030 outlines a plan to turn Kenya into a middle-income country by 2030 and targets the economic, political, and social pillar of society. The initiatives, briefly presented below, include the government's plan to build an ICT park, various youth funds, as well as group-specific grants.

KONZA TECHNOLOGY CITY

Economically, the initiative aims to achieve and sustain a 10 percent annual economic growth for 25 years. One of the seven sectors targeted is “Information Technology Enabled Services,” which will benefit from a USD 14.5bn project to launch Konza Technology City, an information, communication and technology park 60 kilometers south of Nairobi (Achia, 2013). The government anticipates that the new city will create more than 200,000 IT jobs by 2030 (BBC, 2013). In addition, universities such as JKUAT, the Jomo Kenyatta University of Agriculture and Technology, have also begun to construct their own science parks (Achia, 2013).

YOUTH FUNDS

YOUTH ENTERPRISE DEVELOPMENT FUND. Under Vision 2030, the Kenyan government has also specifically targeted unemployed youth. Launched in 2006, the Youth Enterprise Development Fund (YEDF) is a loan facility with the aim of supporting the creation of youth-owned enterprises. Young entrepreneurs access the zero interest loans through the registered youth group in their constituency. The fund claims to have created 300,000 jobs in the past five years (Kenya Loans, 2014).

UWEZO FUND. A second fund under Vision 2030 is Uwezo (Ability) Fund, which seeks to generate self-employment for youth and women at the county level (Uwezo, 2014). The fund is endowed with Ksh 6bn and was launched in 2013. The first round of funds, disbursed in June this year is envisioned to be accompanied by a skills and capacity building program for the beneficiaries (Makabila, 2014).

KAZI KWA VIJANA. *Kazi* Kwa Vijana (Jobs for Youth) was a joint project created in 2009 by the World Bank and the Government of Kenya. The program aimed to employ local youth in labor-intensive public works projects such as road maintenance and water supply projects, afforestation and waste collection. In 2009/10, the program provided employment to roughly 250 000 youth (OECD, 2010). In 2011, funding for the project was withdrawn after questions arose over use of project funds. (Mmutiga, 2011).

GROUP-SPECIFIC FUNDS

TANDAA DIGITAL CONTENT GRANT. The Tandaa Digital Content grant is offered by the then Kenya ICT board (now Kenya ICT Authority) and partially funded by the World Bank (Mbuvi, 2012). Grants of up to USD 50,000 are offered to companies (USD 10,000 for individuals) for the development of innovative web and mobile phone applications. In 2010, 15 awardees were selected out of 2,000 applicants. Recognizing the need to business strategy development, Tandaa grant offered a business training program to the top 150 applicants (Adero, 2011). Since the last issue of the Tandaa grant, there has been little effort and multitude of questions asked with regards to measuring the success of the winners (Kachwanya, 2012).

C, REMAINING GAPS

Despite the existence of the initiatives presented above, various gaps remain. Our analysis identifies four challenges, namely funds' lack of transparency, constraining application requirements, outdated grant scopes, and a lack of long-term impact.

CHALLENGES REGARDING FUND ADMINISTRATION. A variety of the above-mentioned funds have come under criticism regarding their selection processes and a perception that there has been limited execution due to bureaucracy..

CONSTRAINING APPLICATION REQUIREMENTS. A second major problem that respondents identified was the funds' application requirements. In particular, the requirement of some funds of a group application process, which requires applicants to partner with others and possess assets in order to qualify for the loan program, was perceived to be constraining. Similarly, several respondents from rural areas explained that the majority of funds target urban areas.

OUTDATED GRANT SCOPES. Third, the majority of funds were perceived to be too traditional in their funding scope. A respondent employed at a growth private enterprise suggested that the funds should “find innovative ways of motivating them (youth)...not to expect them to work for free.” Another interviewee, also with a growth private enterprise, proposed that one example for such a more ‘innovative way’ may be to “encourage youth to take up non-traditional roles and avenues in their career” and, in particular, to “encourage women to take careers like math, sciences, IT, and tech careers.”

