**ICT BUSINESS PROJECT INITIATIVES AND QUALITY OF COMMUNITY LIVELIHOODS IN UGANDA: A CASE OF RUKUNGIRI DISTRICT**

**BY**

**DAVIS TUGUME**

**18/MMS PPM/KLA/MAY/010**

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**MASTERS DEGREE IN MANAGEMENT STUDIES (PROJECT PLANNING**

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# DECLARATION

I Tugume Davis declare that this research on “ICT business project initiatives and quality of community livelihoods in Uganda: Case of Rukungiri District**”** is original. It has been written and compiled by me through the best of my ability and it has never been submitted for any qualification to any institution of higher learning for a similar award.

Signature…………………………………………

Date………………………………………

Tugume Davis

18/MMS PPM/KLA/MAY/010

# APPROVAL

This dissertation has been submitted for examination with our approval as UMI-based supervisors.

**Signature: ………………………………… Date: ……………………………**

**Dr. Ivan Twinomuhwezi**

**Signature: ………………………………… Date: ……………………………**

**Dr. Tom Alfred Wanyakala**

# DEDICATION

I dedicate this work to myself first for the much effort I exhibited secondly to my supervisors for the academic support plus my family especially my parents and brothers for the economic support, encouragement and care. I heartily, have made it on time may the good Lord reward you abundantly.

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# LIST OF ABREVIATIONS

ADA : Austrian Development Agency

CBFM Community Based Fisheries Management

CVI : Content Validity Index

DBIC : District Business Communication Information Centers

FGDs : Focus Group Discussions

GO : Government Organization

IBEs : ICT Based Enterprises

ICT : Information and Communications Technology

LAN : Local Area Network

LG : Local Government

MoICT : Ministry of Information and Communications Technology

MSMEs : Micro Small and Medium Enterprises

MTTI : Ministry of Trade, Tourism and Industry

NGO : Non-Governmental Organization

NRI : Networked Readiness Index

ORM : Onion Ring Model

SMEs : Small and Medium Enterprises

SMS : Short Messaging Services

SPSS : Statistical Package for Social Sciences

UBIN : Ugandan Business Information Network

UNCST : Uganda National Council of Science and Technology

UNIDO : United Nations Industrial Development Organization

# ABSTRACT

Uganda has high rates of unemployment and poverty, especially in rural regions where ICT Business project initiatives have been adopted. The purpose of the study was to examine the effect of ICT based business project initiatives on quality of community livelihoods in Rukungiri district. It was guided by the following research objectives: to establish the effect of ICT entrepreneurial skills development, examine the effect of ICT infrastructure and investigate the effect of ICT literacy on the quality of community livelihoods. The study adopted a cross-sectional survey design and quantitative method where 302 respondents were targeted with a response rate of 288. Stratified random sampling was used to select respondents. Data was collected by the use of questionnaires. Quantitative data was presented in the form of descriptive statistics, inferential statistics that include the Pearson correlation model, regression and ANOVA analyses that were used to establish relationship linkages between the variables. Findings revealed that there is a weak positive relationship between ICT entrepreneurial skills development and the quality of community. Quality of community livelihoods is expected to increase by 0.658 units, while holding all other predictor variables constant, and 58.8% variation in quality of community livelihoods in Rukungiri district, is explained ICT literacy alone. It is recommended to focus on initiatives that promote and enhance entrepreneurial skills, infrastructure and literacy among community members. Other studies could be done on impact of ICT entrepreneurial skills on the competitiveness of SMEs, the relationship between ICT infrastructure and Businesses and moderating factors between the ICT business initiatives and the quality of community livelihoods.

**Key Words:** ICT Business Interventions,ICT literacy, ICT infrastructure, ICT projects and community livelihoods.

# CHAPTER ONE:

# INTRODUCTION

## 1.0 Introduction

The purpose of the study was to examine the effect of ICT (Information and Communication Technology) business project initiatives on quality of community livelihoods in Rukungiri district. ICT business project initiatives have gained significant popularity at the global level in recent years, particularly in developing countries where they are considered critical in improving community livelihoods. These initiatives use various ICT tools such as mobile phones, internet, and other digital platforms to promote economic development and social inclusion in underserved communities. Uganda is a developing country in East Africa that has experienced rapid technological advancements in recent years, particularly in the field of ICT. However, despite these developments, there are still disparities in the quality of livelihoods in different regions of the country. One such region is Rukungiri district, which is located in southwestern Uganda and has a predominantly rural population.

Rukungiri district suffers several issues, including limited access to healthcare, education, and other basic utilities, which significantly influence the quality of life of its citizens. The district has a relatively low Human Development Index (HDI) score, which is a measure of the general level of life in a region. Several research studies have been conducted on the impact of ICT initiatives on community livelihoods in Uganda, but most of these studies have focused on urban areas, neglecting rural areas such as Rukungiri district. However, despite the substantial ICT-related advancements made in Uganda, there is still a gap in understanding how ICT initiatives can contribute to the improvement of community livelihoods in rural areas such as Rukungiri district. While there has been some research on ICT and community development, the unique challenges faced by rural areas have not been adequately addressed in previous studies. This dissertation aims to fill this gap by investigating the effect of ICT business project initiatives on the quality of community livelihoods in Rukungiri district, in Uganda.

The historical, theoretical, and contextual bases of the investigation are discussed in this chapter. Additionally, it outlines the research problem, the research aim, objectives, research questions, and research hypotheses, as well as its conceptual framework, rationale, importance, and scope.

## 1.1 Background of the Study

This section explains the historical background, conceptual, theoretical and contextual background to the study in the subsections that follow in order to illuminate the focus of the research problem.

### 1.1.1 Historical Background

Information and communication technology (ICT) research projects with a development emphasis primarily focused on overcoming connection and access constraints to close the digital divide in the 1990s and early 2000s (Farrell et al., 2007). Due to these ties to the outside world, the so-called "last mile" problem that Africa faced was finally much reduced (Kozma & Vota, 2014). Due to the fact that strengthening information flows alone is insufficient to take advantage of development prospects, the focus started to move to the adoption and impact of these ICTs as ICT initiatives began to become more prevalent throughout Africa in the late 2000s and early 2020s. (Miller, 2005).

The move to knowledge societies required promoting digital possibilities and social inclusion through boosting the use of ICTs in initiatives for capacity-building, governance, empowerment, and social involvement. It was also essential to expand capacity for information sharing, scientific research, cultural production, performance, and knowledge exchange, as well as to increase learning chances through access to a diversity of materials and delivery methods (Hosman, 2010). The influence of institutional quality and ICT infrastructure was examined in order to promote sustainability and enhance the lives of people in Africa, living in the rural areas. Ways to enhance the effective completion of ICT projects were explored among other topics. Other subjects covered were the use of mobile phones to facilitate information exchange in the agricultural industry (Farrell et al., 2007). As a move to improve the quality of life for Africans, ICT development concentrated on enhancing human capacity, developing ICT skills, and distributing and employing a variety of ICTs across the continent (Sara et al., 2010).

It's possible that the term "livelihoods'' was first used to refer to a specific strategy in 1986 in Geneva during discussions surrounding the Brundtland Commission's Food 2000 report (Allison & Ellis, 2001). The research, which was co-authored by Robert Chambers, M.S. Swaminathan, and others, articulated a vision for a people-oriented development that started with the rural poverty of impoverished people (Swaminathan, 1987). The book "Rural Development: Putting the Last First'' by Chambers, in particular, explores this topic in depth (Chambers, 1989; Conroay& Litvinoff, 1988). In 1987, the International Institute for Environment and Development held a conference with an emphasis on sustainable livelihoods, thanks to Richard Sandbrook's proposal.

But until 2017 when Chambers and Conway published a working paper for the Institute of Development Studies, there was no generally acknowledged definition of sustainable livelihoods. The objectives of the "sustainable livelihoods approach" came about as a result of conversations between the two authors in the 1990s, when they realized there were important connections between their individual concerns about "putting the last first" in development practice and agro-ecosystem analysis and more general issues of sustainable development (Chambers & Conway, 1992).

Along with working on the ground-breaking research project,Singh & Rennie, (1996) of the International Institute for Sustainable Development additionally to the Society for International Development (Amalric, 1998), The parallel IDS work on "environmental entitlements," which developed upon the ground-breaking work of (Sen & Roy, 2021; Leach, Mearns, & Scoones, 1997), instead of concentrating only on production and abundance, highlighted how institutions mediate access to resources.

### 1.1.2 Theoretical Background

Information Chain Model (ICM), one of the models offered by the ICT and Socio-Economic Development Initiative, served as the study's main framework (Heeks & Wall, 2018). ICM emphasizes the value of accessibility, expertise, local content, and the relationship between technology and daily life. ICTs' function, according to ICM, is to manage information. So, in order for ICT-based initiatives to contribute to socioeconomic development, it is necessary to have a solid grasp of information in development and the information chain (Gomez-Morantes, Heeks, & Duncombe, 2022). In addition, the information chain model demonstrates that it is necessary to acquire and assess raw data. If the information is thought to be beneficial, it is then applied or modified. The transformed data then becomes usable information. To convert data into meaningful information, resources and certain contextual elements are required. Heeks (2018) lists the resources as follows:

• Data resources: First and foremost, pertinent data must be made available.

• Economic resources, including cash, labor, and the tools necessary to access the data.

• Social resources: the drive, self-assurance, and information needed to obtain, evaluate, and use the facts, as well as the source's credibility.

• Action resources: People need to be able to follow through on the choices they make in light of the knowledge. This will need business inputs (such as cash) and human resources.

Inadequate levels of any of the aforementioned resources might endanger the chain of ICM information's ability to work effectively and prevent the poor from accessing it (Heeks& Bukht, 2018). However, the majority of underdeveloped nations typically lack many of the resources required to help the information chain work. If one of the resources is absent, there is an access restriction. Without knowing the dynamics of how the resources will be put to use, it is useless to introduce ICTs to a community in the hopes that they will eliminate poverty.

The use of the information chain model in research that examined the function of ICTs in SMEs (small and medium-sized enterprises) in developing nations demonstrated that ICT applications have enormous promise in these businesses (Gomez-Morantes et al., 2022). ICTs, for instance, might significantly reduce the cost of communication in this industry. However, it was also discovered that too frequently, information on clients, costs, suppliers, rules, and business services was not easily accessible in many of these small/micro businesses.

Data was sometimes accessible, but the entrepreneurs were unable to exploit it because they were unaware that it existed. In other instances, data was acquired, but owing to the limited economic means, businesses were unable to utilize or act on it. For instance, business owners were able to locate new clients but were unable to buy the resources needed to serve them.

To determine how efforts were made locally to close the digital gap, an ICT project in Uganda is studied using the information chain model as a framework (Hellström, 2018). The project's use of ICT was not comprehensive, and the entire information chain was not taken into consideration. The study also discovered that more locally created material needed to be included in data resources. Inadequate economic resources, such as telecommunications infrastructure, energy supply, funds to purchase ICTs, and talent infrastructure to maintain the technology's functionality, also formed a significant access barrier. As a result, the research suggested that the ICT strategy used for projects in underdeveloped nations should have broad objectives, determine how information serves those objectives, and consider how ICTs may assist (Hellström, 2018).

ICTs and community livelihood quality in developing nations have a complicated and difficult-to-address interaction. The ICM model has come under fire for failing to consider the demands of the underprivileged in terms of the standard of communal livelihoods. It is essential to have a more nuanced knowledge of how ICTs contribute to the growth and standard of living in communities, as well as to remove the obstacles that prevent their efficient use. Further investigation is required to comprehend why some ICT technologies have been more effective than others in fostering development and enhancing community lives due to the lack of baseline studies for the ICM model. The ICM model's emphasis on the connection between ICTs and socioeconomic development is consistent with the current study's focus on ICT business ventures and the quality of community livelihoods (Ismail, 2022).

The model does not adequately account for the role of context in shaping the meaning and impact of information and hence the researcher switches to the Onion Ring Model (ORM) that was developed by Heeks (2018) of which will also serve as the study's foundation. The model discusses the function of ICTs in socioeconomic growth from an information-centered perspective. The model highlights the fact that many e-development programs place an excessive amount of emphasis on technology; as a result, the model recommends that technology needs to be understood in its context if it is to truly contribute to development and the elimination of poverty (Heeks& Wall, 2018). The vital function that information plays in development is heavily emphasized in this framework, as the information chain model previously mentioned under theoretical background. The following are the three key lessons for applying the model as a tool for socioeconomic development (Heeks& Wall, 2018). An information-centered approach to the function of ICTs in socioeconomic development is the Onion Ring Model (ORM), developed by Heeks (2018). The concept emphasizes how crucial it is to comprehend technology in its context in order for it to meaningfully contribute to development and poverty reduction. The approach places emphasis on the essential part that information plays in growth. Heeks & Wall (2018) present four key lessons for using the ORM as a tool for socioeconomic development, including: identifying a research need, comprehending the context, devising suitable interventions, and assessing the efficacy of those interventions.

### 1.1.3 Conceptual Background

ICT infrastructure initiatives refer to programs and projects aimed at improving and expanding the ICT infrastructure in a given area or region (Sharma, 2021). ICT literacy is the capacity to acquire, process, and distribute information effectively and efficiently. It also refers to the capacity to get involved in a variety of activities, such as business, education, and communication. It includes a variety of knowledge and abilities, such as digital literacy, internet literacy, and computer literacy (Gnambs, 2021).To effectively engage in the digital economy and society, people, corporations, and governments must be ICT literate. Individuals must have access to ICT literacy education and training in order to fully engage in the digital economy, to increase their employability, and to generally enhance their quality of life ( Khlaisang & Koraneekij, 2019).

ICT Entrepreneurial skills development, ICT infrastructure, and ICT literacy can all have a significant impact on community livelihoods. ICT Entrepreneurial skills development can empower individuals and small businesses in a community to start and run successful businesses in the field of ICT. This can create new economic opportunities and generate income, which can improve the overall livelihoods of individuals and households (Hassan, Iqbal, & Shakir, 2020; Hassen, 2020). Additionally, by providing access to ICTs, entrepreneurs are able to reach new customers and expand their businesses, which can generate more jobs, and improve the overall economic development of the community.

ICT infrastructure refers to programs and projects aimed at improving and expanding the ICT infrastructure in a given area or region. Improved ICT infrastructure can provide better access to information and digital services, which can improve education, healthcare, and business opportunities. This can increase access to knowledge and information for citizens (Bhowal, 2020), and help individuals and households to improve their livelihoods.

ICT literacy is the ability to use ICT effectively and efficiently, and it is essential for individuals, businesses, and governments to participate fully in the digital economy and society. When a community has a high level of ICT literacy, it will have a more educated population, and individuals will be more likely to find better jobs, access e-government services, and engage in e-commerce which can improve the community livelihoods. Overall, ICT Entrepreneurial skills development, ICT infrastructure, and ICT literacy can all play a critical role in enhancing economic development and improving community livelihoods. They can provide individuals and households with the resources (Chukwuji & Umeji, 2019) and skills they need to improve their well-being and achieve economic stability.

The numerous means through which people and households within a community obtain the resources they require to satisfy their fundamental requirements and enhance their well-being are referred to as community livelihoods. It includes everything that affects a community's and its people' wellbeing on an economic, social, and environmental level (Blackie, 2019).

