

E-Booster Uganda: Towards an Inclusive Digital Economy in Uganda Through Provision of ICT Services to The Underserved and Unserved Communities

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Statements and Declarations

Consent to Participate declaration

Participation in the study was on a voluntary basis. Participants were requested to agree to an online informed consent form before participating in the study.

Approval Committee or the Internal Review Board

The research proposal and instruments were submitted to the Uganda Communications Research and Projects Committee for approval before implementation.

Funding Declaration

This research was funded by the Uganda Communications Commission under the e-Booster 2013 Project, which is one of the projects under the Uganda Communications Universal Service and Access Fund (UCUSAF).

Human Ethics and Consent to Participate declaration

Personal data was not collected. Participation in the study was on a voluntary basis and participants were requested to agree to an online informed consent form before participating in the study.

Data availability declaration

The primary data for this study is available in SPSS.

Abstract

e-Booster Uganda 2023 was a project of Uganda Communications Commission implemented by Makerere University Business School between April 2023 and November 2023. We conducted interviews as well as a survey on Information and Communications Technology solutions from various sectors. A review of reports and academic publications related to access to communication services in Uganda was made with a focus on the nature of challenges and solutions that have been made by different actors.

Findings reveal that Uganda has a wide digital divide based on geographical location, particularly between the rural and urban where there is a 70% difference in favour of the urban communities and businesses with only 9% of Ugandans living in rural areas having access to the Internet. It was also found that 60% of the urban people are poor and live in slums hence causing more need for inclusion in the programme.

It is concluded that increased access to and the usage of ICT services is critical for the attainment of National Development Plans including but not limited to the Parish Development Model where the underserved and unserved can be easily reached through ICTs by and in supporting the monitoring of government programmes through promotion and information sharing to those communities and sectors.

Key words: E-Booster Uganda; Digital inclusion; Universal access; ICT Businesses

1. Introduction

e-Booster Uganda 2023 was a project of Uganda Communications Commission implemented by Makerere University Business School between April 2023 and November 2023. The project was one of UCC's initiatives aimed at fostering the adoption of communication technology by Ugandan companies and underserved communities in Uganda. It sought to address the challenges faced by stakeholders, including limited access to funding and technical expertise by "Leaving No One Behind in the Digital Era". The competition welcomed any ICT solution, whether from e-commerce, e-health, e-agriculture, e-education, e-governance etc., provided they were local solutions to bridging the gaps between the served and underserved communities in Uganda. Top 5 five winning companies were supported through training, mentorship and coaching as well financially in order for them implement their solutions.

1.1 Digital communications services and economic development

Digital communications services play a pivotal role in driving economic development by providing enhanced access to information and opportunities (Roztock, et al. 2019).

These services encompass a wide range of technologies, including the internet, mobile telecommunications, and broadband services among others. According to Lawson (2005), digital communication technologies empower businesses and individuals by facilitating access to a vast reservoir of information, thereby supporting research, education, and informed decision-making in businesses. Digital communications also play an important role in fostering online trade through e-commerce, which extends market reach beyond traditional borders and are a catalyst for economic development.

Further, Owens (2013) and Alrabei et al. (2022) argue that digital technology services promote financial inclusion by offering digital banking and mobile payment options, thereby extending financial services to previously underserved populations – especially those in rural areas where there is poor infrastructure. These technologies enable poor people to save, invest, and access credit, thereby contributing to their economic empowerment. According to Holtgrewe (2014), digital communications enable remote work and outsourcing, thereby unlocking cost efficiencies for businesses and providing employment opportunities for individuals in countries where there is high unemployment. Kim (2014) adds that digital infrastructure enhances the effectiveness of government services, which helps to reduce corruption and improve public service delivery, especially in developing countries.

Saykili (2019) argues that digital communication technologies provide educational landscape benefits from online learning opportunities, which contributes to skill development and enhancing the workforce's capacity for economic development.

