



SRI SAI COLLEGE

POST GRADUATE OFFICE

ICT4D IMPLEMENTATION CHALLENGE AND OPPORTUNITIES IN ETHIOPIA

**YIDNEKACHEW ABEBE HAYILEMARIYAM (ID NO.
MBAISMR/163/19)**

IJSER

**A THESIS/RESEARCH PROJECT SUBMITTED TO THE POST
GRADUATE OFFICE IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF
BUSINESS ADMINISTRATION IN INFORMATION SYSTEMS
MANAGEMENT), SRI SAI COLLEGE**

December 2021

Addis Ababa, Ethiopia

Declaration

This thesis my original work and has not been presented for a degree in any other University or higher learning institution.

Except where otherwise specified, I declare that this thesis, entitled "ICT4D implementation challenge and Opportunities in Ethiopia is the result of my own study. With the help and supervision of my research adviser, I conducted the study on my own. Citations with explicit references recognize other sources. There is a list of references at the conclusion of the paper.

Signature: _____ Date 28/12/2021

Yidnekachew Abebe Hailemariam (Id No. MBAISM R/163/19)

Approved by the Board of Examiners

Advisor: Assistant Professor Mulugeta Adibaru

Signature: _____ Date _____

Examiner External: Dr. Kassegn Berhanu

Signature: _____ Date _____

Examiner Internal: Dr. Vittapu

Signature: _____ Date _____

ACKNOWLEDGMENTS

This research would not have been feasible first and foremost without the almighty God will and the affection, assistance, inspiration, and support I got from my advisor, study participant, workplace colleagues, intimate friends, and family members. Although there are others, I am thankful to send my modest and heartfelt special gratitude to the listed individuals below:

Assistant Professor Mulugeta Adibaru as an advisor your great effort and support to make this work happen in successful way. Study participants especially partner office staffs and CRS staffs thank you for your patience in responding to the questionnaire and extensive interview questions.

CRS Ethiopia SMT and Ian. Delarosa, Thank you so much for all your encouragement, financial support, and motivation during my academic year and this thesis work. Thank you, all my loved family Lidiya, Abigya and Yonatan for the moral support given to me throughout my academic year. Above all, this will not happen without the help of almighty God. Thank you, Jesus!!!

IJSER

Table of Contents

| | |
|---|----|
| CHAPTER ONE | 1 |
| INTRODUCTION | 1 |
| 1.1 Background of the study | 1 |
| 1.2 Research Motivations | 6 |
| 1.3 Statement of the Problem | 7 |
| 1.4 Research Questions | 9 |
| 1.5 Objective | 10 |
| 1.5.1 General Objectives | 10 |
| 1.5.2 Specific Objectives | 10 |
| 1.5.3 Scope of the study | 11 |
| 1.6 Significance of the study | 11 |
| CHAPTER TWO | 13 |
| LITERATURE REVIEW | 13 |
| 2.1 The Progress of ICT4D | 13 |
| 2.2 ICT4D Program | 14 |
| 2.3 Typical Nature of ICT4D programs | 15 |
| 2.4 Related computing fields | 15 |
| 2.5 ICT4D sustainability in Ethiopia | 16 |
| 2.6 ICT4D Success | 18 |
| 2.7 ICT4D Failure | 19 |
| 2.8 ICT4D's Role | 20 |
| 2.9 Success of ICT4D Implementation vs. Long-Term Sustainability | 20 |
| 2.10 ICT Using Challenges in Developing Countries | 23 |
| 2.11 The Digital Divide and Appropriate ICT | 24 |
| 2.12 ICTs in Ethiopia Context | 25 |
| 2.13 ICT Access Methods | 26 |
| 2.14 The Special Case of Mobile Phones | 26 |
| 2.15 Government Policy | 28 |
| 2.16 Infrastructure | 29 |
| 2.17 Training and Qualification | 29 |