Income is the money or other types of remuneration that a person or family receives through their job, their own business, their investments, or other sources (Cabral, Gemmell, &Alinaghi, 2021). It is the primary means by which individuals and households acquire the resources they need to meet their basic needs and improve their well-being. Income can be in the form of wages, salaries, profits, rents, and other forms of payment. Income is a key aspect of community livelihoods, as it is the primary means by which individuals and households acquire the resources they need to meet their basic needs. Income can come from various sources such as wages, self-employment, or government transfers (Kakhkharov, 2019). Income generation is essential for individuals and households to improve their well-being and achieve economic stability.

Assets are resources that have monetary value and can be owned by individuals, households, or organizations. They can be physical assets like land, housing, vehicles, and equipment, financial assets like savings, investments and cash, or human assets like skills, knowledge, and abilities (Nnaeme, Patel, &Plagerson, 2021). Assets are important for individuals and households to improve their well-being, achieve economic stability and to build wealth. Assets, including physical, financial and human assets, are also an important part of community livelihoods. Physical assets include things like land, housing, and livestock, while financial assets include savings and investments. Human assets refer to the skills, knowledge, and abilities of individuals and households (Stirling, Gallant, & Purves, 2023). Having access to assets can help individuals and households to improve their well-being and achieve economic stability.

Food availability refers to the physical presence of food in a country or region, food access refers to the economic and physical means of obtaining food and food use refers to the utilization of food through adequate diets and care (Clapp, Moseley, Burlingame, & Termine, 2021). Since food is necessary for both survival and well-being, it is an important component of communal livelihoods. Without access to sufficient and nourishing food, people and households run the danger of being undernourished, ill, and living in poverty. The term "food security" relates to a community's access, availability, and stability of food. This indicates that families have access to adequate food to have active, healthy lives (McKay, Haines, & Dunn, 2019). Since food is necessary for both survival and well-being, it is an important component of communal livelihoods. Malnutrition, sickness, and poverty are risks for people and households without access to enough and nourishing food.

### 1.1.4 Contextual Background

Due to its fast expanding population and underdeveloped economy, Uganda has high rates of unemployment and poverty, especially in rural regions. The Ugandan government has been making investments in ICT recently to support economic growth and raise the standard of community livelihoods (Mawejje, 2019).

In western Uganda particularly In Rukungiri district, several ICT-based projects have been implemented in recent years with the goal of improving access to ICTs, promoting entrepreneurship and small business development, and increasing access to information and digital services (Chama, 2022). One example of such an initiative is the Rukungiri Community Technology Center (CTC) project. The project was implemented with the aim of providing access to ICTs for citizens in remote and underserved areas of the district. The CTC provides training and support for individuals and businesses to use and benefit from ICTs (Chama, 2022). The CTC also provides access to the internet and other digital services, as well as a range of e-government services such as e-health and e-learning.

Another initiative is the Rukungiri Digital Empowerment for Rural Development (DERD) project. The DERD project aims to improve access to ICTs and digital services for rural communities in the district. The project includes the installation of community telecenters and the provision of training and support for individuals and businesses to use and benefit from ICTs.

The impact of these initiatives on community livelihoods in Rukungiri district has been significant. For example, the CTC and DERD projects have helped to increase access to information and digital services, which has improved access to education, healthcare, and business opportunities. This has helped to improve the overall livelihoods of individuals and households in the district. Additionally, by providing training and support for individuals and businesses to use and benefit from ICTs, these initiatives have helped to promote entrepreneurship and small business development, which has generated new economic opportunities and increased income for individuals and households (Muwanguzi & Namyalo-Ganafa, 2022). It's crucial to keep in mind that these programs' capacity to attract private investment and access to money are typically key factors in their success. The capacity to address additional social and economic issues including poverty, unemployment, and limited access to essential services that might have an influence on community livelihoods is also necessary for these projects to be successful (Mawejje, 2019).

It's possible that the ICT business project initiatives in Uganda, particularly in Rukungiri district, may not have been fully successful in improving the quality of community livelihoods. One reason for this is a lack of proper implementation and management of the projects. For example, if the ICT infrastructure is not properly maintained, it may not be reliable or accessible to the community. Additionally, if there is a lack of training and support for individuals and businesses to use and benefit from the ICTs, the potential benefits of the projects may not be fully realized. Another reason is a lack of access to ICTs, particularly in rural and remote areas. Even if the infrastructure is well-maintained and there is training and support available, individuals and households may not have the resources or access to use the ICTs. This can further compound the digital divide between urban areas and rural areas and limit the potential benefits of the projects. Furthermore, if the projects are not integrated with other development initiatives such as improving access to basic services like education, healthcare and infrastructure, it may not be able to fully improve the community livelihoods (Muwanguzi & Namyalo-Ganafa, 2022). This study will therefore seek to examine the contributions of ICT based business project initiatives such as Rukungiri Community Technology Center, and Rukungiri Digital Empowerment for Rural Development on the quality of community livelihoods with specific reference to DBIC in Rukungiri District.

## 1.2 Problem Statement

People’s livelihoods in Rukungiri district are poor and are still characterized by high levels of poverty (Rukungiri District LG Statistical Abstract, 2018/19). According to the District’s Statistical Abstract for the Financial Year 2018/19, 72.7% of the population in the district earn less than 1 US dollar per day which is a manifestation of low incomes. In terms of quality of asset ownership, 61.4% of the district’s population hardly own major assets apart from land as over 95% are heavily reliant on agriculture as their major economic activity (Rukungiri District LG Statistical Abstract, 2018/19).

As part of efforts to improve the quality of livelihoods in Rukungiri district and Uganda at large since 2018, the Government of Uganda through the Ministry of ICT and the Civil Society rolled out and implemented different ICT based business project Initiatives in the district (GoU Vision 2040). These include the District Incubation Center project which avails market related information to Micro, Small and Medium Enterprises through ICT; the Rural Communications Development Fund (RCDF) project of Uganda Communication Commission, which provides sustainable access to ICT services to people in rural areas in the district with relatively more commercial activity such as trade and farming; the Village Phone Project in collaboration with Mobile Telecom Network (MTN), which expands telecommunications access to rural villages in collaboration with regional microfinance organizations by giving residents of underdeveloped rural areas the chance to work as "Village Phone Operators"; the Microsoft Innovation Centre Project, which offers training support to SMEs, independent software vendors, and new start-up businesses to improve their businesses; the Nyaru Project, which aims to improve the quality of life for the Nyaru tribe in rural Kenya (Rukungiri District Five year Development Plan II, 2020-2025). Other ICT based initiatives in Rukungiri District are Nyarushanje Community Library and Empowerment Center Project and Organizational Capacity Development. The Project is supported by Foundation for Community Development and Empowerment (FCDE) being implemented by PeerLink Initiative Uganda (PELI-U) with a Field office in Nyarushanje Sub County, Rukungiri District.

Despite the above ICT project initiatives, little is mentioned/research on how each of them has contributed to the progress regarding improvement of the quality of household livelihoods in the district; where overall poverty increased from 8.4% in the financial year 2017/18 to 10.2% in 2018/19 (UBoS Statistical Abstract, 2020); and from 11% in financial year 2020/21 to 12.2% in 2021/22 (Rukungiri District Budget Framework Paper FY 2021/22). It was from this background with such concerns that this study was justified. The aim of this study therefore was to examine the effect of adopted ICT based business project initiatives on the quality of community livelihoods in Rukungiri district in Uganda.

## 1.3 Purpose of the Study

The purpose of the study was to examine the effect of ICT business project initiatives on quality of community livelihoods in Rukungiri district.

## 1.4 Objectives of the Study

1. To establish the affects of ICT entrepreneurial skills development on the quality of community livelihoods in Rukungiri district.
2. To examine the effects of ICT infrastructure on the quality of community livelihoods in Rukungiri district.
3. To investigate the effects of ICT literacy on the quality of community livelihoods in Rukungiri district.

## 1.5 Research Questions

1. Does ICT entrepreneurial skills development affect the quality of community livelihoods in Rukungiri district?
2. Does ICT infrastructure affect the quality of community livelihoods in Rukungiri district?
3. Does ICT literacy affect the quality of community livelihoods in Rukungiri district?

## 1.6 Null Hypotheses

1. ICT Entrepreneurial skills development has no statistically significant effect on the quality of community livelihoods
2. ICT infrastructure has no statistically significant effect on the quality of community livelihoods
3. ICT literacy has no statistically significant effect on the quality of community livelihoods

## 1.7 Conceptual framework

The illustration below is a diagrammatic expression of the relationship between the independent variable and the dependent variable together with their respective constructs and sub constructs.

**Independent variable Dependent variable**

**ICT based business initiatives Community Livelihoods**



**Source:** *Adapted by Researcher from Literature Ganjoo, K., & Kazi, R. (2018);Pierce, A. L., Heyder, M., Grant Tregonning, P., Laborgne, O. W., & Wendel, J. (2022); (2018); Chambers and Corney (2017).*

**Figure 1: Conceptual framework**

From the framework above, ICT based business initiatives was the independent variable while community livelihoods is the dependent variable. Under the independent variable, the researcher looks at entrepreneurial skills development, ICT infrastructure and ICT literacy as conceptualized by Ganjoo, K., & Kazi, R. (2018); Pierce, A. L., Heyder, M., Grant Tregonning, P., Laborgne, O. W., & Wendel, J. (2022). Under the dependent variable (livelihood), the study relies on income, assets and food security as conceptualized by Chambers and Corney (2017). The framework suggests that ICT based business initiatives predict livelihoods.

## 1.8 Justification for the Study

Uganda is a low-income country that faces numerous challenges related to poverty reduction and economic development. Despite the government's efforts to increase access to ICT infrastructure and promote ICT entrepreneurship, many communities in Uganda, particularly in rural areas, still lack access to basic ICT services (Chama 2022). Therefore, it is essential to examine how ICT business project initiatives can improve the quality of living of people in such communities.

## 1.9 Significance of the Study

The study findings may contribute to further understanding of quality of community livelihoods which according to many studies refers to the state of poverty in a household. This is to help broaden the knowledge of quality of community livelihoods in rural settings. The study is to be useful to communities outside the study area (Rukungiri) because some of the livelihood challenges experienced are common to communities in other parts of Uganda; hence when litigation measures for these problems are found, they can be applied in general to make their operations better and easier. The Ministry of ICT could use the findings as a basis for setting out more ICT projects to create sustainable change in as far as quality of community livelihoods are concerned. The findings and recommendations to the study is to add on the existing body of knowledge about ICT based business initiatives and quality of community livelihoods thus generating new ideas for future researchers.

## 1.10 Scope of the Study

This section provides the subject, geographical and time scope elements as presented below.

### 1.10.1 Content Scope

The purpose of this study is to examine and highlight the critical role that business project efforts related to Information and Communication Technology (ICT) play in improving the standard of living for residents in the Rukungiri district precincts. Through a thorough examination of the intervention areas that are being targeted, with a particular emphasis on the enhancement of entrepreneurial abilities, the research seeks to clarify the importance of these activities in promoting economic growth, creativity, and eventually raising community standards of living. This study has the potential to provide a thorough understanding of how these ICT-based initiatives support regional socioeconomic development and sustainable advancement by empowering people to create sustainable livelihoods and boosting the local economy, ICT infrastructure and ICT literacy as conceptualized by Amue et al. (2018); Zhang et al., (2020); Wu and Pierce (2018). On the other hand, the concepts/constructs for consideration under quality of community livelihoods are income, asset generation and food security as conceptualized by Chambers and Corney (2017).

### 1.10.2 Geographical Scope

The geographical scope of this study was Rukungiri District in southwestern Uganda. The district is located in the Kigezi sub-region, and is bordered by Kabale District to the southwest, Kanungu District to the west, Kisoro District to the northwest, and Ntungamo District to the east. Rukungiri District is predominantly rural, with a population of approximately 353,000 people, according to the 2014 national census. The district is known for its agricultural production, with the main crops being bananas, beans, maize, and coffee. Access to ICT infrastructure and services in the district is limited, with most people relying on mobile phones as the primary mode of communication (Qureshi, 2017).

### 1.10.3 Time scope

The time scope of this study covered a period of 5 years, from 2018 to 2022. This period was relevant because it aligned with the Uganda National Development Plan III (NDP III), which covered the period 2020/2021 - 2024/2025. The NDP III emphasized the importance of leveraging ICTs to enhance socio-economic transformation in Uganda, particularly in the areas of agriculture, education, health, and tourism.

## 1.11 Operational Definitions

**ICT based enterprises** – Business units involving extensive application or use of ICTs.

**ICT entrepreneurship** – new business creation in the net economy. The rise of the creative market with an emphasis on the online information and connection network is significantly impacted by the net economy (Matlay, 2004)

**Business centres** – Places providing office facilities and services to people.

**Entrepreneurial skills development** – Process of imparting skills to entrepreneurs to upgrade their already existing skills

**Livelihood** – a series of tasks that one performs during their lifetime that are necessary for survival.

**Income** – potential for spending and saving acquired by a business during a predetermined duration, often stated in monetary terms.

**Assets** – Resources owned or controlled by a person, business or an economic entity.

## 1.12 Chapter Summary

This chapter has discussed the background to the problem of the study, and defined the study purpose, justification, conceptual model and operational definitions that are added in the next chapter in more detailed way.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 Introduction

The study's goal was to determine how ICT-based business activities affected the standard of community livelihoods in the Rukungiri area. To conceptualize and concentrate on the contribution of this study, this chapter offers a literature review based on the independent and dependent variables listed in chapter one. It includes scholarly academic books, journals, abstracts from dissertations, policy studies, and papers delivered at conferences, as well as publications in magazines and reputable newspapers. According to the study's aims and changeable aspects, the chapter offers a theoretical, conceptual, and general overview of the literature.

## 2.1 Theoretical Review

Research on the Information Chain Model (ICM) that guides this has largely focused on how the model can be applied to different types of organizations and systems. Studies have shown that the model can be used to understand and improve the flow of information in business organizations, government agencies, and non-profit organizations (Nunes, Causer, & Ciolkosz, 2020). However, a potential research gap in this area of study could be examining the applicability and effectiveness of the Information Chain Model in specific industries or sectors such as healthcare or education. Another potential research gap could be exploring the use of the model in international and cross-cultural contexts to understand how information flows in different cultural and organizational settings.

Many studies have examined the Information Chain Model (ICM) in the context of business organizations. Researchers have found that the model can be used to identify inefficiencies and bottlenecks in the flow of information within a business, and to develop strategies for improving the overall performance of the information chain. In government organizations, the model has been used to understand the flow of information in complex bureaucratic systems, and to identify ways to improve the efficiency and effectiveness of government services (Nunes et al., 2020). A potential research gap in this area could be the examination of the Information Chain Model in the context of non-profit organizations, specifically how it can be used to understand and improve the flow of information in non-profit organizations and their programs.

In non-profit organizations, the model has been used to understand the flow of information in the context of social and development programs, and to identify ways to improve the impact and effectiveness of these programs. Overall, the literature suggests that the Information Chain Model is a useful framework for understanding and improving the flow of information in different types of organizations and systems. It can be used to identify inefficiencies and bottlenecks, and to develop strategies for improving the overall performance of the information chain. However, it is worth noting that the literature on the Information Chain Model is mostly from the early 2000s, and it might be useful to conduct a more recent literature review to check if there is any new development on the model (Jia, Blome, Sun, Yang, & Zhi, 2020). However, a potential research gap in this area could be a more in-depth examination of how the model can be applied to specific types of non-profit programs such as healthcare or education programs.