LACK OF LONG-TERM EFFECTS. Finally, studies find that the funds’ impact on job creation for youth has been relatively small. Relatively few ventures were created, and spillover effects to non-participating youth were limited (Maisiba and Gongera. 2013). Many interviewees perceived the funds to ill-designed to adapt to local contexts and in some instances, the jobs created have been temporary and not leading to long terms job creation.

KEY FINDING 1

POTENTIAL FOR DIGITAL JOB CREATION IN THE ICT ECOSYSTEM

The section below will describe how ICT startups and ICT growth private enterprises play a job-creating role in the ICT ecosystem, by offering employment as a result of innovation, product creation and market growth. In contrast, ICT training institutes and ICT hubs play a job-facilitating role by providing support through robust training programs, mentorship, capacity building, events and partnerships. We find that startups and growth private enterprise create digital jobs at a moderate scale. Growth private enterprises hold potential for medium-scale digital job creation in the future although this first requires a bridging of the skills gap (*see Key Finding 2*).

**TABLE 3: CRITERIA FOR ASSESSING JOB CREATION
AMONG ORGANIZATIONS**

Category	Indicators
Products/innovations	<ul style="list-style-type: none">• Number of products/innovations• Sector focus of the products/innovations
Business model	<ul style="list-style-type: none">• Revenue model• Number of customers targeted• Types of models
Growth plan	<ul style="list-style-type: none">• Number of employees• caling/expansion strategy
Job creation	<ul style="list-style-type: none">• Strategy of digital job creation• Number of jobs created• Types of jobs being created

A, **JOB-CREATING STAKEHOLDERS:** ICT STARTUPS AND ICT GROWTH PRIVATE ENTERPRISES

A. **ROLE OF ICT STARTUPS**

Generally, the startups that were interviewed operate with a small-scale, passionate team. The median number of employees in a startup is 4, all of who are expected to employ digital skills as part of their roles. Kenya currently hosts approximately 40,000 ICT startups (GSMA, 2014), meaning that ICT startups create roughly 160,000 jobs with digital capacities. A startup focusing on mobile solutions explained that “value creation is our priority...I wouldn’t say creating jobs for the sake of creating jobs is a priority, so it’s creating value and in order to do that we need skilled people.” Startups tend to offer a range of digital jobs requiring various levels of skills, such as “designers, engineers, sales representatives and human resource professionals,” as one entrepreneur explains.

Maintaining the organizational culture is a priority for startups when they hire employees to join their teams. Prospective employees must be “passionate for what we are doing,” “interested to learn on the job,” and “very creative and presentable.” Startups tend to hire interns because internships provide a low-risk means for examining whether a prospective employee fits with the organization. Unlike later-stage businesses, startups realize that they “...do not have the resources to employ the qualified personnel, so we get campus students and train them, mold them and build them in what we want them to become.” However, the startups included in this study had a zero to one per cent growth rate for this year. Therefore, although they offer digital jobs, they are not expected to create new digital jobs at a large scale.

B. **ROLE OF GROWTH PRIVATE ENTERPRISES**

Growth private enterprises tend to offer digital jobs in order to further improve business products, generate innovations, and ensure growth. Similar to startups, growth private enterprises look for people who “fit within the company culture,” have technical and non-technical skills and experience based on a “track record of previous work.” Growth private enterprises offer nearly three times as many digital jobs as startups, 25 on average (median: 13). In addition, most growth private enterprises mentor entrepreneurs by highlighting opportunities for innovation. With an average growth rate of 33 per cent between 2013 and 2014, growth private enterprises exhibit significant potential for digital job creation in the future. However, as the next section will outline, for their current medium-scale job creation to evolve, a skills gap among youth will need to be bridged.