| | | |
|--|---|-----------|
| 2.18 | The Digital Divide..... | 30 |
| 2.19 | ICT4D Implementation Theoretical framework..... | 31 |
| 2.20 | Multidimensional Poverty Indicators | 32 |
| 2.21 | A comprehensive framework for sustainable technology to alleviate poverty..... | 33 |
| CHAPTER THREE..... | | 35 |
| RESEARCH METHODOLOGY..... | | 35 |
| 3.1 | Research Design..... | 35 |
| 3.2 | Sampling technique and size determination | 35 |
| 3.3 | Data type and source..... | 36 |
| 3.4 | Data collection technique | 37 |
| 3.5 | Data analyzing technique | 38 |
| CHAPTER FOUR | | 39 |
| DATA PRESENTATION AND ANALYSIS..... | | 39 |
| 4.1 | Data Presentation..... | 39 |
| 4.2 | Geographic Coverage of the research..... | 41 |
| 4.3 | Process and Methods of Observation data collection | 41 |
| 4.4 | Field Visit Scheduled while doing..... | 42 |
| 4.5 | Characteristics of Respondents..... | 43 |
| 4.6 | Data Analysis..... | 47 |
| 4.6.1 | Perception and engagement in ICT4D implementation..... | 48 |
| 4.6.2 | Opportunities of using ICT4D platform concerning the expansion of mobile phone Ethiopia..... | 52 |
| Chapter Five | | 59 |
| SUMMARY, CONCLUSIONS AND RECOMMENDATIONS..... | | 59 |
| 5.1 | Summary of The Major Findings | 59 |
| 5.2 | Conclusion..... | 61 |
| 5.3 | Recommendations..... | 62 |
| Reference | | 64 |
| Appendix II – Consent Form | | 72 |
| Appendix III Survey Questionnaires..... | | 73 |

List of Tables

| | |
|--|----|
| Table 2. 1 List of literature evidence on ICT4D implementation challenge and Opportunities in Ethiopia | 22 |
| Table 4. 1 Characteristics of respondents, CRS and implementing partner MCS..... | 43 |
| Table 4. 2 Characteristics of staff position ICT4D experts in CRS and MCS office | 46 |
| Table 4. 3 Perception and engagement in ICT4D implementation among donor and implementing partner staff | 48 |
| Table 4. 4 Application used for ICT4D Platform | 50 |
| Table 4. 5 Challenges on ICT4D implementation on sample donor and implementing partner offices and Sample woreda front line worker | 53 |

IJSER

List of Figures

| | |
|---|----|
| Figure 2. 1 Comprehensive theoretical framework for sustainable technology-supported participatory development to alleviate poverty | 34 |
| Figure 4. 2 Geographic Coverage of the research | 41 |

IJSER

List of Acronyms

| | |
|-----------------|--|
| ACM/IEEE | Institute of Electrical and Electronic Engineers/Association for Computing Machinery |
| AISI | African Information Society Initiative |
| AI4D | Artificial Intelligence for Development |
| CRS | Catholic Relief Service |
| DFSA | Development Food Security Activity |
| FMOH | Federal Ministry Of Health |
| ICT | Information Communication Technology |
| ICT4D | Information Communication Technology for Development |
| IS | Information System |
| IT | Information Technology |
| ITU | International Telecommunication Union |
| JEOP | Joint Emergency Operation Plan |
| JSI | John Snow, Inc |
| LDC | Least Developed Countries |
| LRO | Livelihood Resilient Oromia |
| MCS | Maki Catholic Secretariat |
| MDG | Millennium Development Goal |
| NEPAD | New Partnership for Africa's Development |
| NGO | Nongovernmental Organization |
| NITDA | Technology Developing Agency |
| UN | United Nation |
| UNDP | United Nations Development Program |
| UNITAD | Understanding Needs of Individuals Through Education Of Diversity |
| USAID | United States Agency for International Development |

ABSTRACT

Identifying ICT4D implementation challenges and Opportunities in Ethiopia helps for all stakeholders such as the government of Ethiopia, INGOs, private organizations to have a common understanding of the issues. Also, propose solutions to how to overcome identified challenges for successful implementation and shared knowledge of the process. This research identified ICT4D implementation challenge and the opportunity to use ICT4D for humanitarian and development work that aims to alleviate poverty in a country like Ethiopia.