The Information Chain Model (ICM) is a framework for understanding and analyzing the flow of information within an organization. It was first proposed by David Straub (1984) and has since been used in a variety of studies to examine information management practices in organizations. The information source, the transmitter, the channel, and the receiver make up the ICM's four primary parts. The origin of the information, such as a document or person, is known as the information source. The person or entity in charge of conveying the information is known as the sender. The channel is the method used to transfer the information, such as email or face-to-face interaction. The person or group that gets the information is the receiver (Wamba & Queiroz, 2020). However, a potential research gap in this area is the examination of the ICM in the context of digital organizations, such as e-commerce or technology companies, where the flow of information may be different and more complex than in traditional organizations.

One key aspect of the ICM is the idea that information can be distorted at any point in the chain, leading to misunderstandings or inaccuracies. The model also highlights the importance of effective communication in ensuring that information is accurately transmitted and understood. The ICM has been used in a variety of studies to examine information management practices in organizations. For example, it has been used to study the flow of information in multinational corporations, in government organizations, and in healthcare settings. Some studies have also used the ICM to identify barriers to effective information management and to suggest strategies for improving information flow (Wamba & Queiroz, 2020). However, a potential research gap in this area is the examination of the ICM in the context of remote and virtual teams, where the communication and information flow may be different than in traditional face-to-face teams.

The ICM has been widely accepted and used in literature as a framework for understanding and analyzing the flow of information in organizations. It provides a holistic perspective on information management and allows researchers to identify key areas for improvement. However, it is important to note that the ICM is a simplified representation of information flow and may not fully capture the complexity of information management in real-world organizations (Wamba &Queiroz, 2020). A potential research gap in this area could be to examine the ICM in the context of organizations that operate in highly regulated and compliance-heavy environments, such as healthcare and financial sectors, to see how the information flow is affected and how to improve it.

Although, the ICM has been widely accepted and used in literature as a framework, it has some weaknesses like Oversimplification where it does assume a linear, one-way flow of information from a single sender to a single receiver. However, real-world communication is often much more complex and dynamic, involving multiple senders, receivers, and feedback loops. The model fails to capture the intricacies of interactive and multidirectional communication. Furthermore, it Lacks context in that it focuses primarily on the transmission of information and neglects the importance of context. Communication is not just about the transfer of data; it also involves interpretation, shared understanding, and contextual nuances. The model does not adequately account for the role of context in shaping the meaning and impact of information and hence the researcher switches to the Onion Ring Model (ORM) that was developed by Heeks (2018) of which will also serve as the study's foundation. The model discusses the function of ICTs in socioeconomic growth from an information-centered perspective. The model highlights the fact that many e-development programs place an excessive amount of emphasis on technology; as a result, the model recommends that technology needs to be understood in its context if it is to truly contribute to development and the elimination of poverty (Heeks& Wall, 2018). The vital function that information plays in development is heavily emphasized in this framework, as the information chain model previously mentioned under theoretical background. The following are the three key lessons for applying the model as a tool for socioeconomic development (Heeks& Wall, 2018). An information-centered approach to the function of Information and Communication Technologies (ICTs) in socioeconomic development is the Onion Ring Model (ORM), developed by Heeks (2018). The concept emphasizes how crucial it is to comprehend technology in its context in order for it to meaningfully contribute to development and poverty reduction. The approach places emphasis on the essential part that information plays in growth. Heeks & Wall (2018) present four key lessons for using the ORM as a tool for socioeconomic development, including: identifying a research need, comprehending the context, devising suitable interventions, and assessing the efficacy of those interventions.

## 2.2 Empirical Literature Review

This section examines the empirical literature in light of the study's goals, including how the development of entrepreneurial skills, ICT infrastructure, and ICT literacy affect community livelihood quality.

### 2.2.1 ICT Entrepreneurial skills development and quality of community livelihoods

In order to operate their business as a successful venture, tribal women in Bangladesh receive the necessary financial and technical help from local NGOs (Khanum, Islam, & Rahman, 2018). Khan, Alam, and Islam (2012) Researchers looked at the Community Based Fisheries Management (CBFM)-2 project and discovered that it had a favorable impact on the project fishermen's fishing revenue. This is due to participant households' ability to spend more on their essential necessities than non-participating households thanks to the growth of their entrepreneurial abilities (Roy & Manna, 2014). Patil (2015) it was also stated that around 50% of female entrepreneurs paid between 40% and 60% of their business revenue towards family costs, while approximately 2% paid more than 80%. Research on specific tactics and interventions that may be used to aid in the management of small-scale fisheries sustainably as well as the empowerment of marginalized people, notably women and racial and ethnic minorities, to get access to and profit from these resources, is lacking.

People's awareness and understanding are increased by the development of ICT entrepreneurial skills with the help of GOs and NGOs, which motivates them to adapt some income-generating activities as small businesses rather than stopping their household activities and doing some income-generating activities instead in excess or during downtime (Khan et al., 2012). The growth of entrepreneurship is a crucial component of household economic advancement because it influences people's access to and control over assets and capital for their livelihood on a personal, societal, and economic level (Khanum et al., 2018). Lack of information about the long-term effects of ICT entrepreneurial skills development initiatives on community livelihoods and food security represents one possible study gap in this field. Even while studies like Khan et al. (2012) and Khanum et al. (2018) found encouraging outcomes, additional study is required to assess the long-term viability of these initiatives and how they help communities improve their livelihoods and food security. In order to guarantee that marginalized groups, such as women and racial minorities, participate in these programs and are successfully targeted, further study may be required in this area.

The development of entrepreneurial abilities helps people to improve their family's overall income and expenses, purchase the clothing, furniture, and other necessities they need for themselves, and save money from their earnings (Khanum et al., 2018). In addition to ensuring the food security of livelihoods, implementing novel business ventures to increase household income and expenditures directly enhances the livelihood status of people (Soni, 2015). This study does not reveal exactly how entrepreneurship skills development translates into asset generation, and how it improves household income and expenditure. The current study will seek to bridge this gap by revealing how entrepreneurship skills development under the DBIC project in Rukungiri District enables the beneficiaries to generate assets, and improve their household income and expenditure.

Using ICT to build entrepreneurial abilities, people may lower the cost of information search, improve market transactions, increase farm productivity, give chances for revenue generation, and streamline the delivery of financial and agricultural services (Leng, Ma, Tang, & Zhu, 2020). The development of ICT-driven entrepreneurial skills is essential for income growth and diversifying rural families' earnings (Donati & Sarno, 2013; Ma, Grafton, & Renwick, 2018; Ma, Nie, Zhang, & Renwick, 2020; Vickers, 2017). One potential research gap in the area of ICT-led entrepreneurship skills development for rural households is the lack of understanding of the specific ways in which ICT can be used to support entrepreneurship in different cultural and socioeconomic contexts.

Entrepreneurship skills development enables households to exploit non-farm employment that offers realistic income returns and provides opportunities for asset generation and expansion (Audretsch, Heger, & Veith, 2015). Rural African families become less dependent on agriculture as their primary source of income as entrepreneurial skills growth among farmers enables them to be income diversified and create revenue from non-farm industries like mining (Dzanku, 2015; Ellis, 2010). While many studies have demonstrated the beneficial effects of entrepreneurship skill development on income and livelihoods in the short term, more research is required to fully understand the effects of these programs on community livelihoods and food security. This research should focus on the long-term effects and sustainability of these programs.

Kabir, Hou, Akther, Wang, and Wang (2012) investigated how developing small business skills affected Bangladeshi rural poor women's assets for sustainable subsistence. 300 female business owners that operate in the cattle and poultry, fishing, and vegetable industries made up their sample. To determine the sample size, a stratified random sampling procedure was utilized. The study employed the sustainable livelihood analysis framework as an analytical tool to find strategies for improving small business livelihood. Their findings revealed that small entrepreneurship skills development increased on the livelihood assets of livestock and poultry women farmers in Bangladesh. The study above reveals a statistical gap since no inferential statistics were used to test the effect of entrepreneurial skills development on sustainable livelihood assets so as to improve livelihoods. The current study bridged this gap by using inferential statistics to test the relationship effect of entrepreneurial skills development on the generation of sustainable livelihood assets among operators/owners or managers of micro, small and medium enterprises under the DBIC project in Rukungiri District.

Kamwi et al. (2018) completed an evaluation of skills and livelihood activities in rural Namibia's Zambezi region and the implications for policy and poverty alleviation. Their study's findings demonstrated that the development of rural livelihoods' ability to generate revenue and expand depended critically on the employment of a variety of livelihood activities and entrepreneurial abilities in diverse combinations. Because of their ability to combine farming and non-farming activities due to the development of their entrepreneurial skills, they were able to diversify their income away from agriculture. These reasons included having few skills, having a large family, having access to opportunities, the seasonal nature of agricultural products, a favorable demand for goods and services, or a combination of these. This study highlights a geographic gap that the present study will attempt to fill. The study was carried out in the Zambezi region of Namibia, a water catchment area for River Zambezi. However, the current study will be conducted in Uganda’s local governments, specifically Rukungiri District Local Government among micro, small and medium enterprises under the DBIC project.

### 2.2.2 ICT infrastructure and quality of community livelihoods

ICT are increasingly emerging as the primary drivers of social and economic development, including agricultural development, not just in developed countries but also globally. The world of today is mostly information-driven (Sennuga, 2019). ICT usage has significantly increased in Sub-Saharan Africa during the past 20 years (Conger & Elder, 2020). However, (Chikaire, Anaeto, Emerhirhi, & Orusha, 2017) highlighted a few aspects that limit the use of ICT, such as a lack of understanding, a weak legal framework for exchanging information, infrastructural issues, insufficient access to a worldwide network, maintenance issues, a lack of research and development, and excessive taxes. Many Africans working in a variety of industries now own personal ICT devices including laptops, tablets, and phones, among others.

Studies have shown that ICTs improve market prospects for rural microbusiness owners by bridging the gap between their local unofficial marketplaces and more formal ones by building networks and linkages with value chain participants (Schilling &Seuring, 2022). ICTs assisted small businesses in creating effective networks that connected them to other people and businesses beyond rural boundaries and penetrated metropolitan marketplaces to expand market prospects for buying and selling. Despite the fact that many people in rural areas rely on microbusinesses for their living, community livelihoods were not examined in the research.

ICTs help micro-enterprises to capture new markets and expand the customer base (Dzawanda, Nicolau, Matsa, &Kusena, 2021). As a result, micro-entrepreneurs earn more income and revenue, which is understood as the intended "livelihood outcome." The growth of e-business is still difficult in informal rural economies due to infrastructure limitations including low internet penetration and poor cell connections (Mbuyisa & Leonard, 2017). Since no inferential statistics were utilized to examine the impact of ICT infrastructure on new market acquisition among micro companies, the aforementioned study exposes a statistical gap. Inferential statistics will be used in the current study to examine the link between ICT infrastructure and market acquisition among microbusinesses in Rukungiri District, which can help people improve the quality of their life.

Micro Businesses in rural regions that depend on ICT infrastructure for their livelihoods have restricted access to these resources due to low internet penetration. This is accompanied by a lack of investment by the company in human capital, as well as in digital expertise and knowledge needed to build a digital workforce capable of doing business (Gikenye, 2018). As a result, it is said that ICTs will only have a little positive impact on micro-enterprises unless they are used to improve a wider variety of human or capacity assets in addition to creating more efficient structures and procedures that help rural and informal micro-enterprises (Palmer-Abbs, Cottrill, & Farrington, 2021). It is shown how various organizational, physical, and human limitations may prevent the realization of livelihood outcomes in a particular environment.

According to a research by Malanga & Banda (2021) on the ICT use and livelihoods of women-owned microenterprises in Malawi, women needed reliable energy, reasonable transportation, and access to low-cost ICT equipment and services including discounted air time, cellphones, and internet bundles. Further research found that women claimed to demand affordable, fast, and relevant information resources in addition to physical resources in order to run their enterprises. According to the respondents, the most important information demands were connected to supplier information, marketing, and promotion. Participants stated that ICTs like mobile phones helped them find information about suppliers, market their products on social media sites linked to smartphones, and save client information like contacts and addresses (Mbuyisa & Leonard, 2017). The little impact of ICTs on the physical assets of women-owned microenterprises was therefore clear. However, it was evident that there was a need to upgrade the ICT infrastructure, including the creation of telecenters in rural areas, improvements to the road network, and programs for rural electrification that would provide inexpensive power (Qureshi, 2017). This study highlights a geographic gap that the present study will attempt to fill. In contrast to the present study, which will be undertaken in Uganda, especially in the Rukungiri District, the study was carried out in Malawi.

Utilizing ICTs like mobile phones helped women-owned micro businesses boost income, profitability, and business prospects. They also gave them access to market pricing and information, decreased their reliance on natural and physical capital assets, and reduced risks (Malanga & Banda, 2021). ICTs boosted women's empowerment, business growth, household food security, better well-being, and productivity (Noruwana, Chigona, & Malanga, 2018). However, the selected women's microbusinesses were unable to fully realize their livelihood results due to ICT infrastructure, environmental, cultural, and personal constraints.

One of the main claims stated in the literature is that there is little empirical data about the function and effects of ICTs in reducing poverty, which has a direct bearing on community livelihoods. It is asserted that those who support ICTs frequently exaggerate their contribution to eradicating poverty and focus on the ICTs' supply side (Hulsmann, 2016). One of the main points raised in the literature is that there is little empirical data on the relationship between ICTs and poverty reduction, which has a direct impact on community livelihoods. It is said that proponents of ICTs often exaggerate the contribution they make to eradicating poverty and focus on the ICTs' supply side.

### 2.2.3 ICT literacy and quality of community livelihoods

Digital technologies are believed to have the “potential to end global poverty and hunger faster, including in rural parts of developing countries, where the majority of people earn their living from agriculture”(Alant & Bakare, 2021). The affordances offered by the use of “mobile phones and other digital technologies to access customized, actionable agricultural information in real time” are believed to have the potential to “revolutionize how rural communities secure and improve their livelihoods” (Alant & Bakare, 2021). Despite the aforementioned advantages, technology-based agricultural systems have failed "to consider the actual context of use and adoption by smallholder farmers in rural and developing contexts" (Emeana, Trenchard, &Dehnen-Schmutz, 2020). These factors, according to the authors, include things like high rates of illiteracy, inadequate technological infrastructure, and a need for smartphone-based technologies that only a tiny number of smallholder farmers in underdeveloped countries can use.

Nyabako, T., Mvumi, B. M., Stathers, T., Mlambo, S., & Mubayiwa, M. (2020) highlighted that uneven distribution of this digital revolution's ICT literacy was causing the "digital divide" to grow. In this context, certain studies, especially in Africa, cast doubt on the significance and long-term viability of this digital revolution (Emeana et al., 2020). The studies, however, were more concerned with sustainability than community livelihoods. More specifically, unstable energy, a lack of accessible ICT equipment, a lack of knowledge about how to use ICTs in companies, and a lack of ICT literacy skills were important issues that impacted women-owned microbusinesses. This implied that women required greater ICT education because livelihoods in rural regions tended to be female-dominated.

To increase crop growth and generate enough cash to feed their family, all farmers-local or international, big or small need accurate information about historical, present, and anticipated weather data (Waarts et al., 2021). Numerous new digital tools, including Connected Farmer and Esoko or TigoKilimo (Tanzania), are currently expediting actions that have increased agricultural production and growth (Waarts et al., 2021). With the use of the AgriCloud Application (2019) by Rain for Africa (R4A), farmers in South Africa were given "agricultural advisory services based on the best available weather and climate information at their specific location to help improve the quality and quantity of food production in a sustainable manner", according to the application. There are many different forms of weather data accessible, such as "manual observations, automatic weather stations, weather radars, satellite and weather forecast modeling output" (Walker et al., 2021). Due to their poor levels of ICT literacy, the vast majority of Small Holder Farmers (SHFs) frequently cannot access or understand these data sources.