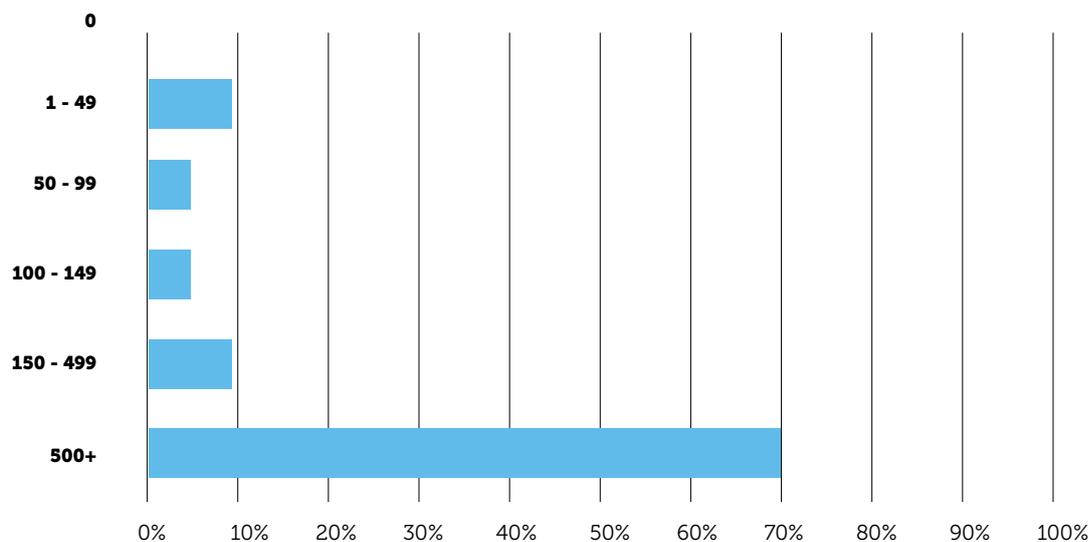
B, **JOB-FACILITATING STAKEHOLDERS:** ICT TRAINING INSTITUTES AND ICT HUBS

A. **ROLE OF ICT TRAINING INSTITUTIONS**

Training Institutes are not “creating digital jobs, but rather, connecting people to them and enriching people with ICT skills.” Therefore, such institutes play a facilitating rather than a job-creating role. Many training institutes teach students ICT tools as well as communication and soft skills, through social media courses, for example, with the aim of making youth employable.

In addition, many training institutes connect their students to online platforms offering employment. A training institute in the mobile technology field said that through the program, “trainees are able to work online using Internet, mobile phones and computers.” Online ICT services in the form of e-portals and e-pay platforms may create opportunities for students to be connected with global opportunities in addition to local opportunities. Lastly, training institutes see themselves as leveraging strategic partnerships with larger organizations such as Microsoft and Safaricom to offer networking opportunities to their students.

FIGURE 1. NUMBER OF TRAINEES/STUDENTS ENROLLED IN INSTITUTION



More than 70 percent of training institutes interviewed have had an enrollment of more than 500 students (*see Figure 1*). Consequently, ICT training institutes play a significant role in driving digital competencies among youth.

B. ROLE OF ICT HUBS

ICT hubs aim to support tech entrepreneurs to create and monetize their innovations by offering capacity building, Internet connectivity, training and networking events, co-working, mentorship programs and partnerships with businesses and investors. As one innovation hub explained, hubs provide “entrepreneurs a chance to employ themselves in their [own] company” and foster the incorporation of ICT in various sectors. Most ICT startups interviewed felt that incubation centres are critical to assisting entrepreneurs at a very early stage by providing them with the environment and mentorship that fosters the creation of tech startups. However, ICT startups also felt that ICT hubs currently do not deliver on the promised facilitation of partnerships between investors and startups. ICT startups are also beginning to explore virtual incubation, i.e. the electronic delivery of incubation services in order to facilitate the creation of ICT startups and growth private enterprises.

Over the past years, ICT hubs have significantly expanded their reach (see Table 4). In 2014, two ICT Hubs were supporting between 30-59 startups and six hubs were supporting 10 to 29 startups. Over time, as hubs have become more established among entrepreneurs, they are more able to support a large number of startups, which results in the strengthening of the Kenyan ICT ecosystem.