All stockholders need to be aware of the challenge of using ICT4D system and the opportunities associated with it.

Therefore, they need to know the fundamental issues and opportunities for example (efficiency, fairness, digital bridge, and sustainability), and the challenges (infrastructure issues, skill gaps, capacity building challenges, and challenges related to financing ICT4D platform use, to name a few). The aim of the research is to provide a better understanding of ICT4D implementation challenges and Opportunities in humanitarian and development work in Ethiopia. Thematic analysis is employed to analyze the data collected aimed at simplifying an understanding of ICT4D implementation challenges and opportunities to use the system.

Accordingly, creating a question in the mind of different stakeholders why ICT4D system implementation is not successful as anticipated, also how to integrate into day-to-day routine project implementation activities, and providing better insight for the formulation of strategy, policy, guidelines. Also, this research document is very helpful for resource mobilization, building a good internal organizational process, improve and sustaining ICT4D platform's effectiveness beyond the successful execution of project activities by using ICT4D knowledge management framework.

Keywords: *ICT4D implementation challenge, digital divide, ICT4D for development work, INGO.*

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

In the 1980s, the concept of ICT4D was introduced. When we explain ICT in terms of technology, it progresses through radio, Television, Internet, and mobile technologies are all used to advance means of communication. The scope of applications is expanding to include social, political, physical, environmental, human, and financial concerns. ICT is seen as critical to achieving the millennium development goals, which were established by the United Nations (UN) to combat poverty, improve healthcare, improve education, promote gender equality, and expand global development partnerships in developing countries (World Bank, 2003). Despite massive investments in ICT4D development projects by the government, non-governmental organizations (NGOs), and the private sector, only minor impacts on marginalized and poor communities have been reported. The lack of political will, inspiration, and knowledge on how to evaluate the impact of ongoing and initiated projects (Heeks & Alemayehu, 2008).

When impact evaluations are carried out, they often focus on measuring technological and financial factors, with less attention paid to the possible impact on wider development issues. ICT4D research focuses on a variety of topics, including ICT artifact diffusion, infrastructure growth, and service implementation (Braa & Hedberg, 2002; Meso et al., 2005; Walsham & Sahay, 1999), impact evaluation of ICT interventions (Kumar & Best, 2006), linking ICT and development (Avgerou, 2003; Ngwenyama et al., 2006; Urquhart et al., 2008), and I (Warschauer, 2003). ICT4D implementation challenge and Opportunities in Ethiopia research looks at the various social and technical factors as well as the actors that challenge implementation. Numerous programs involving ICT innovation in developing countries have struggled to achieve the expected benefits, according to existing studies (Heeks, 2002b). Poor management, skill gaps, lack of telecom infrastructure, design problem, resistance to change, and complex power dynamics are among the factors found.

Socially driven implementation strategies have been recommended not only for impact analysis, but also for the effective penetration of an ICT artifact in developed countries (Braa et al., 2007; Heeks & Stanforth, 2007; Walsham & Sahay, 1999). According to current research, numerous

ICT innovation initiatives in developing countries like Ethiopia have failed to achieve the desired outcomes (Heeks, 2002b). Among the factors discovered were poor management, resistance to change, and complex power dynamics. Not only for impact analysis, but also for the successful penetration of an IT artifact in developing countries, socially oriented implementation strategies have been suggested (Braa et al., 2007; Heeks & Stanforth, 2007; Walsham & Sahay, 1999).

Many of the programs addressing socioeconomic development problems depend on introducing new technology to poor and marginalized communities, such as mobile phones, computers, Internet access, and different communication media. These programs are referred to as ICT4D because they aim to bridge the digital divide. The digital divide is the distinction between those who can easily use information communication technologies, such as the internet, different communication medias and those who can't. In Ethiopia Information and communication technologies for development (ICT4D) are used by the vulnerable community through different aid agencies and non-governmental organizations (NGOs) and by Ethiopian government. Non-governmental organizations that work to assist people impacted by natural disasters such as fires, floods, and hurricanes, as well as violence, war, desert locus, pandemic disease, people dispute, and genocide. Improve socio-economic conditions (such as jobs, poverty, education, healthcare, and so on) in developing countries.