Gabriele et al. (2001) argues that these technologies promote innovation and entrepreneurship as digital communication services lower barriers to entry for new businesses and facilitate access to global markets. In terms of urbanization, Tanwar et al. (2018) argues that digital communication services underpin smart cities and infrastructure development, including smart grids, traffic management systems, and healthcare solutions, which offer cost savings and improved quality of life. Deichmann et

al. (2016) adds that digital communication technologies in agriculture and rural areas benefit farmers by providing real-time information on weather and market prices, and helping to increase productivity and income. Moreover, Yang et al. (2021) emphasize the role played by digital communication services in managing global supply chains, enhancing their efficiency and responsiveness, thus benefiting industries dependent on international trade. According to Yang et al. (2021) and Gunasekaran and Ngai (2004), data which is generated by digital communication technologies can be harnessed for data-driven decision-making across various sectors, leading to increased efficiency and innovation. Therefore, it is critical that developing countries such as Uganda work towards bridging the digital divide to ensure that these benefits are accessible to all citizens. Addressing issues related to privacy, security, and digital literacy is essential to maximize the potential of digital communications for economic development, particularly in developing countries.

2.2 Underserved and Unserved communities in Uganda

According to Atkinson and McKay (2007) and Imamov and Semenikhina (2021), access to digital communication services and the internet is essential for personal development, economic prosperity, and societal advancement in the modern era. However, Rutebemberwa et al. (2009) argue that in Uganda, there are communities that lack adequate access to these crucial services. Gillwald et al. (2019) post that communities with difficulties to access digital communication services in Uganda are commonly referred to as "underserved" and "unserved." According to Mutenyo et al. (2022) and Zomers (2014) underserved and unserved communities in Uganda face significant obstacles in accessing essential digital communication services, thereby hindering their ability to fully participate in educational, healthcare, economic, and social opportunities. The lack of reliable, affordable, and accessible digital infrastructure poses profound challenges to these communities, resulting in educational disparities, limited healthcare access, economic disadvantages, social isolation, and restricted civic engagement (Gillwald et al. 2019). Therefore, bridging the digital divide is imperative to ensure equitable access to the benefits of the digital age and to promote overall development and inclusivity in Uganda. Kasusse (2005) argue that efforts to bridge the digital divide

in underserved and unserved communities in Uganda should extend beyond technological advancement and represent a stride towards creating a more equitable society. By extending access to digital communication services, Uganda can empower these communities, thereby promoting education, enhancing healthcare, fostering economic opportunities, and improving overall quality of life (Gillwald et al. 2019). This can be achieved through deliberate and well-planned investments in digital education, community engagement in order to pave the way for a more interconnected and inclusive future for all its citizens in Uganda.

2.3 The role of Uganda Communication Commission in promoting digital inclusion

Studies have highlighted that bridging the digital divide through promotion of digital inclusion is critical for socio-economic development (Adam & Dzang, 2021). According to Mutenyo et al. (2022), the Uganda Communications Commission plays a crucial role in promoting digital inclusion in Uganda. Reisdorf and Rhinesmith (2020) define digital inclusion as the effort to ensure that all individuals and communities, including those in underserved and remote areas, have access to and can effectively use digital technologies and services. Alamelu (2013) adds that it is imperative for countries to have regulatory institutions such as the Uganda Communications Commission with a mandate to promote digital inclusion.

According to Alemu (2018), the Uganda Communications Commission is responsible for regulating the telecommunications and broadcasting sectors in Uganda. It sets policies and standards to ensure that telecommunication operators and service providers expand their networks and services to underserved and unserved areas (Walyemera, 2022). The Commission also helps to promote universal access through planning, administering and overseeing universal access programs aimed at extending telecommunication and internet services to remote and marginalized communities in the country (Bowman, 2019). This involves subsidizing infrastructure development in areas where commercial viability is low. The Commission also helps in licensing and spectrum allocation whereby it allocates licenses and spectrum to telecommunications providers,

ensuring that they commit to expanding their networks and services to underserved areas as a condition of their licenses. This helps to encourage private sector investment in regions with limited market potential but need critical communication services.

Mutenyo et al. (2022) argue that among others, the Uganda Communications Commission has promoted digital inclusion through consumer protection, carrying out digital literacy campaigns and creating public awareness. This has helped in safeguarding the interests of consumers, including those in underserved areas through enforcement of regulations that prevent discrimination in service provision and ensures that consumers receive fair and equal access to digital services. The Commission often collaborates with other stakeholders to promote digital literacy and public awareness campaigns which help to ensure that individuals in underserved areas have the skills and knowledge needed to use digital technologies effectively as well as being informed about the benefits of digital communication services and how they can access and utilize them.