A number of studies (Chikaire et al., 2017; (Nzonzo&Mogambi, 2016) showed that the lack of ICT literacy among smallholder farmers (SHFs) prohibited them from integrating technology into their farming practices. This was confirmed in Botswana (Chikaire et al., 2017), the Eastern Cape of South Africa, and Tanzania Benard, R., Dulle, F., & Lamtane, H. (2020) (Chisango & Lesame, 2019). Yet the literature fails to specify how to develop SHFs ICT literacy levels (Chikaire, Nnadi, Anyoha, Abdulsalam-Sagir, & Orusha, 2017). The lack of ICT literacy skills among rural people inevitably causes a digital gap and poverty and may prevent them from integrating ICT into their agricultural methods. There is currently a void in the body of knowledge about SHFs' degrees of ICT literacy and their acquisition of it. Therefore, determining the ICT literacy levels of SHFs was deemed crucial for the creation of a future novel intervention directed at their advancement (Chikaire, Nnadi, et al., 2017). This study highlights a geographic gap that the present study will attempt to fill. In contrast to the present study, which will be done in Uganda, especially in Rukungiri District, the previous study was undertaken in Tanzania.

Gender, age, and social and economic categories all have different levels of digital literacy and Internet access (Gulgec, Shahidi, Matarazzo, & Pakzad, 2017). To stop the digital divide from growing, a deeper knowledge of these gaps and their particular causes is crucial. Gender, social, and cultural inequalities are often exacerbated in the context of catastrophes and displaced circumstances (Tauson & Stannard, 2018). For instance, it appears that women and men use technology differently. Women and girls are less likely to utilize technology for learning and other purposes, according to a review of the research by (Tauson & Stannard, 2018). Possible factors include social and material impediments, cultural and institutional injustices, and time constraints brought on by their duties as housewives (Tauson & Stannard, 2018). Due to the fact that women and girls in the Somali and Sudanese refugee populations in the Kakuma refugee camp had considerable household duties, male users of community technology access centers outnumbered female users.

Due to the specialized capacity, knowledge, and abilities related to digital technology that these projects demand, only highly educated and technologically capable refugees often benefit from digital initiatives like digital jobs, coding skills training, and online learning programs (Benton & Glennie, 2016). This means that the livelihoods and occupations that women and girls may acquire as a result of having digital literacy are diminished more so that their potential to contribute to society is low and they become a financial burden to the authorities, whereas if ICT trainingis implemented the opposite is true. Initial analyses of the digital divide can aid in developing inclusive programs and training that narrow this gap. Increasing outreach to women and advantaged groups and offering specialized digital and IT training for these underrepresented groups can improve their equitable participation.

It is important to realize that technological adaptation takes time. Even in wealthy nations, it takes around ten years to integrate technology into the education system. Technical skills and digital literacy like site design, database administration, and digital security will not be gained in a short period of time when the programs help refugees and IDPs to launch e-commerce firms or work as freelance programmers, enhancing and sustaining their livelihoods (Tauson & Stannard, 2018)

## 2.3 Summary of literature

The literature suggests that ICTs have the potential to significantly impact livelihoods in developing countries. However, the impact of ICTs on livelihoods depends on a variety of factors, including access to infrastructure, skills, and literacy. Studies have shown that ICT skills development can increase income-generating opportunities and improve the quality of community livelihoods. Additionally, access to ICT infrastructure can facilitate communication and access to markets, education, and healthcare, further enhancing livelihoods. However, there is a need for more research on the specific impact of ICTs on community livelihoods in rural areas.

Existing studies have focused on different aspects of the relationship between ICTs and livelihoods. Some studies have examined the impact of ICTs on income-generating activities, while others have focused on the role of ICTs in accessing education and healthcare. Additionally, studies have looked at different types of ICT infrastructure, including mobile phones, computers, and the internet. Finally, studies have been conducted in different contexts, with varying levels of ICT penetration and different levels of economic development.

It is clear that ICTs have the potential to impact livelihoods in developing countries. There is evidence to suggest that ICT skills development and access to ICT infrastructure can improve income-generating opportunities and access to education and healthcare. However, there is a need for more research to understand the specific impact of ICTs on livelihoods in rural areas. Despite the existing literature, there are still gaps in our understanding of the impact of ICTs on livelihoods in rural areas. It is not clear, for example, how ICT skills development programs can be effectively implemented in rural communities. Additionally, there is a need for more research on the specific types of ICT infrastructure that are most beneficial in different contexts. By focusing on a specific context, this study provided insights into the impact of ICTs on livelihoods in a rural area with limited ICT penetration. Additionally, the study used a quantitative approach, which allowed for a more comprehensive understanding of the complex relationships between ICTs and livelihoods in this context.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.0 Introduction

The study's goal was to determine how ICT-based business initiatives affected the standard of community livelihoods in the Rukungiri district. From the beginning of the research process to the end, the chapter describes the methodologies used in the study. The research design, study population, sample size, sampling techniques, data collecting techniques, data collection tools, data quality control, data collection procedure, data analysis, data measurement, and ethical issues are among them.

## 3.1 Research Design

Orodho (2008) defines a research design as the scheme, outline or plan that is used to generate answers to research problems. Based on the conceptualization and nature of objectives in Chapter One, this study used cross sectional survey research design with a mixed method approach involving quantitative. Cross-sectional research design is used to study a particular population at a specific point in time. This design is useful for identifying patterns and relationships among variables, as well as for making comparisons across groups. Additionally, cross-sectional research is relatively quick and inexpensive to conduct, making it a useful option for researchers with limited resources. Quantitative research is a systematic, empirical and objective approach to research that involves the collection and analysis of numerical data (Bloomfield & Fisher, 2019). The data collected in quantitative research was numerical. This also provided a broad picture of the current state of ICT access and usage in the area, as well as a baseline for measuring the impact of the selected ICT-Project Initiative.

## 3.2 Study Population

A target population is a comprehensive group of research on all participants in a real or fictitious collection of individuals, occasions, or things, to whom an investigator extrapolates the findings (Evans, Hastings, & Peacock, 2001). Information was obtained from the Ministry of ICT as the project implementer in collaboration with the district and communities (project beneficiaries) of DBIC project Rukungiri district who are Micro, Small and Medium Enterprises (MSMEs) in the district. According to the District business register (2020), Rukungiri has 2,235 registered and operational Micro, Small and Medium Enterprises. However, the target population was owners and managers of MSMEs who are estimated at 2,067 while the functional ICT Based Initiatives in the district targeting livelihoods in the business incubation center which is overseen by the District Senior ICT officer, the District Information Officer and the Chief Administrative Officer (CAO) and, MSMEs owners and managers were targeted because they are the beneficiaries of ICT knowledge from the District Business Incubation Center ICT initiative while the ICT staffs at the district are the project overseers. The population of study is 2,067 project beneficiaries.

## 3.3 Sample Size

The sample size is the number of units or people the researcher chooses from whom to gather information or data (Evans et al., 2001). The sample size for project beneficiaries was established using the table from Krejcie and Morgan (1970), which reads as follows:

Where n is the sample size.

N= Number of people

e is the allowable sampling error.

P is the population percentage (if unknown, 0.5) and 2 is the chi-square of degree of freedom 1 and confidence 95% = 3.841.

A total of 302 project recipients provided information.

## 3.4 Sampling Techniques

Sampling is the practice of taking data from a subset of the population to draw generalizations about the population as a whole (Johnson et al., 2007). Both random and stratified sampling techniques were used where 302 respondents were successfully sampled randomly from 2067 numbers of people. In addition, the researcher employed stratified sampling. A probability sampling approach called stratified sampling divides the population into smaller groups, or strata, depending on particular traits or features. The sample is then chosen from each stratum so that the percentage of each stratum's beneficiaries is indicative of the percentage of the stratum's sample size.

Since all project beneficiaries were unable to participate in the survey, simple random selection was utilized in these strata. Up until the requisite sample size (75), participation in the study was chosen at random. With simple random sampling, samples of the same size have an equal probability of participating (Johnson et al., 2007).

## 3.5 Data Collection Methods

This section reviews the data collection methods such as questionnaire surveys that was employed. Through questionnaire surveys, information from project beneficiaries (Micro, Small, and Medium Enterprises) in the Rukungiri District was acquired. Using a Likert scale, which awards 5 points for strongly agreeing, 4 for agreeing, 3 for neutrality, 2 for disagreeing, and 1 for strongly disagreeing, surveys were performed. A survey is one way to obtain information for a research (Gall, Borg, & Gall, 1996). A questionnaire is a tool used to collect information regarding research variables, and it consists of a series of questions or items that respondents must read and complete (Malhotra, 2010). Questionnaire surveys were used because they collect information with minimal errors but with high level of confidentiality since respondents are not bothered by the researcher’s presence or absence.

## 3.6 Data Collection Tools.

This section examines the data gathering method; questionnaires, as seen below.

### 3.6.1 Questionnaires.

A survey tool meant for self-administered questions is known as a questionnaire (Hamzeh et al., 2019). Structured questionnaires will be used to collect data from DBIC project beneficiaries. This study specifically used a Likert scale self-administered questionnaire with a 5-scale grading that will be guided by study objectives whereby opinion statements were developed and respondents were expected to tick what was appropriate to their reactions. The questionnaires were self-administered where the respondents filled them in their own time and the researcher collected them at agreed upon schedules. Surveys were selected because they provided participants the opportunity to reply to difficult but true questions and enough time to refer to other materials for precise and thorough information (Rowley, 2014).

## 3.7 Data Quality Control.

Data quality control was assessed basing the reliability of the research instruments and the validity of the research instrument.

### 3.7.1 Reliability of Research instruments.

The researcher carried out pre-testing of the data collection tools, which were piloted and revised in consultation with the research supervisors to clarity in a way that they generated the required information to meet the study objectives before actual data collection. The degree to which a variable or group of variables consistently measures the thing it is meant to measure is known as reliability (Hair, Black, Babin, & Anderson, 2009). By inputting the data from each questionnaire question into the Statistical Package for Social Sciences (SPSS) application, the reliability of the instruments was verified using Cronbach's Alpha, and the appropriate values for reliability analysis were achieved. All alpha () coefficient values were over 0.7 (70%), meaning that > 0.7 is necessary for the questionnaire to be considered credible to Amin (2005).

**Table 3. 1: Reliability Statistics**

| Variable | Cronbach's Alpha | N of Items |
| --- | --- | --- |
| Entrepreneurial skills development | 0.765 | 10 |
| ICT infrastructure | 0.811 | 11 |
| ICT literacy | 0.803 | 10 |
| Quality of community livelihood | 0.926 | 10 |

**Source: Researcher Field Data 2023**

According to **table 3.1** above, Cronbach's Alpha for Entrepreneurial skills development, ICT infrastructure, ICT literacy, and Quality of community livelihood were 0.765, 0.811, 0.803, and 0.926 respectively on testing the reliability. It indicates that the instruments were reliable.

### 3.7.2 Validity of Research Instruments.

Validity is defined as "the degree to which a measure accurately represents what it is supposed to", and as a result, validity is concerned with how effectively the idea is characterized by the measure(s) (Kothari, 2004). The questionnaire's content validity was determined, and the research instruments' content validity was evaluated using the Content Validity Index (CVI), where CVI = K/N.

C.V.I = Total number of questions deemed valid or relevant

Number of questions in the questionnaire as a whole

K is the total number of questions that were deemed legitimate.

N is the total number of questions in the survey.

With a significance level of 0.7

All CVI values were determined to be greater than 0.7 (70%), which means that CVI > 0.7 is adequate to consider the questionnaire legitimate for data collection (Kothari, 2004). However, there were 230 total questions in the questionnaire, 200 total questions that were considered legitimate or relevant, and a CVI of 0.87.

## 3.8 Pilot survey.

A pilot survey is a small-scale version of a full survey that is conducted before the main survey is administered. The main purpose of a pilot survey is to test the survey instrument (questionnaire) and the survey process (e.g. sampling, data collection, data analysis) to ensure that they are both valid and reliable. In this case, the researcher used the same survey instrument (questionnaire) that was used in the main survey. A small sample of participants was selected to participate in the pilot survey, representative of the population that will be surveyed in the main survey.

The survey was administered using the same data collection methods that will be used in the main survey. After analyzing the data, the researcher used the feedback to refine the survey instrument and process. This included making changes to the questionnaire, adjusting the sampling method, or modifying the data collection procedures. Once the necessary changes were made, the pilot survey was repeated to ensure that the survey instrument and process were valid and reliable before the main survey was conducted.

## 3.9 Procedure of Data Collection.

When the research supervisor approved the research proposal and tools of data collection, a recommendation letter of the study was issued for commencement of data collection. Testing of the research instruments were carried out to ensure validity and reliability. An initial meeting was held with the Rukungiri District Chief Administrative Officer (CAO) seeking permission to conduct the study in the district. Questionnaires were then administered to the respective respondents and interview appointments were fixed.

## 3.10 Data Analysis.

This section involves data analysis for quantitative data and it is as discussed below

### 3.10.1 Quantitative Data Analysis.

The data was described using descriptive analysis, such as frequencies and measures of central tendency, such as mean and standard deviation statistics, by using SPSS. This allowed the researcher to accurately explain the distribution of scores or measurements. The data were first provided in the form of descriptive tabulations, percentages, and frequencies before a thorough statistical analysis was conducted. The best methods for determining how the ICT business initiative influenced the standard of community livelihood were regression analysis and inferential statistics.

## 3.11 Measurement of Variables.

The study also used measurement levels; Nominal level, interval, and ration levels because it suits the variables that were measured. Ordinal variables were scaled on a 5 point Likert scale questionnaires with a five score response continuum of Strongly Agree (5), Agree (4), Not Sure (3), Disagree (2), and Strongly Disagree (1). Because of the inclusive nature of nominal level, sex and educational level were measured (Sekaran, 2003) Ratio scale measurements were used to determine the mean, standard deviation, and correlation of theme variables in the conceptual framework while interval scale measurements were used to determine how strongly participants agreed or disagreed with the statements on a five-point scale.

## 3.12 Ethical Considerations.

UMI provided me with an introduction letter that was distributed to the respondents to obtain their consent. The study's objectives, the steps involved, any possible dangers or advantages, and the participants' choice to discontinue at any time were all clearly disclosed to them. To participate in the study, participants voluntarily gave their consent.

To ensure confidentiality of the respondents, a confidentiality statement at the beginning of the survey was reassured to the respondents about the confidentiality and anonymity of their responses and aggregated hence building trust of the respondents to provide honest feedback. Furthermore, Personal information was not disclosed without the participant's consent, and any identifying information was kept confidential. The researcher ensured that data was collected, stored, and analyzed in a secure and confidential manner. Data was done in accordance with the participant's consent. Used literature was cited and referenced to avoid plagiarism.

## 3.13 Chapter Summary.

The research design, study population, sample size, sampling techniques, data collecting method, data collection tools, data quality control, data collection process, data analysis, measurement of variables, and ethical considerations were all covered in this chapter.

# CHAPTER FOUR

# PRESENTATION AND INTERPRETATION OF FINDINGS

## 4.0 Introduction

The purpose of the study was to examine the effect of ICT based project business initiatives on quality of community livelihoods in Rukungiri district. This chapter presents and interprets the findings in relation to the demographic characteristics and objectives of the study. Below are the findings on background characteristics of respondents, descriptive statistics, correlation, regression and ANOVA.