In the report “The National ICT for Development (ICT4D) Five Years Action Plan for Ethiopia”, as Dzidonu (2006) Ethiopia recognized the developmental potentials and opportunities of the knowledge and technological revolution to embark on a process of economic transformation through the modernization of key sectors of the economy, including agriculture, services, and industry, through the deployment and exploitation of ICTs, according to the study.

Recognizing the critical role that ICT growth, deployment, and exploitation can play in Ethiopia's economic and social development, the government recognizes the need for rapid development of the country's information and communications infrastructure, as well as educational and human resource development to bring about the necessary socio-economic change and transformation. According to Dzidonu (2006), the Ethiopian government not only sees ICT as a necessary tool for reducing poverty, but it also sees it as a key tool for promoting

the ongoing state transition, which is aimed at providing effective and efficient service delivery in all sectors.

As a result, the government considers ICTs in the light of its socioeconomic development goals. Ethiopia's aim is to become an ICT-driven country capable of operating successfully in a global economy. To help achieve this vision, Ethiopia's government developed an ICT4D strategy that involves a number of initiatives such as E-health, Wereda Net, and School Net, to name a few. The Ethiopian government launched a satellite TV service as part of the national School Net Initiative in 2004, which is a nationwide network of Ethiopian secondary schools, according to Gebeyehu (2014) and Birhanu (2012, 2013).

ICTs provide a useful tool for aid organizations and NGOs to prioritize assistance among countries and to decide what form of support is most required in any given country. ICT4D is concerned with the issue of whether or not, as well as the degree to which, ICTs will lead to economic growth and long-term sustainability (Fillip 2003). In Ethiopia ICT4D is now receiving mounting interest from aid and international agencies and is seen as one of the best development catalysts. Many of these organizations agree that ICT provides an unrivaled opportunity for poor communities to develop contact and relationships, as well as a source of information exchange and innovation (Göransson and Söderberg 2003).

Many studies have shown that the advancement and use of information and communication technologies (ICTs) can play an important role in development and can be a powerful tool for human resource capacity building and poverty reduction (Jussawalla 2001, Rabayah 2008, Wilson and Heeks 2000). However, third-world countries specifically Ethiopia in general lack the capacity to create, sustain, and use ICT4D tools to address socioeconomic needs due to several reasons. As an example, none of the more than forty-two (42) government universities in Ethiopia teaches ICT4D as a study field or a course on ICT4D in the IT related programs they offer such as Computer Science, Computer Information Systems, information science and Management Information Systems. Due to this ICT4D implementation challenge is extremely high. A thorough investigation (Sundén and Wicander 2006) was conducted to determine the root causes of IT project failure in developing countries.

Another study (Van Reijswoud 2009) claims that ICT projects in developing countries are more competitive when they are tailored to local circumstances, and it introduces the idea of suitable technology to help such projects succeed. Incorporating an ICT4D course into IT education would be a critical component in increasing the success rate of ICT ventures and ICT4D initiatives in Ethiopia. The academic area concerned with the use of ICTs for development is known as information and communication technology for development (ICT4D).

As a result, ICT4D can be seen as part of a broader global development issue. We'll go through some of the implementation challenge in Ethiopia, as well as its implications for ICT4D, later in the paper. An ICT is any device that can store, retrieve, control, send, or receive information. Personal computers, television, radio, email, and cell phones are all examples of this. They provide a massive cross-cutting opportunity to increase and boost the effectiveness of development work, improve programming efficiency, and contribute to fund raising. Information and communication technologies (ICTs) are often hailed as panaceas for reducing poverty, boosting economic growth, and empowering the poor and oppressed (Greenberg, 2005). The use of information and communication technology (ICT) in various social, economic, and political activities is referred to as ICT4D. (Kramer, Jenkins & Kats, 2007).