Gillwald et al. (2019) argue that Uganda Communications Commission collaborates with government agencies, private sector entities, non-profit organizations, and international partners to implement initiatives that expand digital access and promote digital inclusion. The commission collaborates by conducting research and providing information to development partners critical data on the state of digital inclusion in the country, identifying areas with the greatest need for intervention. The Commission also guides policy formulation in the Communications sector in order to pave way for critical ICT infrastructural development, such as broadband networks, to reach underserved areas. This helps to provide communication services to the underserved and unserved communities (Rutebemberwa et al. 2009). Therefore, the Uganda Communications Commission is a key stakeholder in promoting digital inclusion as it plays a multifaceted role through regulation, facilitating infrastructure development, ensuring consumer protection, and promoting digital literacy. These efforts are crucial for bridging the digital divide and ensuring that all Ugandans have equitable access to digital communication services and the benefits they bring in terms of education, healthcare, economic opportunities, and social engagement (Mutenyo et al. 2022; Adam & Dzang, 2021).

3.0 Methodology

3.1 Design of the study

The data was collected through a combination of primary and secondary data collection methods. Primary data included private sector players, and interviews with industry experts, and business leaders. On the other hand, secondary data involved analyzing industry reports by the Uganda Bureau of Statistics, the Uganda Vision 2040 report, academic publications, and online sources to complement and validate the findings.

3.2 Stakeholder Engagement

Stakeholder engagement informed our decisions on developing a tool for collection of ICT solutions ideas from respondents. Stakeholder engagement involved a process of actively engaging and communicating with relevant stakeholders to ensure that their interests, needs, and perspectives are considered in the design, implementation of the programme. The stakeholders engaged were the UCC e-Booster focal persons, local leaders, and underserved communities in both rural and urban areas. As earlier indicated, we also consulted the Uganda Bureau of Statistics and Uganda Vision 2040 report and working documents. These stakeholders were engaged through pre-arranged meetings, webinars and in some cases interviews with focal persons. We also reviewed relevant reports.

3.3 Attraction of quality responses

It was in the interest of the entire team to attract high-quality responses from our selected participants in the ICT solutions sphere. This was deemed crucial for the success of the *e-Booster programme*. In order to achieve this, we ran a publicity campaign for the *e-Booster programme* beginning with a launch event that was covered by media houses at UCC Headquarters. we used a blended approach to attract responses from various units of inquiry as detailed below;

- i. We followed this with targeted marketing techniques, such as email campaigns and social media ads on Twitter and WhatsApp in order to reach specific groups of potential applicants. We also published adverts in the Daily Monitor, New Vision, MUBS and UCC websites. We also held webinars with potential

applicants in which we made presentations on the strategic goal of the *e-Booster programme* and also demonstrated to them how they could submit applications via the *e-Booster portal*. The Question-and-Answer sessions enabled us to get feedback and make continuous improvements on both the criteria and portal.

- ii. We also developed all relevant digital content and detailed information on the e-Booster programme such as the objectives, benefits, eligibility requirements, and application process, on the programme's website www.ebooster.co.ug. The submission portal had additional guidelines on each and every submission item on the submission template.

Last but not least, we used of social media influencers and the MUBS alumni network such as lecturers, university administrators and student leaders to push the messages through to larger community. These were respected individuals who are role models in the ICT industry. These multiple sources enabled

4. Findings

4.1 ICT solutions and achievement of Uganda's Vision 2040

Uganda's Vision 2040 is a long-term development plan that outlines the country's aspirations and goals for sustainable socio-economic transformation by the year 2040. The Uganda Vision 2024 identifies ICT as one of the key drivers of economic development, with an emphasis on ICT and solutions. Because of this, the government plans to implement a "Hi-tech ICT city and associated ICT infrastructure" by the year 2040. However, the current state of ICTs in the country was not good. The country is a net importer of ICT products given that there were no ICT exports made compared to other emerging economies such as Malaysia, Singapore, and the Philippines which have heavily relied on ICT to improve on their foreign exchange. The Vision highlights that investment in ICT industry will greatly help grow the country's GDP and provide jobs, especially for the youth and other special interest groups.