## 4.1 Response Rate

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Since not all targeted respondents were able to respond to the instruments, the response rate was considered and can be evidenced below.

**Table 4. 1: Shows the response rate**

| Category | Sample size | Response | Response rate |
| --- | --- | --- | --- |
| Project beneficiaries | 302 | 288 | 95% |

**Source: Researcher**

**Table 4.1** shows the overall response rate of 95%, attributing to the good data collection instruments that were simple, not too long questions and easily interpreted.

## 4.2 Demographic Characteristics of Respondents

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings from the field on the Demographic Characteristics of Respondents were captured and results are evidenced below.

### 4.2.1 Gender Distribution of Respondents.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Responses based on the gender are as under **Table 4.2.**

**Table 4. 2: Gender Distribution of Respondents**

| **GENDER** | **NO. OF RSPONDENTS** | **PERCENTAGE (%)** |
| --- | --- | --- |
| MALE | 132 | 45.8 |
| FEMALE | 156 | 54.2 |
| **TOTAL** | **288** | **100** |

**Source: Researcher Field Data, 2023**

According to **table 4.2** above, out of 288 respondents there were 132 men and 156 women. This implies there were 45.8% men and 54.2% women among the respondents. This suggests that the study was gender sensitive to gender since the results above represent fair representation between men and women.

### 4.2.2 Level of education.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the level of education were captured under **Table 4.3** to find out whether respondents had the capacity to answer the questionnaire.

**Table 4. 3: Level of education.**

|  |  | **Numbers** | **Percentage** |
| --- | --- | --- | --- |
|  | Secondary | 64 | 22.2 |
| Diploma | 156 | 54.2 |
| Degree | 68 | 23.6 |
| Total | 288 | 100.0 |

**Source: Field Data, 2023**

According to **Table 4.3** above, 23.6% had a degree, 54.2% had a diploma, and 22.2% were responders. This suggests that the majority of respondents were able read and understand the questions in order to respond to them sensibly since the majority had diploma and above to reply to the questionnaire's questions.

## 4.3 Descriptive Results.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. The descriptive findings on how independent variables (ICT Entrepreneurial Skills Development, ICT Infrastructure, ICT Literacy) affect the dependent variable (Community Livelihood) in the study are discussed in the sub sections below.

### 4.3.1 Descriptive Statistics on ICT Entrepreneurial Skills Development.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. The findings on the descriptive statistics on entrepreneurial skills development were captured and results are evidenced under **Table 4.4** below.

**Table 4. 4: Descriptive statistics on ICT entrepreneurial skills development**.

| **Statement** | SD | | D | | NS | | A | | SA | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| F | % | F | % | F | % | F | % | F | % |
| 1. Technologically trained to run business | 88 | 30.6 | 160 | 55.6 | 36 | 12.5 | 4 | 1.4 | 0 | 0 |
| 2. Have workers in my business who are my responsibility. | 144 | 50 | 100 | 34.7 | 40 | 13.9 | 4 | 1.4 | 0 | 0 |
| 3. Receive ICT basic training together with my workers on business prospects. | 64 | 22.2 | 160 | 55.6 | 64 | 22.2 | 0 | 0 | 0 | 0 |
| 4. The duties and responsibilities of each of my workers are clearly defined | 40 | 13.9 | 20 | 6.9 | 12 | 4.2 | 92 | 31.9 | 124 | 43.1 |
| 5. I am the only one doing this business in this area. | 36 | 12.5 | 12 | 4.2 | 24 | 8.3 | 76 | 26.4 | 140 | 48.6 |
| 6. Respondents get goods from the same suppliers as my competitors. | 48 | 16.7 | 132 | 45.8 | 108 | 37.5 | 0 | 0 | 0 | 0 |
| 7. Respondents access loans from the same financial services providers as their competitors | 48 | 16.7 | 136 | 47.2 | 104 | 36.1 | 0 | 0 | 0 | 0 |
| 8. Business is strategically located where access by customers and potential customers is easy | 44 | 15.3 | 116 | 40.3 | 84 | 29.2 | 28 | 9.7 | 16 | 5.6 |
| 9. My business is located in a densely populated area | 44 | 15.3 | 144 | 50 | 68 | 23.6 | 24 | 8.3 | 8 | 2.8 |

**Source: Researcher Primary Data, 2023.**

The descriptive statistics on entrepreneurial skills developmentas in **table 4.4** generally indicate that the respondents had divergent views about capacity building in relation to management of ICT business projects. For example, in reference to **question 1** in table above, 30.6% of those surveyed said they strongly disagreed that they are technologically trained to run their business, 55.6% disagreed, 12.5% were not sure, and 1.4% agreed. This shows that most respondents are not technologically trained to run their business. Similarly, in reference to **question 2** in table above, 50% of those surveyed said they strongly disagreed that they have workers in their business who are their responsibility, 34.7% disagreed, 13.9% were not sure, and 1.4% agreed. This shows that most respondents do not have workers in their businesses who are their responsibility.

In reference to **question 3** in table above, 22.2% of those surveyed said they strongly disagreed that they receive ICT basic training together with their workers on business prospects, 55.6% disagreed, and 22.2% were not sure. This shows that most respondents do not receive ICT basic training together with their workers on business prospects. In reference to **question 4** in table above, 13.9% of those surveyed said they strongly disagreed that the duties and responsibilities of each of the workers are clearly defined, 6.9% disagreed, 4.2% were not sure, 31.9% agreed, and 43.1% strongly agreed. This shows that the majority of respondents believe that the duties and responsibilities of each of the workers are clearly defined.

In reference to **question 5** in table above, 12.5% of those surveyed said they strongly disagreed that they are the only one doing their business in this area, 4.2% disagreed, 8.3% were not sure, 26.4% agreed, and 48.6% strongly agreed. This shows that most respondents believe that they are the only ones doing their business in the area. In reference to **question 6** in table above, 16.7% of those surveyed said they strongly disagreed that they get goods from the same suppliers as their competitors, 4.2% disagreed, 8.3% were not sure, 26.4% agreed, and 48.6% strongly agreed. This shows that most respondents believe that they do not get goods from the same suppliers as their competitors.

In reference to **question 7** in table above, 16.7% of those surveyed said they strongly disagreed that they access loans from the same financial services providers as their competitors, 47.2% disagreed, and 36.1% were not sure. This shows that most respondents believe that they do not access loans from the same financial services providers as their competitors. In relation to **question 8** in table above, 15.3% of those surveyed said they strongly disagreed that their business is strategically located where access to their customers and potential customers is easy, 40.3% disagreed, 29.2% were not sure, 9.7% agreed, and 5.6% strongly agreed. This shows that most respondents believe that their business is not strategically located where access to customers and potential customers is easy. In relation to **question 9** in table above, 15.3% of those surveyed said they strongly disagreed that their business is located in a densely populated area, 50% disagreed, 23.6% were not sure, 8.3% agreed, and 2.8% strongly agreed. This shows that most respondents believe that their business is not located in a densely populated area.

From the above descriptive statistics on entrepreneurial skills development, it is generally observed that the respondents are not skilled enough in terms of acquiring skills for managing ICT business projects.

### 4.3.2 Descriptive statistics on the quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. The findings on the descriptive statistics on Quality of Community Livelihoods were captured under **Table 4.5** and results are detailed therein.

**Table 4. 5: Descriptive statistics on the quality of community livelihoods.**

| Statement | SD | | D | | NS | | A | | SA | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| F | % | F | % | F | % | F | % | F | % |
| 1. My income has grown significantly over the last 5 years | 32 | 11.1 | 132 | 45.8 | 20 | 6.9 | 56 | 19.4 | 48 | 16.7 |
| 2. My income has remained the same over the last 5 years | 88 | 30.6 | 108 | 37.5 | 64 | 22.2 | 24 | 8.3 | 4 | 1.4 |
| 3. My income has declined in the last 5 years. | 88 | 30.6 | 112 | 38.9 | 56 | 19.4 | 24 | 8.3 | 8 | 2.8 |
| 4. My assets have grown significantly over the last 5 years | 88 | 30.6 | 108 | 37.5 | 56 | 19.4 | 28 | 9.7 | 8 | 2.8 |
| 5. My assets have remained the same over the last 5 years | 96 | 33.3 | 104 | 36.1 | 56 | 19.4 | 24 | 8.3 | 8 | 2.8 |
| 6. My assets have reduced over the last 5 years**.** | 92 | 31.9 | 116 | 40.3 | 48 | 16.7 | 24 | 8.3 | 8 | 2.8 |
|
| 7. I feed at least more than 2 times a day | 80 | 27.8 | 112 | 38.9 | 68 | 23.6 | 24 | 8.3 | 4 | 1.4 |
| 8. Respondents have enough access to food. | 76 | 26.4 | 112 | 38.9 | 72 | 25 | 24 | 8.3 | 4 | 1.4 |
| 9. Food is very available in my household. | 68 | 23.6 | 116 | 40.3 | 76 | 26.4 | 24 | 8.3 | 4 | 1.4 |
| 10. respondents have unlimited access to food all year round | 60 | 20.8 | 112 | 38.9 | 64 | 22.2 | 32 | 11.1 | 20 | 6.9 |

**Source: Researcher Primary Data, 2023.**

In reference to **question 1** in table above, 11.1% of those surveyed said they strongly disagreed that their income has grown significantly over the last 5 years, 45.8% disagreed, 6.9% were not sure, 19.4% agreed, and 16.7% strongly agreed. This shows that their income has not grown significantly over the last 5 years. In relation to **question 2** in table above, 30.6% of those surveyed said they strongly disagreed that their income has remained the same over the last 5 years, 37.5% disagreed, 22.2% were not sure, 8.3% agreed, and 1.4% strongly agreed. This shows that their income has remained the same over the last 5 years.

In reference to **question 3** in table above, 30.6% of those surveyed said they strongly disagreed that their income has declined in the last 5 years, 38.9% disagreed, 19.4% were not sure, 8.3% agreed, and 2.8% strongly agreed. This shows that their income has declined in the last 5 years. In relation to **question 4** in table above, 30.6% of those surveyed said they strongly disagreed that their assets have grown significantly over the last 5 years, 37.5% disagreed, 19.4% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that their assets have not grown significantly over the last 5 years.

In reference to **question 5** in table above, 33.3% of those surveyed said they strongly disagreed that their assets have remained the same over the last 5 years, 36.1% disagreed, 19.4% were not sure, 8.3% agreed, and 2.8% strongly agreed. This shows that their assets have not remained the same over the last 5 years. In relation to **question 6** in table above, 31.9% of those surveyed said they strongly disagreed that their assets have reduced over the last 5 years, 40.3% disagreed, 16.7% were not sure, 8.3% agreed, and 2.8% strongly agreed. This shows that their assets have not reduced over the last 5 years.

In reference to **question 7** in table above, 27.8% of those surveyed said they strongly disagreed that they feed at least more than 2 times a day, 38.9% disagreed, 23.6% were not sure, 8.3% agreed, and 2.8% strongly agreed. This shows that most respondents feed at least more than 2 times a day. In reference to **question 8** in table above, 26.4% of those surveyed said they strongly disagreed that they have enough access to food, 38.9% disagreed, 25% were not sure, 8.3% agreed, and 1.4% strongly agreed. This shows that most respondents do not have enough access to food.

In reference to question 9 in table above, 23.6% of those surveyed said they strongly disagreed that Food is very available in my household, 40.3% disagreed, 26.4% were not sure, 8.3% agreed, and 1.4% strongly agreed. This shows that Food is not very available in most households. In relation to **question 10** in table above, 20.8% of those surveyed said they strongly disagreed that they have unlimited access to food all year round, 38.9% disagreed, 22.2% were not sure, 11.1% agreed, and 6.9% strongly agreed. This shows that most respondents do not have unlimited access to food all year round.

In conclusion, the high percentage of the respondents disagreed with the fact that the quality of their livelihood has improved in the past 5 years. This shows that ICT Entrepreneurial development skills that have continuously been taught to the community have a less effect on the quality of livelihoods since they are rarely applied and a different approach needs to be implemented if the original goal is to be achieved.

### 4.3.3 Descriptive statistics on ICT infrastructure.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. The descriptive statistics on findings how ICT infrastructure has affected the quality of Community Livelihoods were captured under **Table 4.6** and results are detailed therein.

**Table 4. 6: Descriptive statistics on ICT infrastructure.**

| **Statement** | **SD** | | **D** | | **NS** | | **A** | | **SA** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| F | % | F | % | F | % | F | % | F | % |
| 1. All stakeholders are engaged during the implementation of the initiative | 32 | 11.1 | 124 | 43.1 | 96 | 33.3 | 28 | 9.7 | 8 | 2.8 |
| 2. Ideas of stakeholders are put in to consideration | 40 | 13.9 | 132 | 45.8 | 80 | 27.8 | 28 | 9.7 | 8 | 2.8 |
| 3. Initiatives done in several areas are profitable and sustainable | 44 | 15.3 | 128 | 44.4 | 80 | 27.8 | 28 | 9.7 | 8 | 2.8 |
| 4. When generating ideas cultural and environment impacts are considered. | 52 | 18.1 | 120 | 41.7 | 92 | 31.9 | 20 | 6.7 | 4 | 1.4 |
| 5. Support systems are customized to address need of several initiatives. | 40 | 13.9 | 132 | 45.8 | 80 | 27.8 | 28 | 9.7 | 8 | 2.8 |
| 6. There is easy access to initiatives when seeking for Support system | 52 | 18.1 | 120 | 41.7 | 80 | 27.8 | 28 | 9.7 | 8 | 2.8 |
| 7. Support systems to initiatives are physical | 48 | 16.7 | 124 | 43.1 | 80 | 27.8 | 28 | 9.7 | 8 | 2.8 |
| 8. Research is often done before executions | 52 | 18.1 | 116 | 40.3 | 100 | 34.7 | 16 | 5.6 | 4 | 1.4 |
| 9. Business plans/project plans are always implemented | 16 | 5.6 | 48 | 16.7 | 56 | 19.4 | 72 | 25 | 96 | 33.3 |
| 10. Marketing of products & services is done in several initiatives | 144 | 50 | 60 | 20.8 | 28 | 9.7 | 44 | 15.3 | 12 | 4.2 |

**Source: Researcher Field Data, 2023.**

In reference to **question 1** in table above, 11.1% of those surveyed said they strongly disagreed that all stakeholders are engaged during the implementation of the initiative, 43.1% disagreed, 33.3% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that not all stakeholders are engaged during the implementation of the initiative. In relation to **question 2** in table above, 13.9% of those surveyed said they strongly disagreed that Ideas of stakeholders are put in to consideration, 45.8% disagreed, 27.8% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that most Ideas of stakeholders are not put in to consideration.

In reference to **question 3** in table above, 15.3% of those surveyed said they strongly disagreed that Initiatives done in several areas are profitable and sustainable, 44.4% disagreed, 27.8% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that most Initiatives not done in several areas are profitable and sustainable. In relation to **question 4** in table above, 18.1% of those surveyed said they strongly disagreed that when generating ideas cultural and environment impacts are considered, 41.7% disagreed, 31.9% were not sure, 6.9% agreed, and 1.4% strongly agreed. This shows that when generating ideas cultural and environment impacts are not considered.