TABLE 4: NUMBER OF START-UPS HOSTED BY KENYAN INNOVATION HUBS ANNUALLY

	Number of startups per innovation hub			
	0	1 - 9	10 - 29	30 - 59
2014	2 hubs	2 hubs	6 hubs	2 hubs
2013	2	3	6	0
2012	2	2	4	0
2011	0	5	1	0
2010	2	0	1	0

KEY FINDING 2

THE DIGITAL SKILLS GAP

A. HIGH-COMPETENCE DIGITAL SKILLS GAP

Most ICT startups, growth private enterprises and ICT hubs are creating digital jobs that require a high-competence level of proficiency regarding digital skills. When organizations in the ICT sector were asked about the biggest challenges they face in relation to youth employment, the most named response was applicants' lack of skills. Moreover, 80 per cent of public stakeholders (Government stakeholders) also felt that the lack of skilled capacity was a key challenge. The skills lacking are technical, business development, legal knowledge and soft skills.

- **Technical skills:** These include software skills, programming skills, and training in using digital programs. One of the hub managers interviewed explains, “There is a serious lack of technical skills in the Kenyan market compared to other markets we are in. Our model of running a hub cannot work in developing countries because everything [here] is seen from a short term point of view.”
- **Business development skills:** Business skills are crucial to the success of any enterprise. In other words, “once you build business skills, you create and give other people potential to go and employ themselves and other people also.” A lack of business skills was mentioned by 64 per cent of respondents. Some of examples of missing business development skills that were mentioned include but not limited to, marketing and sales skills and strategy skills.
- **Legal knowledge:** It was noted that most startups and growth private entrepreneurs have no or little knowledge in basic legal procedures and best practices. In addition, they lack information on how to access channels for legal support.
- **Soft skills:** 72 per cent of training institutes and public institutions mentioned a lack of negotiation, presentation and financial skills as a crucial barrier to employment.

a. Attracting and Retaining Employees

74 per cent of startups, growth private enterprises and ICT hubs perceive that they “are fighting for same pool of employees.” Moreover, startups (75 per cent), growth private enterprises (68 per cent) and ICT hubs (78 per cent) perceive that it is too expensive to hire qualified experts. A representative from a mobile payment startup explained that organizations in the ICT ecosystem “are fighting for same pool of employees” with “high expectations from employees because there is better pay from other companies.” This shows that there is a demand from startups and private enterprises to employ youth with high competence digital skill sets, but these organizations perceive that there is not a high supply pool of affordable talent available.

Most of the organizations interviewed utilize a set of incentives to retain their employees. Most startups and growth enterprises offer non-monetary incentives such as flexible working hours, ownership in decision-making processes, and equity options. In addition, they promote an open and friendly organizational culture and a co-working environment to attract highly skilled employees since they have minimal financial incentives available. In addition, team-building activities such as games, overseas trips, site visits to other corporates and leadership trips are used to retain employees.

b. Training Employees

Startups and growth private enterprises choose employees based on their relevant skills set, their fit with the organizational culture, and their past experience. Most respondents prioritized the availability of the relevant skills set and past experience over a degree from a training or academic institute. As one startup mentioned, “we don’t focus on academic qualifications, we look at what a person can do and the passion they have.” Another growth private enterprise added that recruiting potential employees is based “more on the talent rather than education.” However, 94 per cent of growth private enterprises’ and 79 per cent of startups’ employees acquired their skills from educational institutions. Complementary avenues for skills acquisition were on the job training (88 per cent and 79 per cent respectively) and self-learning (82 per cent and 79 per cent respectively). On the job training was highly practiced by startups and growth entrepreneurs since they do not have sufficient resources to invest in highly qualified experts or employees. Startups create “internal training programs in order to add value to employees through gaining skills” and “helping them [employees] discover what they are good at.” In addition, some private enterprises have “mentorship and internship programs, which enable them to interact with other employees and gain skills.” Lastly, employees who did not acquire their skill sets from on-the-job training did so by watching educational videos and reading books.