ICT and solutions play a significant role in the attainment of Uganda's Vision 2040, with a focus on leveraging technology to drive economic growth, enhance service delivery, and improve overall quality of life for its citizens. The Vision 2040 emphasizes the need

to establish and strengthen robust digital infrastructure, including internet connectivity, broadband networks, and ICT facilities, to ensure seamless communication and data access across the country. It was found that the sectors that require more usage of ICT include healthcare, education, agriculture, and governance will improve efficiency, accessibility, and effectiveness in delivering public services.

Further, the vision recognizes the importance of fostering a culture of innovation and entrepreneurship in the country by providing plans to support the development of an enabling environment for startups, SMEs, and innovative ventures to thrive and contribute to economic growth and job creation. Therefore, it is critical to invest in research and development (R&D) in ICTs in order to drive technological advancements and innovation. This includes supporting scientific research, technology incubation centers, and collaboration between academia, industry, and the government.

Last but not least, Uganda's Vision 2040 addresses the need to extend the benefits of ICT and solutions to rural and underserved areas through initiatives like e-Booster that are envisioned to bridge the digital divide and ensure that technology reaches all segments of the population. This would enable the transformation of government services through the adoption of e-government initiatives such as digitizing administrative processes, implementing online service delivery platforms, and enhancing transparency and accountability through digital governance systems.

4.2 The Uganda Bureau of Statistics reports on ICT solutions

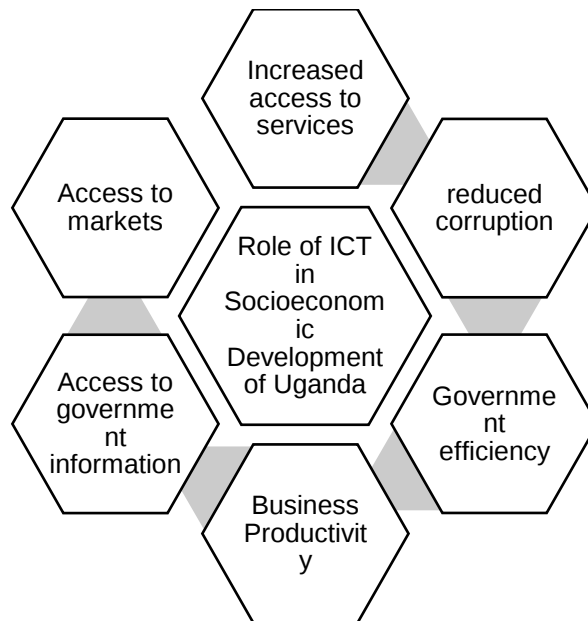
Over the years, the Uganda Bureau of Statistics (UBOS) has conducted various studies and published reports on the impact of ICT innovation on economic development in the country. Among the areas where ICT innovation is expected to have a maximum impact include job creation, increased productivity, access to global markets, improved service delivery, and financial inclusion. The Bureau acknowledges that ICT innovation can lead to the development of new industries, services, and businesses, which, in turn, will create employment opportunities for the population which is predominantly youthful –

under the age of 30 years. The growth of the ICT sector itself also leads to job creation in areas like software development, tech support, and digital marketing.

The Bureau underscores the critical need for the populations to adopt ICT tools and technologies in order to enhance the efficiency and productivity of businesses and industries as it is envisaged that automation, data analytics, and streamlined processes will significantly contribute to better resource management and reduced operational costs. Additionally, the Bureau argues that ICT innovation will enable businesses to access global markets through e-commerce platforms and digital marketing channels. This will open up opportunities for small and medium-sized enterprises (SMEs) to reach a broader customer base and expand their markets beyond national boundaries and hence spur business growth as well as improving the country's GDP.

Just like it is highlighted in the Vision 2040, Uganda Bureau of Statistics recommends government institutions to harness the benefits ICT innovation by improving service delivery and reducing bureaucracy. This would also reduce the rampant corruption in the country since e-government initiatives such as the Integrated Financial Management Information System (IFMIS) help to promote transparency, accountability, efficiency, and citizen engagement. Further, ICT solutions in the private sector such as mobile banking and digital payment systems, can enhance financial inclusion by providing banking services to previously unbanked or underbanked populations. This would support entrepreneurship and economic participation for marginalized communities in urban and rural areas. Hence, it is important that deliberate ICT education programmes are introduced in order to spur ICT solutions. Therefore, the government should invest in ICT R&D and programmes such as the e-Booster in order to promote the development of ICT solutions, infrastructure and the support for innovation ecosystems in the country. This will lead to the creation of homegrown solutions that address specific challenges and directly contribute to the country's economic growth.