In reference to **question 5** in table above, 13.9% of those surveyed said they strongly disagreed that Support systems are customized to address the need of several initiatives, 45.8% disagreed, 27.8% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that the Support system is not customized to address the needs of several initiatives. In relation to **question 6** in table above, 18.1% of those surveyed said they strongly disagreed that there is easy access to initiatives when seeking a Support system, 41.7% disagreed, 27.8% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that there is no easy access to initiatives when seeking a Support system.

In reference to **question 7** in table above, 16.7% of those surveyed said they strongly disagreed that Support systems to initiatives are physical, 43.1% disagreed, 27.8% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that Support systems to initiatives are not physical

In reference to **question 8** in table above, 18.1% of those surveyed said they strongly disagreed that Research is often done before executions, 40.3% disagreed, 34.7% were not sure, 5.6% agreed, and 1.4% strongly agreed. This shows that research is not often done before executions.

In reference to **question 9** in table above, 5.6% of those surveyed said they strongly disagreed that Business plans/project plans are always implemented, 16.7% disagreed, 19.4% were not sure, 25% agreed, and 33.3% strongly agreed. This shows that Business plans/project plans are always implemented. In reference to **question 10** in table above, 50% of those surveyed said they strongly disagreed that Marketing of products & services is done in several initiatives, 20.8% disagreed, 9.7% were not sure, 15.3% agreed, and 4.2% strongly agreed. This shows that marketing of products & services is not done in several initiatives.

In conclusion, a high percentage of the respondents disagree with the increase of ICT infrastructure in the past 5 years within the study area. This shows that however much the community has received training in the previous section of the study (section 4…..), hands on training has not been supported due to lack of infrastructure. It was further noted that lack of infrastructure development might have had a negative impact on the project implementation hence affecting the overall goal of the project.

### 4.3.3 Descriptive Results on ICT literacy.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the Descriptive statistics on ICT literacy were captured and results are evidenced **Table 4.7** below

**Table 4. 7: Descriptive statistics on ICT literacy.**

| Statement | SD | | D | | NS | | A | | SA | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| F | % | F | % | F | % | F | % | F | % |
| 1. Stakeholders are knowledgeable on ICT related tools | 48 | 16.7 | 148 | 51.4 | 56 | 19.4 | 28 | 9.7 | 8 | 2.8 |
| 2. There is applicability of ICT knowledge in several initiatives. | 80 | 27.8 | 112 | 38.9 | 60 | 20.8 | 28 | 9.7 | 8 | 2.8 |
| 3. Several stakeholders easily access information in their initiatives | 64 | 22.2 | 120 | 41.7 | 56 | 19.4 | 36 | 12.5 | 12 | 4.2 |
| 4. ICT literacy has enabled businesses initiatives start DBO | 16 | 5.6 | 40 | 13.9 | 36 | 12.5 | 108 | 37.5 | 88 | 30.6 |
| 5. Several business initiatives have got online presence. | 60 | 20.8 | 156 | 54.2 | 40 | 13.9 | 24 | 8.3 | 8 | 2.8 |
| 6. More profitability & sales have been registered. | 56 | 19.4 | 172 | 59.7 | 44 | 15.3 | 12 | 4.2 | 4 | 1.4 |
| 7. Training on ICT is conducted by the relevant district authorities. | 56 | 19.4 | 172 | 59.7 | 44 | 15.3 | 12 | 4.2 | 4 | 1.4 |
| 8. E-governance is well coordinated | 64 | 22.2 | 152 | 52.8 | 28 | 9.7 | 28 | 97 | 16 | 5.6 |
| 9. E-governance reaches a wider audience. | 56 | 19.4 | 144 | 50 | 24 | 8.3 | 24 | 8.3 | 40 | 13.9 |
| 10. E-governance is accessible to the community | 52 | 18.1 | 152 | 52.8 | 32 | 11.1 | 32 | 11.1 | 20 | 6.7 |

**Source: Researcher Field Data, 2023**

In reference to **question 1** in table above, 16.7% of those surveyed said they strongly disagreed that Stakeholders are knowledgeable on ICT related tools, 51.4% disagreed, 19.4% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that Stakeholders are not knowledgeable on ICT related tools. In reference to **question 2** in table above, 27.8% of those surveyed said they strongly disagreed that there is applicability of ICT knowledge in several initiatives, 38.9% disagreed, 20.8% were not sure, 9.7% agreed, and 2.8% strongly agreed. This shows that there is no applicability of ICT knowledge in several initiatives.

In reference to question 3 in table above, 22.2% of those surveyed said they strongly disagreed that several stakeholders easily access information in their initiatives, 41.7% disagreed, 19.4% were not sure, 12.5% agreed, and 4.2% strongly agreed. This shows that several stakeholders not easily access information in their initiatives. In connection to **question 4** in table above, 5.6% of those surveyed said they strongly disagreed that ICT literacy has enabled business initiatives to start DBO, 13.9% disagreed, 12.5% were not sure, 37.5% agreed, and 30.6% strongly agreed. This shows that ICT literacy has enabled businesses to start DBO.

In reference to **question 5** in table above, 20.8% of those surveyed said they strongly disagreed that Several business initiatives have got online presence, 54.2% disagreed, % were not sure, 37.5% agreed, and 30.6% strongly agreed. This shows that several business initiatives have not got an online presence. In relation to **question 6** in table above, 19.4% of those surveyed said they strongly disagreed that more profitability & sales have been registered, 59.7% disagreed, 15.3% were not sure, 4.2% agreed, and 1.4% strongly agreed. This shows that more profitability & sales have not been registered.

In reference to **question 7** in table above, 19.4% of those surveyed said they strongly disagreed that Trainings on ICT are conducted by the relevant district authorities, 59.7% disagreed, 15.3% were not sure, 4.2% agreed, and 1.4% strongly agreed. This shows that training on ICT is not conducted by the relevant district authorities. In connection to **question 8** in table above, 22.2% of those surveyed said they strongly disagreed that e-governance is well coordinated, 52.8% disagreed, 9.7% were not sure, 9.7% agreed, and 5.6% strongly agreed. This shows that e-governance is not well coordinated.

In reference to **question 9** in table above, 19.4% of those surveyed said they strongly disagreed that e-governance reaches a wider audience, 50% disagreed, 8.3% were not sure, 8.3% agreed, and 13.9% strongly agreed. This shows that e-governance does not reach a wider audience. In relation to **question 10** in table above, 18.1% of those surveyed said they strongly disagreed that e-governance is accessible to the community, 52.8% disagreed, 11.1% were not sure, 11.1% agreed, and 6.9% strongly agreed. This shows that e-governance is not accessible to the community.

As indicated above the descriptive statistics on Information Communication Technology literacy is still lacking in managing related business projects in Rukungiri District. As suggested by the literature, this capacity gap needs to be addressed at the policy level. Since objective one and two were not achieved, ICT literacy wouldn’t be achieved too.

## 4.4 Correlation Results.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. The correlation findings on how independent variables (ICT Entrepreneurial Skills Development, ICT Infrastructure, ICT Literacy) affect the dependent variable (Community Livelihood) in the study are discussed in the sub sections below.

### 4.4.1 Correlation analysis on ICT entrepreneurial skills development and quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the Correlation analysis on entrepreneurial skills development and quality of community livelihoods in Rukungiri district were captured and results are illustratedunder **Table 4.8** below.

**Table 4. 8: Correlation analysis on ICT entrepreneurial skills development and quality of community livelihoods.**

|  |  | Entrepreneurial ICT skills development | Quality of community livelihoods |
| --- | --- | --- | --- |
| Entrepreneurial ICT skills development | Pearson Correlation | 1 | .198\*\* |
| Sig. (2-tailed) |  | .001 |
| N | 288 | 288 |
| Quality of community livelihoods | Pearson Correlation | .198\*\* | 1 |
| Sig. (2-tailed) | .001 |  |
| N | 288 | 288 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | |  |

**Source: Researcher Field Data, 2023.**

The first objective was to establish the effect of ICT entrepreneurial skills development on quality of community livelihood in Rukungiri district. In reference to the table above, results show that there is a weak positive significant relationship between entrepreneurial ICT skills development and the quality of community livelihoods at Pearson correlation r=0.198 significant at 0.001 below the critical value of 0.05, implying that the strength of the relationship is positively significant. This implies that in managing ICT business initiatives, more emphasis needs to be put on ICT entrepreneurial skill development as seen below compared to the other independent variables whose relationship is weaker towards r=1.0.

### 4.4.2 Correlation analysis on ICT infrastructure and the quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the correlation analysis on ICT infrastructure and the quality of community livelihoods were captured and results are evidenced in **Table 4.9** below.

**Table 4. 9: Correlation analysis on ICT infrastructure and the quality of community livelihoods.**

|  |  | ICT infrastructure | Quality of community livelihoods |
| --- | --- | --- | --- |
| ICT infrastructure | Pearson Correlation | 1 | .658\*\* |
| Sig. (2-tailed) |  | .000 |
| N | 288 | 288 |
| Quality of community livelihoods | Pearson Correlation | .658\*\* | 1 |
| Sig. (2-tailed) | .000 |  |
| N | 288 | 288 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | |  |

**Source: Researcher Field Data, 2023.**

In reference to the table above, results show that there is a strong positive significant relationship between ICT infrastructure and the quality of community livelihoods at Pearson correlation r=0.658 significant at 0.000 below the critical value of 0.05, implying that the strength of influence is weak as compared the ICT entrepreneurial skill development.

### 4.4.3 Correlation analysis on ICT literacy and the quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the Correlation analysis on ICT literacy and the quality of community livelihoods were captured and results are illustrated in **Table 4.10** below.

**Table 4. 10: Correlation analysis on ICT literacy and the quality of community livelihoods.**

|  |  | ICT literacy | Quality of community livelihoods |
| --- | --- | --- | --- |
| ICT literacy | Pearson Correlation | 1 | .768\*\* |
| Sig. (2-tailed) |  | .000 |
| N | 288 | 288 |
| Quality of community livelihoods | Pearson Correlation | .768\*\* | 1 |
| Sig. (2-tailed) | .000 |  |
| N | 288 | 288 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | |  |

**Source: Researcher Field Data, 2023.**

In reference to the table above, results show that there is a strong positive significant relationship between ICT literacy and the quality of community livelihoods at Pearson correlation r=0.768 significant at 0.000 below the critical value of 0.05, implying that among the Independent variables ICT literacy has the weakest influence to the dependent variable. However this weakness may not be in isolation as there is a possibility of other moderating /intervening factors that influence the weakness of the relationship that could be a subject to further research.

## 4.5 Regression Results.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. The regression findings on how independent variables (ICT Entrepreneurial Skills Development, ICT Infrastructure, ICT Literacy) affect the dependent variable (Community Livelihood) in the study are discussed in the sub sections below.

### 4.5.1 Regression analysis on ICT entrepreneurial skills development and quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the regression analysis on entrepreneurial ICT skills development and quality of community livelihoods in Rukungiri were captured.The summary of the regression model on ICT entrepreneurial skills development and the quality of community livelihoods is presented in **Table 4.11** below.

**Table 4. 11: Model summary on ICT entrepreneurial skills development and quality of community livelihoods.**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| --- | --- | --- | --- | --- |
| 1 | .198a | .039 | .036 | .80379 |
| a. Predictors: (Constant), Entrepreneurial skills development. | | | | |

**Source: Researcher Field Data, 2023.**

Having adjusted R square to 0.036, it means that 3.6% of the variation in quality of community livelihoods in Rukungiri district is explained by ICT entrepreneurial skills development. This suggests that as much descriptive statistics indicated lack of emphasis on ICT skills development the regression results indicate that it is desirable to emphasize ICT skills development in business projects management to have better quality community Livelihoods in Rukungiri district.

**Table 4. 12: Regression on ICT entrepreneurial skills development and quality of community livelihoods.**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| --- | --- | --- | --- | --- | --- | --- |
| B | Std. Error | Beta |
| 1 | (Constant) | 1.513 | .222 |  | 6.827 | .000 |
| ICT Entrepreneurial skills development | .304 | .089 | .198 | 3.416 | .001 |
| a. Dependent Variable: Quality of community livelihoods | | | |  |  |  |

**Source: Researcher Field Data, 2023.**

In reference to the table above Y=α + βX

Where Y is the dependent variable which is “Quality of community livelihoods”, X is the independent variable which is “Entrepreneurial ICT skills development”. The beta value =0.198 at p=0.00i implies that Entrepreneurial ICT skills development has a significant positive effect on Quality of community livelihoods. Therefore, a standardized coefficient (beta) of 0.198 indicates that for a one standard deviation increase in Entrepreneurial skills development, Quality of community livelihoods is expected to increase by 0.198 units, while holding all other predictor variables constant.

### 4.5.2 Regression analysis on ICT infrastructureand quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the regression analysis on ICT infrastructure and quality of community livelihoods in Rukungiri were captured. The summary of the regression model on ICT entrepreneurial skills development and the quality of community livelihoods ispresented in **Table 4.13** below.

**Table 4. 13: Model summary on ICT infrastructure and quality of community livelihood**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| --- | --- | --- | --- | --- |
| 1 | .658a | .434 | .432 | .61717 |
| a. Predictors: (Constant), ICT infrastructure. | | | |  |

**Source: Researcher Field Data, 2023.**

Having adjusted R Square as 0.432 means that 43.2% variation in quality of community livelihoods in Rukungiri district, is explained by ICT infrastructure.

**Table 4. 14: Regression analysis on ICT infrastructure and quality of community livelihood**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| --- | --- | --- | --- | --- | --- | --- |
| B | Std. Error | Beta |
| 1 | (Constant) | -.010 | .157 |  | -.063 | .950 |
| ICT infrastructure | .913 | .062 | .658 | 14.796 | .000 |
| a. Dependent Variable: Quality of community livelihoods | | | | |  |  |

**Source: Researcher Field Data, 2023.**

In reference to the table above Y=α + βX

Where Y is the dependent variable which is “Quality of community livelihoods”, X is the independent variable which is “ICT infrastructure”. The findings of beta value of 0.658 at p=0.000 indicate that ICT infrastructure has a weak positive effect on Quality of community livelihoods. Therefore, standardized coefficient (beta) of 0.658 indicates that for a one standard deviation increase in ICT infrastructure, Quality of community livelihoods is expected to increase by 0.658 units, while holding all other predictor variables constant and this implies that ICT infrastructure has a reasonable influence on quality of community livelihoods.

#### 4.5.3 Regression analysis on ICT literacy and the quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Regression findings on regression analysis on ICT literacy and the quality of community livelihoods were captured and results are presented in **Table 4.15** below.

**Table 4. 15: Model Summary on ICT literacy and the quality of community livelihoods.**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| --- | --- | --- | --- | --- |
| 1 | .768a | .589 | .588 | .52541 |
| a. Predictors: (Constant), ICT literacy | | | |  |

**Source: Researcher Field Data, 2023.**

Having adjusted R Square as 0.588 means that 58.8% variation in quality of community livelihoods in Rukungiri district, is explained ICT literacy alone. The other percentage (100-58.8) % could possibly be due to other sub variables of ICT skills development and infrastructure including intervening factors that were beyond the scope of this study.