For the people living urban ICT is now rooted in the goods and services we use and consume on a regular basis. As a result, it has an effect on every aspect of growth, including social, economic, and political development (Cole & Roman, 2003). Currently, a wide variety of stakeholders, including states, international organizations, professionals, and civil society organizations, accept and campaign for the use of ICT in the advancement of humanity. (Yusof & Lim, 2003). The role of ICT4D in social, economic, and political growth will make a direct or indirect difference in the lives of the poor and marginalized community.

According to the World Bank Digital Dividends, which argues that we are “in the midst of the greatest information and communications revolution in human history” and take advantage of this rapid technological transition to make the world more stable and inclusive.” Those who use information and communication technology (ICT) for growth (ICT4D) have made significant progress, but there is still much more work to be done. many people still need access to ICT, and there is a feeling that further work needs to be done to understand how technology can better support humanitarian and development efforts.

At this point in time, ICT4D and its associated growth and humanitarian work activities can be considered extremely significant. We are all aware of how ICT4D's ubiquity, affordability, and widespread use has aided poverty alleviation for the poor and marginalized community, not least due to the exponential spread of mobile phones. Despite the importance of the region, there are still numerous obstacles to fully implementing its potential in Ethiopia. Some non-governmental organizations and some government development sectors, for example, are unsure how much ICT4D contributes to development and humanitarian work, especially among the poorest members of society.

The way we can we extend the benefits of ICT4D more widely in society and mitigate the negative effects marginalized community /excluded from social, political and economic activities, for example. How can we as researchers theorize what is happening in a compelling way, As a country still there is no higher education curriculum, clear policy except the 5 year ICT4D action plan, rule and regulation how to implement ICT4D, poor telecom infrastructure, community perception for ICT4D usage.

Undeveloped area and conflict-affected Ethiopian contexts and shrinking civil society spaces are two of the major current challenges to humanitarian and development organizations working with others to alleviate poverty and challenge inequalities. They are challenging their traditional approaches to programming and increasing the need to consider how to promote social cohesion and empower nations and communities to become inclusive and resilient to external and internal shocks in the face of restrictions on movement and access on what they need. The shifting digital landscape is changing the way that these organization and more importantly those with whom these organization works communicate and access services. This has consequences for how stakeholders produce, access and use data, while striving to become ever more transparent. In recent year Ethiopia as a country has a burgeoning ICT technology scene for example by building IT park. It is not, however, without ongoing accessibility and direct access problems, which reinforce inequity and the invisibility of the voice, and limit the successful use of ICT to lead to positive social change.

Rapid advancements in ICT applications, as well as the availability of high-speed networks, are allowing for the generation and management of ever-increasing volumes of data that can be customized to the needs of users and contribute to development goals. However, in order to reap

the benefits of these advancements, a broad variety of technical and related skills must be improved. In almost every situation, decisions must be taken on which technical components and services can be manufactured domestically and which must be sourced from outside the country. In order to contribute to national development priorities, decisions must be made on how the applications should be implemented. The variety of products and services and the differences in the economic and social conditions in developing countries make it extremely

1.2 Research Motivations

Since the rise of interest in ICT for development, sustainability has been seen as the cornerstone of the ICT4D agenda. According to several researchers, such as Ali and Bailur (2007), ICT4D sustainability is a hot topic that needs to be researched and addressed. Furthermore, Ali (2007) found that the primary concern of multi-sectorial "ICT for development" project is sustainability. Urban initiatives, such as tele centers, education, and others, are possible. His research drew attention to the topic of "what is sustainability?" "How will sustainability be achieved?" is another question. Will be the next step in ICT4D research, as well as a new paradigm. Beyond the appropriate use of ICT artifacts, more IS research and literature should focus on sustainability. Many unsuccessful telecentre attempts resulted in an emphasis on the initiatives' sustainability, according to Heeks (2008), as an example of failed ICT projects for development. Until recently, the problem of ICT4D sustainability was a hot topic among many scholars. Despite the substantial attention paid to new technologies, according to Thapa et al. (2021), many situations have not attained the anticipated result, much alone ensured sustainability.