Figure 1: Role of ICT in socioeconomic development



Source: *Vision 2040; UBOS (2021)*

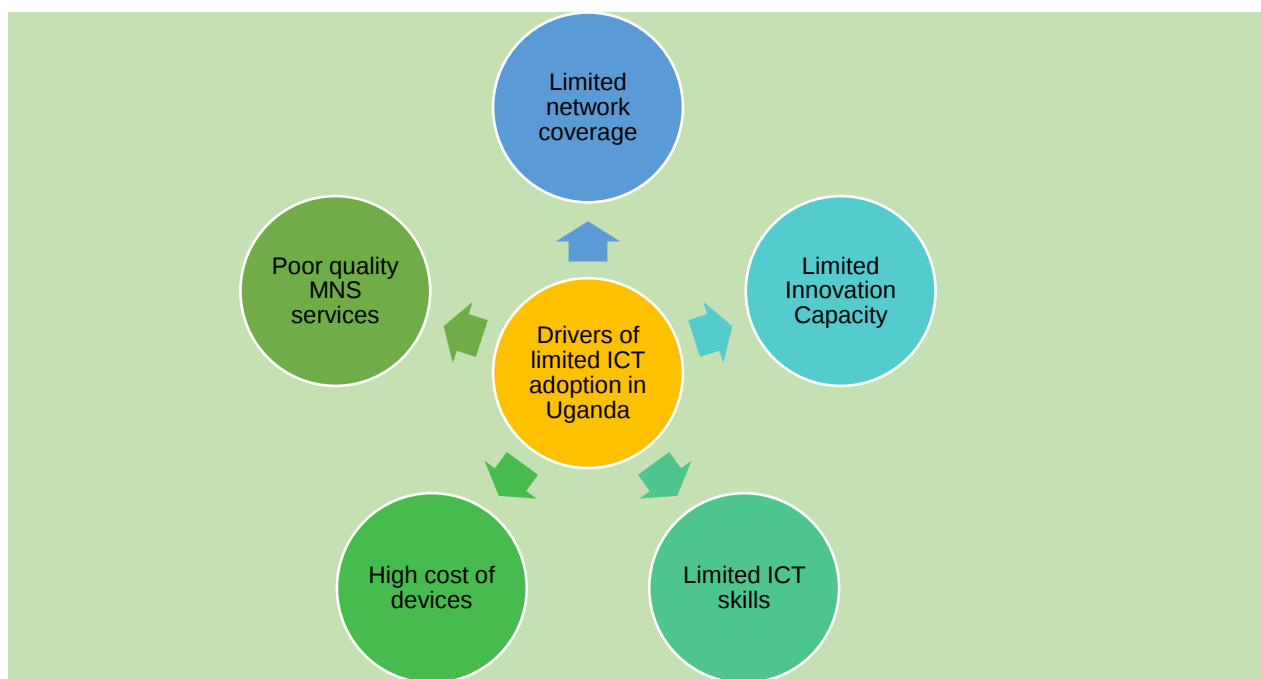
Antecedents of low internet usage (Gillwald, Mothobi, Ndiwalana & Tusubira, 2021)

Internet is a key driver in accessing information and communication services. According to the authors, there are several inhibitors of access to the internet in Uganda viz;

- Lack of electricity and underdeveloped ICT infrastructure which are the primary causes of huge discrepancies in urban–rural Internet use and mobile phone penetration rates in Uganda.
- Low smartphone density; Uganda has the second-lowest smartphone device ownership in the countries surveyed at 16 percent of the total number of mobile phone users, with only Rwanda's nine percent performing worse.
- Digital illiteracy; Other than poor supply-side factors, human development factors are also a cause of concern in Uganda. 36% of non-Internet users are digitally illiterate, 23% do not know how to use the Internet and 13% have negative attitudes towards the internet.
- High costs of internet

- Limited broadband coverage (65%) of the population is covered by 3G and only 17% covered by LTE/4G.
- High costs of rolling out by Mobile Network Companies (MNS). Although Section 5(1)(y) of the Uganda Communications Act (2013) encourages infrastructure sharing, this has not been embraced with the exception of network towers. This is reflected in the in high costs of rolling out and maintaining infrastructure, the underutilisation of capacity and high Internet prices.