**Table 4. 16: Regression analysis on ICT literacy and the quality of community livelihoods.**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| --- | --- | --- | --- | --- | --- | --- |
| B | Std. Error | Beta |
| 1 | (Constant) | -.167 | .123 |  | -1.355 | .177 |
| ICT literacy | 1.008 | .050 | .768 | 20.265 | .000 |
| a. Dependent Variable: Quality of community livelihoods | | | | |  |  |

**Source: Researcher Field Data, 2023.**

In reference to the table above Y=α + βX

Where Y is the dependent variable which is “Quality of community livelihoods”, X is the independent variable which is “ICT literacy”. The findings of Beta value=0.768 at p=0.00 [which is less than 0.05], imply that ICT literacy has a statistically weak positive effect on Quality of community livelihoods. Therefore, standardized coefficient (beta) of 0.768 indicates that for a one standard deviation increase in ICT literacy, Quality of community livelihoods is expected to increase by 0.768 units, while holding all other predictor variables constant. Thus, for sustainability in Quality of community livelihoods, there is need to persistently improve on ICT literacy with current trends of 4IR (Fourth Industrial Revolution). This refers to the current era of connectivity, advanced analytics, automation, and advanced-manufacturing technology.

## 4.6 ANOVA (Analysis of variance) Findings.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. The ANOVA findings on how independent variables (ICT Entrepreneurial Skills Development, ICT Infrastructure, ICT Literacy) affect the dependent variable (Community Livelihood) in the study are discussed in the sub sections below.

### 4.6.1 ANOVA on ICT entrepreneurial skills development and quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the ANOVA on entrepreneurial skills development and quality of community livelihoods were captured and results are presented in **Table 4.17** below.

**Table 4. 17: ANOVA on entrepreneurial skills development and quality of community livelihoods.**

|  | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
| --- | --- | --- | --- | --- | --- |
| Between Community Groups | 101.190 | 21 | 4.819 | 14.065 | .000 |
| Within Community Groups | 91.128 | 266 | .343 |  |  |
| Total | 192.318 | 287 |  |  |  |

**Source: Research Field Data, 2023.**

The **table 4.17** illustrateshow ANOVA tested whether “ICT entrepreneurial skills development had no statistically significant effect on the quality of community livelihoods”. At the significant value of 0.000 that is below the critical value 0.05 indicating that the null hypothesis was not true. ICT entrepreneurial skills development has a statistically significant effect on the quality of community livelihoods, and the F-value is calculated as 14.065, meaning that the variation between the groups is fourteen times greater than the variation within the groups, this means that there is a good chance that the difference between the groups it is statistically significant.

### 4.6.2 Analysis of variance on ICT infrastructure has no statistically significant effect on the quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings on the Analysis of variance on ICT infrastructure has no statistically significant effect on the quality of community livelihoods were captured and results are presented in **Table 4.18** below.

**Table 4. 18: ANOVA on ICT infrastructure has no statistically significant effect on the quality of community livelihoods.**

|  | Sum of Squares | df | Mean Square | F | Sig. |
| --- | --- | --- | --- | --- | --- |
| Between ICT infrastructure and quality community livelihood Groups | 131.991 | 23 | 5.739 | 25.114 | .000 |
| Within ICT infrastructure and quality of community livelihood Groups | 60.327 | 264 | .229 |  |  |
| Total | 192.318 | 287 |  |  |  |

**Source: Researcher Field Data, 2023.**

The **table 4.18** illustrateshow the hypothesis is significant when ANOVA was used to test whether “ICT infrastructure has no statistically significant effect on the quality of community livelihoods” the significant value of 0.000 was below the critical value 0.05 indicating that the null hypothesis was not true. ICT infrastructure has a statistically significant effect on the quality of community livelihoods, and the F-value is calculated as 25.114, meaning that the variation between the group means/averages is twenty-five times greater than the variation within the individual groups, this means that there is a good chance that the difference between the groups is statistically significant despite its weak magnitude.

### 4.6.3 ANOVA on ICT literacy and quality of community livelihoods.

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. ANOVA Findings on ICT literacy has no statistically significant effect on the quality of community Rukungiri district livelihoods captured are presented in **Table 4.19** below.

**Table 4. 19: ANOVA on ICT literacy has no statistically significant effect on the quality of community livelihoods.**

|  |  | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
| --- | --- | --- | --- | --- | --- | --- |
| Between Groups |  | 152.155 | 25 | 6.086 | 39.702 | .000 |
| Within Groups |  | 40.163 | 262 | .153 |  |  |
| **Total** |  | 192.318 | 287 |  |  |  |

**Source: Researcher Field Data, 2023.**

On testing whether the hypothesis is significant, ANOVA was used to test whether “ICT literacy has no statistically significant effect on the quality of community livelihoods”, according to **table 4.19**, the significance value of 0.000 was below the critical value 0.05 indicating that the hypothesis was not true. ICT literacy has a statistically significant effect on the quality of community livelihoods, and the F-value is calculated as 39.702, meaning that the variation between the groups is thirty-nine times greater than the variation within the groups, this means that there is a good chance that the difference between the groups is statistically significant.

## 4.7 Chapter Summary.

This focused on the presentation and interpretation of findings in relation to demographic characteristics, and objectives of the study such as; to establish the effect of entrepreneurial skills development on the quality of community livelihoods, establish the effect of ICT infrastructure on the quality of community livelihoods, establish the effect of ICT literacy on the quality of community livelihoods at Rukungiri district. The results were interpreted and explained after each table. The next chapter summarizes, discuses, makes conclusions and recommendations related to the study.

# CHAPTER FIVE

# SUMMARY, DISCUSSION, CONCLUSION, AND RECOMMENDATIONS.

## 5.0 Introduction.

The purpose of the study was to examine the effect of ICT based business project initiatives on quality of community livelihoods in Rukungiri district. This chapter provides a summary of the findings in relation to the study objectives, discussions, conclusions based on the discussion and recommendations based on the conclusions.

## 5.1 Summary of the findings.

The findings are summarized in the sections below in accordance to the study's objectives.

### 5.1.1 Entrepreneurial skills development and quality of community livelihoods

The researcher distributed, out of 302 questionnaires that were distributed, 288 respondents were able to comply and responded and 14 people of the sample size never complied. Findings revealed that the variation between the groups is fourteen times greater than the variation within the groups. Besides that, there is a weak positive relationship between entrepreneurial ICT skills development and the quality of community, and 3.6% variation in quality of community livelihoods in Rukungiri district is explained by entrepreneurial ICT skills development. More so, for a one standard deviation increase in entrepreneurial skills development, Quality of community livelihoods is expected to increase by 0.198 units, while holding all other predictor variables constant.

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### 5.1.2 ICT infrastructure and quality of community livelihoods

Findings revealed that the variation between the group means/averages is twenty-five times greater than the variation within the individual groups, this means that there is a good chance that the difference between the groups is statistically significant, and 43.2% variation in quality of community livelihoods in Rukungiri district, is explained by ICT infrastructure. More so, quality of community livelihoods is expected to increase by 0.658 units, while holding all other predictor variables constant.

### 5.1.3 ICT literacy and quality of community livelihoods

Findings revealed that the variation between the groups is thirty-nine times greater than the variation within the groups, this means that there is a good chance that the difference between the groups is statistically significant, and 58.8% variation in quality of community livelihoods in Rukungiri district, is explained ICT literacy alone. The other percentage of 41.2 is possibly due to sub-variables and moderating factors that were beyond the scope of this study. More so for a one standard deviation increase in ICT literacy, quality of community livelihoods is expected to increase by 0.768 units, while holding all other predictor variables constant. Thus, for sustainability in quality of community livelihoods, there is need to persistently improve on ICT literacy with current trends of Fourth Industrial Revolution (4IR).

## 5.2 Discussion of findings

This section discusses the study findings and the literature in relation to the study objectives.

### 5.2.1 Entrepreneurial ICT skills development and quality of community livelihoods

Findings revealed that entrepreneurial skills development has a statistically significant effect on the quality of community livelihoods. This relates with the findings of (Khanum et al., 2018) who pointed out that entrepreneurship growth is a crucial component for household economic advancement since it influences people's access to and control over assets and capital for their livelihood on a personal, societal, and economic level.

The study revealed that there is a weak positive relationship between entrepreneurial skills development and the quality of community livelihoods at Pearson correlation r=0.198 significant at 0.096 above the critical value of 0.05, and the strength of the relationship is not significant. This disagrees with the findings of (Khanum et al., 2018) Furthermore, it was said that the development of entrepreneurial abilities helps people create assets by allowing them to improve their family's overall income and expenses, purchase important personal items like clothing, furniture, and ornaments, among other things, and save money.

It was revealed that entrepreneurial skills development affects the quality of community livelihoods in Rukungiri district by 3.9%. this is in line with the findings of Kamwi et al. (2018) who asserted that this is because they were able to combine farming and non-farming activities thanks to the development of their entrepreneurial skills, and they did so in order to diversify their income away from agriculture for a variety of reasons, including a lack of skills, a large family, the availability of opportunities, the seasonality of agricultural produce, favorable demand for goods and services, or a combination of these.

The research revealed that a unit increase in ICT entrepreneurial skills development would increase quality of community livelihoods by 0.304. This is in line with the findings of (Leng et al., 2020) who made the case that developing entrepreneurial abilities via the use of ICT enables individuals to lower the cost of information search, improve market transactions, increase farm productivity, offer chances for income generation, and streamline the provision of financial and agricultural services.

### 5.2.2 ICT infrastructure and quality of community livelihoods

Findings revealed that ICT infrastructure has a statistically significant effect on the quality of community livelihoods. This concurs with the findings of (Ummethala, S., Harter, T., Koehnle, K., Li, Z., Muehlbrandt, S., Kutuvantavida, Y., ... & Koos, C 2019) who said that through establishing links and networks with participants in the value chain, ICTs help rural microentrepreneurs access more formal markets by bringing them outside their immediate area's informal marketplaces.

The research revealed that there is a strong positive relationship between ICT infrastructure and the quality of community livelihoods at Pearson correlation r=0.658 significant at 0.000 below the critical value of 0.05, and the strength of the relationship is significant. This is in line with the findings of Dzawanda, Nicolau, Matsa, &Kusama (2021) who pointed out that ICTs aid microbusinesses in gaining new customers and expanding their markets. As a result, micro entrepreneurs earn more income and revenue, which is considered the intended "livelihood outcome". The growth of e-business is still difficult in informal rural economies due to infrastructure limitations including low internet penetration and poor cell connections.

The study revealed that ICT infrastructure affects the quality of community livelihoods in Rukungiri district by 43.4%. This is in line with the findings of Gikenye (2018) who pointed out that rural microbusiness livelihoods have limited access to ICT infrastructure due to low internet penetration, which restricts access to resources, information, and communication. This is coupled by a lack of company investment in human capital, as well as in digital expertise and knowledge needed to build a workforce capable of doing business.

It was revealed that a unit increase in ICT infrastructure would increase Quality of community livelihoods by 0.913, this agrees with the findings of Qureshi & Xiong (2017) who pointed out that ICTs have a limited impact on women's microbusinesses' tangible assets. However, it was evident that there was a need to upgrade the ICT infrastructure, including the creation of tele centers in rural areas, improvements to the road network, and programs for rural electrification that would provide inexpensive power.

### 5.2.3 ICT literacy and quality of community livelihoods

Findings revealed that ICT literacy has a statistically significant effect on the quality of community livelihoods. This is in line with the findings of Malanga & Banda (2021) who made the case that main issues affecting women-owned micro enterprises were unstable energy, a lack of accessible ICT equipment, a lack of knowledge on how to use ICTs in businesses, and a lack of ICT literacy skills. This implied that women were more likely to reside in rural areas and needed greater ICT education.

It was revealed that there is a strong positive relationship between ICT literacy and the quality of community livelihoods at Pearson correlation r=0.768 significant at 0.000 below the critical value of 0.05, and the strength of the relationship is significant. This is in line with the findings of Chikaire et al. (2017) who observed that the lack of ICT literacy skills among rural people inevitably causes a digital gap and poverty and may prevent the use of ICT in agricultural activities. There is currently a void in the body of knowledge about SHFs' degrees of ICT literacy and their acquisition of it. In order to create a novel intervention directed at their growth in the future, it was thought important to ascertain the ICT literacy levels of SHFs.

The study revealed that ICT literacy affects the quality of community livelihoods in Rukungiri district by 76.8%. This is in line with the findings of Benton & Glennie (2016) who pointed out that because they demand specialized capacity, knowledge, and abilities linked to digital technology, digital efforts like digital employment, coding skills training, and online learning programs also tend to benefit primarily highly educated and technologically adept immigrants. This indicates that women and girls who lack digital literacy have fewer opportunities for livelihoods and vocations, which reduces their capacity to contribute to society and places a financial burden on the government. However, if ICT training programs are undertaken, the opposite is true.

The research revealed that a unit increase in ICT literacy would increase Quality of community livelihoods by 1.008. This is in line with the findings of Pakzad (2017) who pointed out that expanding outreach to women and other favored groups and offering special digital and IT training to these underrepresented groups might improve their equitable participation.

## 5.3 Conclusion

This section concludes the study according to the research objectives.

### 5.3.1 The effect of entrepreneurial ICT skills development on the quality of community livelihoods

It can be concluded that entrepreneurial skills development may have some impact on the quality of community livelihoods, but the relationship is not strong enough to make definitive conclusions. Further research is needed to determine the strength and nature of the relationship between these two variables. In the meantime, it is recommended that efforts to promote entrepreneurial skills development be accompanied by other initiatives aimed at improving the quality of community livelihoods, as the impact of entrepreneurial skills development alone may not be substantial.

### 5.3.2 The effect of ICT infrastructure on the quality of community livelihoods

Based on these results, it can be concluded that ICT infrastructure is a critical factor in determining the quality of community livelihoods. Therefore, it is recommended that policymakers and development organizations invest in ICT infrastructure as a means of improving the quality of community livelihoods. This could involve the implementation of initiatives such as the provision of access to high-speed internet, the establishment of community ICT centers, and the development of digital skills training programs.

### 5.3.3 The effect of ICT literacy on the quality of community livelihoods

Based on these results, it can be concluded that ICT literacy is a critical factor in determining the quality of community livelihoods. Therefore, it is recommended that policymakers and development organizations invest in programs aimed at improving ICT literacy among communities. This could involve initiatives such as the provision of ICT training and education programs, the development of digital skills training programs, and the establishment of community ICT centers. By promoting ICT literacy, communities will be better equipped to use technology to improve their livelihoods and overall quality of life.

## 5.4 Recommendations

This section provides recommendations arising from the study discussions and conclusions.

### 5.4.1 The effect of entrepreneurial ICT skills development on the quality of community livelihoods

Given the weak positive significant relationship between entrepreneurial ICT skills development and the quality of the community, it is recommended to focus on initiatives that promote and enhance entrepreneurial skills among community members in Rukungiri district. This can include providing training programs, workshops, and mentorship opportunities to foster entrepreneurial mindset and ICT competencies.

To further improve the quality of community livelihoods, it is important to strengthen support systems for entrepreneurs in Rukungiri district. This can involve establishing business incubators, providing access to financial resources, and creating networks or platforms for collaboration and knowledge sharing among entrepreneurs. By enhancing the support available to entrepreneurs, their potential for success and the overall quality of community livelihoods can be improved.

Encouraging the integration of ICT tools and technologies in community development initiatives can have a positive impact on livelihoods. This can include promoting the use of digital platforms for marketing, e-commerce, and communication, as well as providing training on how to leverage ICT effectively for business and community development purposes.

Encouraging collaboration and partnership among stakeholders in Rukungiri district can contribute to the overall improvement of community livelihoods. This can involve fostering relationships between entrepreneurs, local government authorities, educational institutions, and non-profit organizations. Collaborative efforts can lead to resource sharing, knowledge exchange, and the implementation of sustainable development projects.