This implies that students who complete a formal education degree are not receiving the practical skills that are required when joining startups, private enterprises, and innovation hubs. ICT training institutes explain that a major obstacle is the lack of curriculum review and challenges in implementation. Current curricula focus on theory but fails to tie educational content into practical scenarios. One training institute explains, “curriculum review and implementation is a big problem since IT is changing so fast and implementation is costly. The process of reviewing the curriculum and implementing changes is very slow.” Therefore, graduating students from educational institutions are currently not taught skills that they need in the job marketplace. This led one training institute to mention, “curriculum review should be done to enhance skill development instead of focusing on securing job employment.” A professor at Maseno University also voiced that the biggest challenge for skill development is that “too many youth are taught theory through the methods of memorizing and not understanding.” He believes that it is necessary for “the curriculum to be changed to reflect a 21st century curriculum.” Curriculum revision is therefore crucial to bridging the gap between high-competence digital skills training and employer expectations.

B. LOW-COMPETENCE DIGITAL SKILLS GAP

The second type of digital jobs is basic level digital skill sets where previous ICT training, education and/or experience is not necessary. A professor at Maseno University explains how an organization called The African Maths Initiative (AIMS) connects people with low-competence digital skills to employment opportunities that foster their skills training. The project targets school children, mothers and other community members by providing netbook computers for basic data entry tasks in rural settings. Many local universities and international research organizations employ the service for data entry of locally conducted surveys and questionnaires. As a result of the initiative, persons without digital skills acquired low-competence digital skills and were able to further improve their skill sets through their job.

The initiative could “introduce this to someone who has never touched a computer” and that such low-competence digital jobs did not require formal training in order to be completed successfully. Over time, employees in the initiatives further increased their digital skills by understanding data manipulation, modeling, as well as simple coding and website creation through offline means. This case study displays how data entry may be an entry point for individuals with few or no digital skills into the ICT sector. However, currently such initiatives have not scaled to provide low-competence digital jobs to a wide range of people. Instead, large-scale data entry projects may be more efficiently completed employing digital means such as tablets and phones rather than manual survey. Nonetheless, services such as M-PESA have created thousands of low-competence digital jobs in the form of M-PESA agents and sales personnel across Kenya.

C. MINDSET

Respondents also noted youths’ negative mindset towards entrepreneurship and skills development as a barrier to employment. The majority of youth aim to be employed immediately after graduating from university or an academic training institute and think that opportunities in the startup sector are for a different age bracket. As a result, youth do not take advantage of existing opportunities for entrepreneurship and fail to capitalize on existing technologies to develop innovative businesses.

Although the majority of startups in Kenya are run by youth, respondents noted that youth need to be more aggressive and proactive in seizing opportunities in the ICT sector. At the same time, respondents recognized the need for better support systems and engagement platforms targeting youth entrepreneurs. The ICT hubs explain that incentives need to be created in order to foster youth engagement with ICT entrepreneurship.

D. RECOMMENDATIONS

The ICT skills gap among youth is a primary barrier to youth employment in the digital jobs sector. The following recommendations, namely curriculum review and implementation, internship and apprenticeship programs, and mentorship opportunities, are avenues that may help bridge this gap.

1. Curriculum Review & Development

Training institutes and academic institutions emphasized the need for curriculum redevelopment. Revised curricula could include entrepreneurship training, independent projects, and case studies. In addition, curricula in the IT sector need to be updated annually. Finally, training and academic institutions may work closely with enterprises in the ICT sector to ensure that the skills taught reflect the skills sought by employers. Moreover, training institutes may introduce long-term programs that accompany youth during the first months of their employment. Although revised curricula offer a long-term solution, they are crucial to achieving a sustainable and effective change among youth.

2. Internship and Apprenticeship Programs

One way to immediately address the skills gap that organizations face is through internship and apprenticeship programs. Internships offer early exposure to students and provide them with practical experience to supplement their studies. In addition, interns can support organizations that lack the resources to hire full-time employees. Finally, internships give organizations the opportunity to identify high-performing individuals that fit with the culture and values of the organizations. 32 out of 67 respondents actively mentioned that they would hire interns on a full- or part-time basis. One startup explained: “we have interns...when a chance for employment arises in the organization we consider them for employment.” Similarly, apprenticeship programs may allow employers to assess a persons’ fit with the organization before committing to a long-term contract while simultaneously allowing young employees to gather valuable professional experience.