Figure 2: Findings from the Ministry of ICT and National Guidance



Source: *Ministry of ICT and National Guidance (2023)*

According to the Ministry, the ICT landscape is changing and government has not taken steps to keep this pace through the development and adoption of new strategies that can be leveraged to realize the country's digital future. This has created a wide digital divide among sectors and communities. For that matter, Uganda still faces challenges of access to communication services despite efforts to improve Policies and strategies.

Current interventions

In order to improve the ICT enabling environment, the Ministry of ICT and National Guidance is currently implementing the following interventions under the NDPIII key result areas for ICT;

1. *Increasing ICT penetration (Internet penetration from 25 to 50%,*
2. *Increasing Digital Terrestrial Television signal coverage from 56 percent to 90%, 70% NBI connectivity in Government MDAs/DHq; 90% national broadband coverage with minimum speed of 8 Mbps*
3. *Reducing the cost of ICT devices and services (unit cost of 1Mbps /month of internet on the retail market from USD 237 to USD 70, unit cost of low entry smart phones from UGX 100,000 to UGX 60,000 and cost of a computer from UGX 1,600,000 to UGX 800,000);*
4. *Increasing local ICT innovation products developed and commercialized from 72 to 282.*
5. *Introduction of 5G network.*
6. *Introduction of the National ICT Initiatives Support Programme (NIISP) to facilitate the creation of an ICT Innovation ecosystem and marketplace for Ugandan innovative digital products*

Challenges in Implementing ICT in Science, Technology, Engineering, and Mathematics (STEM) education (Kibirige, 2023).

The author focused the study on the challenges faced by STEM teachers in using ICT and various challenges divided into three categories were identified namely;

- Infrastructure and internet connectivity
- Individual factors and administrative support; and
- Curriculum and learner support materials.

More particularly, it was found that there is a big challenge of lack of computer access, internet connectivity, lack of ICT textbooks, teachers lacked the ICT skills necessary to integrate technology into their teaching methods, and administrative support was insufficient.

4.3 Stakeholder engagements

Most stakeholders interviewed expressed optimism in potential of ICTs as a tool for reaching underserved and unserved communities. For example, they indicated that ICTs have already been demonstrated to be the most reliable tools in the financial sector, education and to bring services closer to underprivileged communities. One stakeholder commented as follows;

“See how ICTs have transformed the banking sector. Just about a decade ago, many people didn’t have bank accounts and could hardly transact any business through a medium other than cash. However, ever since Safaricom in Kenya invented Mpesa transfer systems, it helped to bridge the financial inclusion gap in Kenya. It did not take long for this technology to be adopted by other telecoms across Africa such as MTN and Airtel. The greater effect has been seen helping unprivileged people who previously never owned bank accounts to be able to save money and transact financial businesses remotely via a mobile phone. The beauty of ICTs is that it has enabled individuals and firms to create local solutions to local problems.”

The stakeholders however highlighted the need to proper sector regulations to guide innovation in the ICT sector. For example, the talked about security problems associated with ICTS, especially when the users are not aware of this danger. They also mentioned issues to do with patents and privacy of respondents on ICT platforms, especially social media where there is a risk of private data of unsuspecting users being sold to unknown organizations for commercial and other reasons.

A stakeholder commented as follows:

“Many of the users of new technologies, especially social media are not aware that their data is shared with third parties for commercial purposes. There is a need for UCC and other regulators to sensitize communities on some of these very critical issues”.

“The rate at which Technology is growing, we need to start supporting markets that are sidelined by commercial players due to their lack of market and commercial viability.

This will bring everyone on board to start benefiting from the communication infrastructure- UCC Executive Director

4.4 Availability of local capacities to offer ICT solutions

A total of 39 solutions were gathered from stakeholders. An analysis of the solutions revealed four major categories of submissions namely; Emerging technologies, Industry applications, ICT market challenges, Trade and Community outreach.

4.4.1 Emerging Technologies

Emerging ICT technologies are the latest developments that are trending in the sector and are expected to drive the next generation development. Some of these include Internet of Things (IoT), Artificial Intelligence (AI), and Blockchain, Biometrics and Facial Recognition, Autonomous Systems, Cloud Computing, among others. These technologies are slowly but steadily gaining traction and showing significant potential to impact various industries. While the technology landscape is constantly evolving, these technologies have shown potential in creating new opportunities for innovation and disruption across multiple sectors. Organizations that strategically embrace and adopt these technologies stand to gain a competitive advantage and drive future growth.