It is recommended to establish a system for continuous monitoring and evaluation of entrepreneurial ICT skills development initiatives and their impact on the quality of community livelihoods. Regular assessments will help identify areas for improvement, measure progress, and ensure the effectiveness and sustainability of interventions over time.

Policymakers should recognize the importance of entrepreneurial ICT skills development in driving community livelihoods and consider integrating supportive policies and incentives. This can include creating an enabling environment for entrepreneurship, providing tax incentives for ICT-driven businesses, and allocating resources for training and capacity building programs.

Emphasize the need for long-term sustainability in community development efforts. It is important to ensure that initiatives and interventions are designed and implemented with a focus on long-term impact rather than short-term gains. This can involve promoting sustainable business practices, environmental conservation, and social responsibility among entrepreneurs and community members.

### 5.4.2 The effect of ICT infrastructure on the quality of community livelihoods

Given the significant impact of ICT infrastructure on the quality of community livelihoods in Rukungiri district, it is crucial to prioritize the improvement and expansion of ICT infrastructure. This includes ensuring access to reliable internet connectivity, electricity supply, and necessary hardware and software resources. Collaborating with relevant stakeholders, such as government agencies, telecommunication companies, and non-profit organizations, can help in achieving this goal.

To maximize the benefits of ICT infrastructure, it is important to provide community members with access to information and training on how to effectively utilize ICT tools and resources. This can involve organizing workshops, training programs, and awareness campaigns to enhance digital literacy skills and educate the community on the potential uses of ICT for livelihood improvement.

Encouraging and supporting local entrepreneurs to leverage ICT infrastructure can greatly contribute to the quality of community livelihoods. Initiatives such as providing business development support, access to capital, and mentorship can help entrepreneurs harness the power of ICT to enhance their businesses, create employment opportunities, and stimulate economic growth in the community.

Foster partnerships between various stakeholders, including government entities, private sector organizations, educational institutions, and community-based organizations, collaborative efforts can lead to joint initiatives aimed at improving ICT infrastructure, expanding digital services, and promoting the use of ICT for community development. Engaging with local communities and involving them in decision-making processes can ensure that initiatives are aligned with their specific needs and priorities.

Pay attention to the long-term sustainability and maintenance of ICT infrastructure in the community. This includes establishing maintenance protocols, training local technicians, and allocating funds for regular upgrades and repairs. Ensuring the continuity of ICT services is vital to sustaining the positive impact on community livelihoods.

### 5.4.3 The effect of ICT literacy on the quality of community livelihoods

Given the significant impact of ICT literacy on the quality of community livelihoods in Rukungiri district, it is crucial to prioritize efforts to improve ICT literacy among community members. This can include providing training programs, workshops, and educational initiatives that focus on enhancing digital skills and knowledge. Emphasize the importance of keeping up with current trends, particularly in the context of the Fourth Industrial Revolution (4IR), to ensure the community remains equipped with relevant skills.

Ensure equitable access to ICT resources, such as computers, smartphones, and internet connectivity, across the community. Consider establishing community centers or hubs where community members can access these resources, particularly for those who may not have personal access to ICT devices. Collaborate with relevant stakeholders, including government agencies, NGOs, and private sector organizations, to bridge the digital divide and provide necessary infrastructure.

Implement ongoing training programs and support mechanisms to keep community members updated with ICT skills and knowledge. This can involve organizing regular workshops, webinars, or training sessions that cover various aspects of ICT literacy, including basic computer skills, digital communication, online research, and online safety. Encourage individuals to seek further education or certifications in ICT-related fields to enhance their employment prospects.

Foster partnerships with educational institutions, such as schools, colleges, and universities, to integrate ICT literacy into the curriculum. Encourage the development of ICT-focused courses or modules that equip students with the necessary skills for the digital age. Explore opportunities for mentorship programs where students can contribute to enhancing ICT literacy within the community.

Increase awareness among community members about the importance of ICT literacy and its potential impact on livelihoods. Conduct outreach programs, awareness campaigns, and information sessions to educate the community about the benefits of ICT literacy and how it can enhance their daily lives, employment opportunities, and entrepreneurial endeavors.

Promote entrepreneurship and digital innovation within the community by providing support, mentorship, and access to resources for aspiring entrepreneurs. Encourage the development of ICT-driven businesses and startups that can contribute to economic growth and job creation in the community. Foster a culture of innovation and creativity that embraces technology and its potential for improving livelihoods.

## 5.5 Areas for Further Research

Further research needs to be carried out on the following;

* To examine the impact of ICT entrepreneurial skills on the competitiveness of SMEs in Rukungiri district.
* The relationship between ICT infrastructure and Businesses in Rukungiri.
* To examine the relationship between the availability and quality of ICT infrastructure on business performance.
* Examine moderating factors between the ICT business initiatives and the quality of community livelihoods.

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# APPENDICES

# APPENDIX 1: QUESTIONNAIRE FOR PROJECT BENEFICIARIES

**UGANDA MANAGEMENT INSTITUTE**

**SCHOOL OF BUSINESS AND MANAGEMENT**

Dear Sir/Madam,

My name is **Tugume Davis** from Uganda Management Institute pursuing a Masters of Management Studies- Project Planning and Management (MMS-PPM). I am conducting postgraduate academic research titled “**information and communications technology business project initiatives and quality of community livelihoods in Uganda: A case of selected ICT Project Innitiatives Rukungiri district”.**

You have been identified as a resourceful person to participate in this study and I therefore humbly request you to voluntarily accept to take part. Your answers and opinions are important to this study and will be treated with maximum confidentiality. The information given will be used only for academic purposes. Please do not include your name on this survey. Thank you for your participation.

**Section A: Biographic information**

1. Please indicate your gender 

(1) Male (2) Female 

2. Level of education

(1) Primary (3) Diploma 

(2) Secondary (4) Degree

3. Number of employees in the business 

(1)Less than 5 (2) 5 to 10 employees 

(3)Between 10 to 50 employees (4) Above 50 employees 

4. Annual stock turnover in Uganda shillings

(1) Less than 5 million 

(2) 5 to 50million

(3) 50 to 360million

(4) 360 million and above

5. Length of time (in years) operating the current business

i) Less than 5 iii) 5 – 10 

ii) 11 – 15 iv) 16 years+

In the subsequent sections that follow, use the scale provided and tick in the box of the relevant answer that describes your opinion.

| **Scale** | 5 | 4 | 3 | 2 | 1 |
| --- | --- | --- | --- | --- | --- |
|  | Strongly Agree | Agree | Not sure | Disagree | Strongly Disagree |

**Section B: Entrepreneurial ICT skills development**

| **Code** | **Competitive position** | **5** | **4** | **3** | **2** | **1** |
| --- | --- | --- | --- | --- | --- | --- |
| cp1 | There are several other businesses doing the same business as mine. |  |  |  |  |  |
| cp2 | I am technologically trained to run this business. |  |  |  |  |  |
| cp3 | I have workers in my business who are my responsibility. |  |  |  |  |  |
| cp4 | I receive ICT basic training together with my workers on business prospects. |  |  |  |  |  |
| cp5 | The duties and responsibilities of each of my workers are clearly defined. |  |  |  |  |  |
| **Code** | **Competitive strengths** |  |  |  |  |  |
| cs1 | I am the only one doing this business in this area. |  |  |  |  |  |
| cs2 | I get goods from the same suppliers as my competitors. |  |  |  |  |  |
| cs3 | I access loans from the same financial services providers as my competitors. |  |  |  |  |  |
| cs4 | My business is strategically located where access by customers and potential customers is easy. |  |  |  |  |  |
| cs5 | My business is located in a densely populated area. |  |  |  |  |  |

**Section C: ICT infrastructure**

| **Code** | **Innovations** | **5** | **4** | **3** | **2** | **1** |
| --- | --- | --- | --- | --- | --- | --- |
| lbs1 | All stakeholders are engaged during the implementation of the initiative |  |  |  |  |  |
| lbs2 | Ideas of stakeholders are put in to consideration |  |  |  |  |  |
| lbs3 | Initiatives done in several areas are profitable and sustainable |  |  |  |  |  |
| lbs 4 | When generating ideas cultural and environment impacts are considered. |  |  |  |  |  |
| **Code** | **Support system (SS)** |  |  |  |  |  |
| ss1 | Support system are customized to address need of several initiatives. |  |  |  |  |  |
| ss2 | There is easy access to initiatives when seeking for Support system. |  |  |  |  |  |
| ss3 | Support system to initiatives are physical. |  |  |  |  |  |
| ss4 | Support system involve information sharing, financial advice & literacy |  |  |  |  |  |
|  | **Entrepreneurial application** |  |  |  |  |  |
| ep1 | Research is often done before executions |  |  |  |  |  |
| ep2 | Business plans/project plans are always implemented |  |  |  |  |  |
| ep3 | Marketing of products & services is done in several initiatives. |  |  |  |  |  |

**Section D: ICT literacy**

| **Code** | **Knowledge & information** | **5** | **4** | **3** | **2** | **1** |
| --- | --- | --- | --- | --- | --- | --- |
| ki1 | Stakeholders are knowledgeable on ICT related tools |  |  |  |  |  |
| ki2 | There is applicability of ICT knowledge in several initiatives. |  |  |  |  |  |
| ki3 | Several stakeholders easily access information in their initiatives. |  |  |  |  |  |
| **Code** | **Doing business online (DBO)** |  |  |  |  |  |
| dbo1 | ICT literacy has enabled businesses initiatives start Doing business online. |  |  |  |  |  |
| dbo2 | Several business initiatives have got online presence. |  |  |  |  |  |
| dbo3 | More profitability & sales have been registered. |  |  |  |  |  |
| **Code** | **e-governance** |  |  |  |  |  |
| eg1 | Trainings on ICT are conducted by the relevant district authorities. |  |  |  |  |  |
| eg2 | e-governance is well coordinated. |  |  |  |  |  |
| eg3 | e-governance reaches a wider audience. |  |  |  |  |  |
| eg4 | e-governance is accessible to the community |  |  |  |  |  |

**Section E: Quality of community livelihoods**

| **Code** | **Income** | **5** | **4** | **3** | **2** | **1** |
| --- | --- | --- | --- | --- | --- | --- |
| i1 | My income has grown significantly over the last 5 years. |  |  |  |  |  |
| i2 | My income has remained the same over the last 5 years. |  |  |  |  |  |
| i3 | My income has declined in the last 5 years. |  |  |  |  |  |
|  | **Assets** |  |  |  |  |  |
| a4 | My assets have grown significantly over the last 5 years. |  |  |  |  |  |
| a5 | My assets have remained the same over the last 5 years. |  |  |  |  |  |
| a6 | My assets have reduced over the last 5 years. |  |  |  |  |  |
|  | **Food security** |  |  |  |  |  |
| fc7 | I feed at least more than 2 times a day. |  |  |  |  |  |
| fc8 | I have enough access to food. |  |  |  |  |  |
| fc9 | Food is very available in my household. |  |  |  |  |  |
| fc10 | I have unlimited access to food all year round. |  |  |  |  |  |

End

Thank you very much for your responses

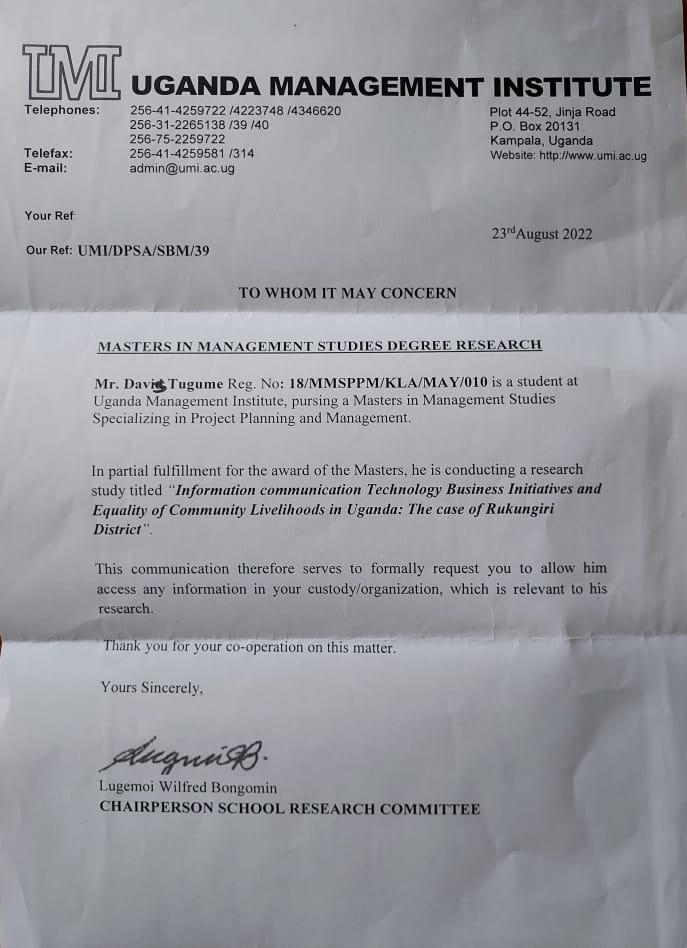
# APPENDIX 3: KREJCIE & MORGAN’S TABLE OF SAMPLE SIZE DETERMINATION

**N=Population size, n=Sample size**

| **N n** | **N n** | **N n** | **N n** | **N n** |
| --- | --- | --- | --- | --- |
| 10 - 10 | 100 - 80 | 280 - 162 | 800 - 260 | 2800 - 338 |
| 15 - 14 | 110 – 86 | 290 - 165 | 850 - 265 | 3000 - 341 |
| 20 - 19 | 120 – 92 | 300 - 169 | 900 - 269 | 3500 - 346 |
| 25 - 24 | 130 – 97 | 320 - 175 | 950 - 274 | 4000 - 351 |
| 30 - 28 | 140 - 103 | 340 - 181 | 1000 - 278 | 4500 - 354 |
| 35 - 32 | 150 - 108 | 360 - 186 | 1100 - 285 | 5000 - 357 |
| 40 - 36 | 160 - 113 | 380 - 191 | 1200 - 291 | 6000 - 361 |
| 45 - 40 | 170 - 118 | 400 - 196 | 1300 - 297 | 7000 - 364 |
| 50 - 44 | 180 - 123 | 420 - 201 | 1400 - 302 | 8000 - 367 |
| 55 - 48 | 190 - 127 | 440 - 205 | 1500 - 306 | 9000 - 368 |
| 60 - 52 | 200 - 132 | 460 - 210 | 1600 - 310 | 10000 - 370 |
| 65 - 56 | 210 - 136 | 480 - 241 | 1700 - 313 | 15000 - 375 |
| 70 - 59 | 220 - 140 | 500 - 217 | 1800 - 317 | 20000 - 377 |
| 75 - 63 | 230 - 144 | 550 - 226 | 1900 - 320 | 30000 - 379 |
| 80 - 66 | 240 - 148 | 600 - 234 | 2000 - 322 | 40000 - 380 |
| 85 - 70 | 250 - 152 | 650 - 242 | 2200 - 327 | 50000 - 381 |
| 90 - 73 | 260 - 155 | 700 - 248 | 2400 - 331 | 75000 - 382 |
| 95 - 76 | 270 - 159 | 750 - 254 | 2600 - 335 | 100000 - 384 |

**Source:** Krejcie and Morgan (1970)

# APPENDIX 3: LETTER TO THE FIELD



# APPENDIX 4: PLAGIALISM REPORT