3. Mentorship Opportunities

Many startups and training institutions felt that Kenyan youth need to embrace a culture emphasizing passion, learning from failures, and a strong work ethic. Mentorships may be an avenue to assist training institutes and academic institutions in achieving such a change in mindset. In addition, the advice of mentors may also help youth in building soft skills and taking ownership over their careers. The challenge that many organizations are facing is a lack of capacity in implementing a mentorship program. ICT training institutes and ICT hubs may offer the expertise and the necessary pool of mentors to implement programs at a low cost for startups and growth private enterprises.

KEY FINDING 3

FUTURE TRENDS FOR DIGITAL JOB CREATION

All respondents were asked about their perceptions of emerging trends in the ICT sector. Online work, big data analytics and mobile applications were the most frequently named. Based on the data and extensive literature review, this report proposes that online work has the potential for medium-scale digital job creation. Big data analytics have small-scale potential, as the sector primarily targets employees with high-competence digital skills. The mobile application sector has medium-scale potential for job creation for both high- and low-competence digital skills. However, to fully capture the employment potential of these trends, it is crucial to reduce the constraints outlined in the previous section.

	Online work	Big data analytics	Mobile applications
Scale of job creation	Medium scale	Small scale	Medium to large scale
Level of competence	High, Low	High	High, Low

A. ONLINE WORK

As of December 2013, 52 percent of Kenyans are estimated to have access to the Internet (Communications Authority of Kenya, 2013). An ICT startup mentioned that, “connectivity to the information is now very easy through fiber optic cable” making it easier to access the Internet. In 2000, only about 200,000 Kenyans were online but with the installation of four fibre-optic submarine cables, Kenya’s international bandwidth increased more than fifty-fold between 2009 and 2013. Today, the accessibility of the Internet in Kenya is significantly higher than the average Internet penetration rate on the continent (21 percent). As a result of a simplified and converged licensing regime, four networks are competing for users, thereby lowering the prices significantly and creating a competitive market. The majority of users (99 percent) are subscribed through mobile data. Surveys find that Internet subscription has increased most noticeably among students as a result of more and more universities connecting to broadband (Mbote, 2014). An ICT hub explained that as a result “more applications that use the Internet can be accessed.” Nonetheless, a significant gap in the technological infrastructure remains between rural and urban areas (Communications Authority of Kenya, 2013). In other words, urban youth thus far benefit most from the increase in Internet accessibility. However those interviewed explained that there remains, as a Kenyan youth put it, a “high cost of acquiring” Internet.

Online work was perceived as an upcoming trend among organizations interviewed. Organizations are willing to communicate with their employees virtually, employ them remotely and therefore enable geographically dispersed job creation. Types of online work platforms include oDesk (<https://www.odesk.com/>), where technology-savvy employees are given the opportunity to complete work tasks virtually. An ICT startup believes that “online jobs are part of digital jobs and must include...oDesk. Such online platforms give a very good test for students, i.e. their readiness for the market in terms of meeting deadlines, offering quality, and speed.” Other online work platforms that could be scaled to reach the general population include the cultivation of micro-work. Micro-work could provide the opportunity for individuals to get paid to complete small tasks using their phones.

Even though an increase in Internet penetration in Kenya has led to a greater accessibility to the Internet in recent years, the supply of online work is still fragmented. Organizations based on online work currently target regional or global markets as the capacity in Kenya is not yet fully developed. In addition, the high costs associated with Internet access would mean that the payment structure of online jobs includes Internet connectivity. In addition, costs associated with hardware pose challenges to making online work an affordable option for ICT enterprises in Kenya.

Given that ICT startups and particularly ICT growth private enterprises are currently creating a variety of digital jobs, online work may be integrated into their business models. This may alleviate the high costs associated with the permanent employment of skilled labor by creating an opportunity to outsource high-competence digital skills to online platform. Given growth private enterprises’ current employment statistics and growth rates, the integration of online work in these businesses would allow for medium-scale job creation.