4.4.2 Industry Applications

Industry ICT applications have a wide range of industry-specific uses and play a vital role in improving efficiency, productivity, and decision-making across various sectors. They are the ones that have the potential for ICT to revolutionize and optimize various sectors of the economy. Some examples include Healthcare solutions such as Electronic Health Records, Telemedicine, Medical Imaging, Health Information Systems among others. There are also Finance and banking applications such as FinTech, Mobile Payments, Online Banking and cryptocurrencies. In the education sector, we have applications such as E-Learning systems, Virtual Classrooms, among other Educational Apps. In Manufacturing sector, we have applications such as Computer-Aided Design, Robotics and Automation, Fleet Management Systems, Supply Chain Management, and Trip share apps, while in Agriculture, there are applications like

Precision Farming, Agricultural Mobile Apps. Lastly, some applications were on retail, e-Commerce and Customer Relationship Management.

4.4.3 ICT Market Challenges

ICT solutions can address several market challenges faced by businesses and industries. These solutions are the ones that provide solutions for improving security, efficiency, reduce costs, enhance customer experiences, and foster competitiveness. With increased digitization, cybersecurity threats have become more sophisticated and pose a significant challenge. This calls for innovative security approaches to ensuring a secure and safe digital environment for individuals and businesses. By leveraging ICT solutions, businesses can address market challenges proactively and gain a competitive edge in today's dynamic and technology-driven marketplace. Some of the applications received on ICT market challenges cover Data Analytics and Business Intelligence, Customer Relationship Management, Cloud Computing, E-commerce and Mobile Commerce, Cybersecurity Solutions, Augmented Reality (AR) and Virtual Reality (VR), Digital Divide and Regulatory Environment.

4.4.4 Community outreach

Community outreach solutions are those efforts and activities undertaken by individuals, organizations, or institutions to engage with and serve a specific community or group of people. The primary goal of these solutions was to establish a connection and build relationships with community members to better understand their needs, challenges, and aspirations. The goals of these projects were to create positive impacts, promote inclusivity, and foster community development through implementing tailored solutions to the specific needs of the target community. Some of these projects were education programmes targeting the girl child, skills development for the poor uneducated, skills programmes for the deaf, health projects among others.

4.4.5 Training

On the other hand, training solutions were those focusing on acquiring knowledge, skills, and competencies through structured learning and practice. They implemented

systematic approaches to develop individuals or groups to perform specific tasks, improve their performance in existing roles, or acquire new abilities for future roles. Many of these solutions were focused on informal skills development on ICTs, and creative skills. Table 1 presents the findings on types of communication solutions.

Table 1: Types of communication solutions

Sectors	Total
Emerging technologies	14
Industry applications	7
ICT market challenges	11
Trade	4
Community outreach	3
Total	39

Findings in Table 1 above reveal that majority of the solutions were on emerging technologies (Frequency=14). This implies that most communication solutions are incorporating aspects of Internet of Things (IoT), Artificial Intelligence (AI), and Blockchain, Biometrics and Facial Recognition, Autonomous Systems, Cloud Computing. The other dominant type of solutions was on ICT market challenges (frequency = 11). These solutions were aiming at improving security, efficiency, reduction of costs while improving the customer experiences and boosting revenues. Further, there were 7 industry applications developed. Here, we established that developers were increasingly developing solutions to solve problems in certain industries such as healthcare, banking and finance, education, manufacturing, agriculture, and trade. These were mostly demand driven solutions.

We also registered ICT solutions on trade (frequency = 4), and community outreach (frequency = 3). Solutions on trade were developed to support business, especially retail business in automation, records keeping and generating of business reports for decision. On the other hand, community outreach solutions had been developed to support the underprivileged members of the community in order to access

communication services. These were the disabled, girl children and communities living in slums and on isolated islands. Table 2 presents the number of solutions by sector.

Table 2: Communications solutions by sector

Sectors	Total
Health	5
Lands	1
Trade	5
Agriculture	4
Tourism	1
Banking	4
Environment	1
Education	9
ICT	1
Transport	3
Legal	1
Real estates	1
Communication	1
Services	2
Total	39

Results in Table 2 reveal that out of the 39 sampled solutions, 14 were on Industry Applications representing 36% of all solutions. This was followed by ICT Market Challenges which had a total of 11 solutions representing 28%. Emerging Technologies had a total of 7 solutions contributing 17% while Community outreach had 4 solutions representing 10%. Training had only 3 solutions constituting 8%.

In terms of sectors distribution, majority of the solutions were in the Education sector (Freq. = 9, 23%). This was followed by Health and Trade, each having 5 solutions representing 13% respectively. Agriculture and Environment came next with a total of 4 solutions, representing 10% each. This was followed by Transport and Services sectors

that had 2 solutions each representing 5% respectively. The remaining sectors namely; Lands, Tourism, ICT, Legal, Real estate, and Communications had only 1 solution each representing 3% respectively. From the above findings, we see that most ICT solutions are applications developed to support industry and some of these are in emerging technologies such as artificial intelligence, and cloud computing.

4.6 Findings from the Bootcamp

4.6.1 Time spent on solutions

Bootcamp participants were asked to state the number of years they had spent on developing and implementing their solutions. Majority indicated 1 to 2 years (67%). Only 11% indicated that they had spent 3 to 4 years developing and implementing their solutions. On the other hand, 22% indicated that they had spent above years on the solutions.

4.6.2 Technical Aspects for Bootcamp

Participants in the bootcamp were asked on whether they had a clear business model, a clear marketing plan, a clear financial plan, and a clear pitch deck. All respondents indicated that they had a clear business model while 89% indicated that they had a clear marketing plan. Only 11% did not have a clear marketing plan. Similarly, 100% of participants indicated that they had a clear financial plan as well as pitch deck.

5. Conclusion and recommendations

5.1 Conclusion

It was noted that e-Booster is a good approach of social economic development where the academia, the private sector, and public agencies partner to find local solutions for local needs could be more effective than going out to consult a big international agency that sometimes does not have the country at heart, does not understand the socioeconomic and psychological dynamics of the communities. E-Booster provided a positive way to engage the communities and to engage other key stakeholders within the framework of development and it is likely to give better impact and sustainable results compared to the previous intervention modalities.

Further, we note that Uganda has very strong local capacity to find solutions to our socioeconomic problems rather than relying on international knowledge which sometimes is not compatible and contextually not related to the needs of our people.

There is a strong opportunity to build grounded theory based on indigenous knowledge and business practices which, if done well, could be used for future reference but also for building intellectual confidence that Uganda can indeed have its own knowledge resources and build our own theories that make things work in our own context.

Lastly, Uganda has very strong potential to transform the way we teach if we develop local content because it is believable especially since the learners are able to observe and monitor the processes through which the knowledge is developed, and they can also take part.

5.2 Recommendations

We recommend a continuous engagement to support the monitoring process of these interventions of selected companies. It helps because from the time we started interacting with these companies, we have observed a lot but also the promises and commitments they have made. It is important that we keep monitoring, and we track the evolvement of the impact that these companies will make and support them on issues of sustainability, local leadership and community engagement whilst profiling key lessons that UCC and the Government can draw to improve access to communication services. It also helps to do knowledge management and transfer in a way that UCC will benefit by getting profiles of these interventions, using them to develop future interventions to scale up these operations because this should not be a one-off but rather an opportunity to understand how to engage more to benefit a lot more in the mandate of UCC by redefining underserved and unserved communities in the perspective of access to communication, especially that communication is a lifeblood of all organizations but also it facilitates government to strengthen community interventions, it communicates government programs by communicating development opportunities, linking markets, linking producers to suppliers.

Institutionalising a longitudinal study of the E-Booster intervention so that the findings can be used as an empirical tracker of the impact that UCUSAF is making towards the vision 2040, Africa Agenda 2063 “*especially with access to communication technologies*”.

For the next e-Booster Programme;

- a. There is a need to require the applicant companies to make provisions for special interest groups such as persons with disabilities in order to make it an inclusive intervention.

Since the results indicate that people in rural communities face more challenges in accessing communication services, the selection criteria can consider solutions that are focused on rural areas. However, this does not mean that in urban areas there are no underserved or unserved communities thus, for relevant solutions proposed for the urban areas, they should not be ignored. Afterall, 60% of the urban people in Uganda live in slums which are characterized by poverty.

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