B. BIG DATA ANALYTICS

Big data describes “digital datasets of unprecedented size in relation to a particular question or phenomenon, and particularly datasets that can be linked, merged and analyzed in combination.” As such, big data involves a process of data collection and analysis, and should be seen “more as a verb than a noun, and more as a process than an object” (Rockefeller Foundation, 2014). Big data is difficult to analyze manually and the adoption of programs for data analysis becomes crucial. The collection, interpretation, and presentation of big data requires high-competence digital skills: big data is analyzed through cluster computing and large data analytics tools like Hadoop, which require not only statistics training, but also the digital skills to operate the programs.

A few respondents explicitly drew attention to the potential of big data in Kenya. One growth private enterprise explains, “there is a very big move in terms of big data. Online tools are used in making sense of information that is collected and analyzing it.” Another growth private enterprise believed that digital skills in mobile and data analytics will be crucial in ensuring that the data is interpreted in actionable and sensible forms. “There is already a lot of open data platforms and debates going on, the challenge is there are no skills in data analytics and maximizing on mobile tools to ensure the people who cannot afford a computer can also access it,” adds one respondent from a growth private enterprise.

The tendency of using big data to gather and make sense of information may create high-competence digital jobs in the form of data collectors, analysts, and visualizers. In addition, this trend may create topic-specific digital jobs. ICT hubs emphasize that it is crucial for themselves and for their users to maintain a steady information flow regarding market trends and technology innovations. However, access to information particularly on market trends is not readily available or easy to understand. In particular, startups highlight that the available market trend information is often disconnected from the type of data that would help entrepreneurs align and scale their business to meet market needs. “There is a lot of data and market research available, the only challenge is presenting the data in a creative and easier way for the tech startups to understand it based on their little knowledge and skills in research,” states one respondent from a tech startup. Due to the technical skills needed and small local market pool of individuals who are capable of performing in the big data opportunities realm, the potential in digital job creation is small scale with a high level of digital competence required.

C. MOBILE APPLICATION SECTOR

Whereas the Kenyan Internet penetration rate stands at 50 percent, roughly 71 percent of the population has access to a mobile phone. The ICT Board of Kenya attributes the rapid increase in Internet penetration to the surge in mobile phone usage; 99 percent of Kenyans subscribe to the Internet through mobile data (Mbote, 2013). 26 ICT startups and 9 growth private enterprises named mobile applications as an upcoming trend in Kenya. However, of those organizations, only 7 ICT startups and 7 growth enterprises currently develop mobile applications as a component of their business.

Nonetheless, the majority of ICT startups and growth entrepreneurs felt that the Kenyan market is moving to a cashless payment environment where mobile payment developments are expected to dominate the market. With the surge of mobile phone connectivity across the country and the decreasing cost of smart phones, applications such as mobile payments are becoming a new standard. Mobile applications are also fostering the growth of e-services, an umbrella term for services that use the Internet. The government of Kenya, for instance, partnered with private firms to develop government e-services in order to facilitate the use of government services and access to public data (Daily Nation 2011). The government also launched the e-service delivery portal, Huduma Kenya (<http://www.hudumakenya.go.ke/>), which aims at improving transparency and accountability in the public sector. Through the e-Government directorate, the government aims at enabling citizens to access integrated public services via their phones, computers and personal digital assistants (PDA). In addition, many ICT hubs are offering free trainings focusing on the creation of mobile apps, how to launch them, and how to create mobile app businesses.

Although these initiatives reveal a growing interest in the mobile applications sector by various stakeholders, mobile applications require a low level of human resource engagement; ICT startups that develop mobile applications employ an average of 5 employees as opposed to the average 9 employees in all other ICT startups. However, once such mobile applications start-ups reach the growth private enterprise stage, it appears they employ the same average number of employees as other growth private enterprises active in other industries. M-PESA is a frequently cited example of how a mobile money platform enables the large-scale creation of high-competence and low-competence digital jobs. This implies that upon reaching the private growth enterprise stage, companies in the mobile applications sector have the potential to create medium- to large-scale digital jobs for youth.

CONCLUSION

THIS STUDY IS ONE OF THE FIRST IN-DEPTH ANALYSES ON THE ROLE THAT DIGITAL JOBS MAY PLAY IN ALLEVIATING UNEMPLOYMENT AMONG KENYAN YOUTH. THIS REPORT DEFINES DIGITAL SKILLS AS A FORM OF EMPLOYMENT THAT REQUIRES TECHNICAL COMPETENCIES RANGING FROM COMPUTER LITERACY TO SOFTWARE DEVELOPMENT AND PROGRAMMING SKILLS. BASED ON OUR RESPONDENTS' INSIGHTS, WE DISTINGUISH BETWEEN HIGH-COMPETENCE DIGITAL SKILLS, CAPTURING ADVANCED CAPACITIES SUCH AS CODING, PROGRAMMING, AND BIG DATA ANALYTICS, AND LOW-COMPETENCE DIGITAL SKILLS, DESCRIBING SKILLS SUCH AS SIMPLE DATA ENTRY OR CUSTOMER SERVICE PROVISION.

Based on this definition, three key findings regarding the current and future potential of digital jobs for youth employment were presented and discussed: the job-creating potential of ICT startups and growth private enterprises, the gap between extant and expected digital skills, and the job-creating potential of future ICT trends such as online work, big data analytics, and the mobile application sector.

ICT startups currently create digital jobs on a small-scale whereas growth private enterprises generate a significant number of digital jobs and given their growth rates, may be expected to continue to do so. ICT training institutes and ICT hubs, in contrast, play a facilitating role by offering opportunities for digital skills development.

Second, a challenge to capturing the job creating potential of the digital sector is the gap between extant and expected skills. The current curricula in academic and ICT training institutions emphasize theoretical skills development whereas employees seek practical digital and management skill sets as well as work experience. This report recommends that curriculum review and re-development, the creation of internship and apprenticeship programs, and mentorship opportunities may help bridge the digital skills gap.

Third, this report identified three future trends in the ICT sector. Online work has the potential to create low- and high-competence digital jobs at a medium scale. Big data analytics may provide employment for job seekers with advanced digital skills at a small scale. Finally, the mobile application sector may hold the potential to create digital jobs at a medium to large scale, as the example of M-PESA has shown.

This report is based on in-depth data from 95 respondents in Kenya's ICT sector. For further research however, it may be crucial to track the creation of jobs in order to assess and further explore the potential of digital job creation in different types of organizations. Although the majority of respondents track employment creation through surveys, questionnaires and matrices, there is currently no process in place to track the creation of digital jobs specifically.

APPENDIX

Definition of terms

5 types of stakeholders interviewed entailed;

- **ICT Hubs** - This is a coworking space that promotes community, learning and innovation. ICT Hubs provide shared support and networking opportunities for tech-entrepreneurs with the aim of attaining capital, funding, mentorship, networking and other forms of support.
- **ICT training institutions** - These are learning institutions/academia that educate the youth on ICT skills based on structured guidelines given by commission for higher education and job market demand in ICT ecosystem with an aim to facilitate job creation.
- **ICT startups** - Early stage ICT based businesses in idea stage, prototype stage and seed stage (GSMA entrepreneurship report 2014)
 Idea stage: Business venture has more than one idea but no tangible prototype yet
 Prototype stage: Business venture has crystalized its ideas to minimum viable products
 Seed stage: Business venture has formed a company based on their minimum viable product, have a clear business model, core team and at least one paying customer
- **ICT growth entrepreneurs** - Business venture has positive revenues, clear commercialization strategy, considerable customer base, first executive hires, establishment of departments or focused teams e.g. R&D, sales and business developer, scaling up its operations and has raised a significant series A round of funding (GSMA entrepreneurs report 2014)
- **Public stakeholders** - Refers to any organization, group or person run by the government.

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