ICT4D sustainability is a critical priority in poor nations, according to most studies, such as Mananga et al. (2013), yet it is not adequately addressed. It is difficult for project managers in this region to ensure the ICT4D initiative since it is difficult to address. As a result, tackling the sustainability problem is a key concern, as it minimizes the failure of IT investments in developing countries. According to the literature, there are several agendas focused on the long-term viability of ICT4D.

1.3 Statement of the Problem

ICT4D analysis, according to Weber (2009), has appeared to be motivated by rhetoric rather than rigor. Although recognizing that "realities" are socially constructed phenomena, argues that we can only know reality through tacit or explicit models of the universe that we build through our encounters with it. This argument supports our goal of developing an explicit, though preliminary, model of the ICT4D landscape in order to gain consensus on some basic components and their relationships, as stated in the Introduction. Stillman and Linger (2009) argue that a structure for Community Informatics and Information Systems based on a common language and expressing a shared ontology and epistemology will enable Community Informatics to fully address the Information Systems problem-solving agenda as well as its community problem-solving activities.

As a result, it will better deal with technological and social design issues, as well as implementation issues of ICT4D utilization. This case for the utility of a common ICT applications in Community Informatics and Information Systems almost certainly applies to ICT4D as a related discipline. There has also been a case made for incorporating development economics (Avgerou, 2008; Chaudhuri, 2012), with Heeks (2014) highlighting the under-representation of economics based ICT4D studies. However, the programming sciences are used as a starting point in this article. The study is driven by the key research question. To what degree is it possible to implement a useful conceptual structure of the ICT4D in developing country like Ethiopia? Poor and marginalized communities will benefit from ICT4D in a number of ways, including economic, social, and political growth. The issue of being poor and without access to information has create new obstacles in addressing this community's problem. Marginalization is described as not being a part of the mainstream community and thus lacking the "social capital" to benefit from a society's benefits and influence its culture.

Poverty, a lack of competence in popular language and/or culture, or a lack of motivation may all be factors. ICT4D solutions can be seen as social harmony and integration facilitators, as well as a means of inclusion. For example, due to the difficulties of not enforcing ICT4D, there is a lack of access to relevant information. Funding constraints continue to limit development partners' or non-governmental organizations' ability to invest in ICT4D as a key capability for their development programs.

The implementation of creative ICT technologies at scale is a costly undertaking that necessitates a significant amount of money. In this regard, stakeholders must ensure the ICT is integrated into development planning (Maung et al., 2019). As an example, none of more than forty-two (42) Ethiopia government universities teaches ICT4D as study field or a course in the IT related programs they offer such as Computer Science, Computer Information Systems, information science and Management Information Systems. Many studies have shown that the failure rate of IT projects is extremely high. A thorough investigation (Sundén and Wicander 2006) was conducted to determine the root causes of IT project failure in developing countries are a lot for example incompetence and lack of knowledge, poor financial capacity, Computer illiteracy, Cultural Barriers, as a country lack of ICT4D Policies, design, and Political Considerations. Another study (Van Reijswoud 2009) claims that ICT projects in developing countries are more competitive when they are tailored to local circumstances, and it introduces the idea of suitable technology to help such projects succeed.

Moreover, in Ethiopia policymakers they didn't address the role of ICT4D in the implementation of critical poverty alleviation programs. Besides, they did not ensure that ICT4D programs are aligned with Ethiopian telecom infrastructure. This approach will be instrumental in contributing to the achievement of negative outcomes in the regards of ICT4D implementation in Ethiopia. Affordable Internet access is a huge issue for developing countries like Ethiopia which is provided by Ethio telecom. Based on ethio telecom report even though there were 46.75 million mobile connections in Ethiopia, but mobile internet access is usually substantially more expensive. In Ethiopia internet network, infrastructure, and operations are one of the headaches to access the service of ICT4D in rural community set up. Key to affordable prices are choice and competition. To enable, an infrastructure with easy access to as many poor and marginalized consider themselves as market.

There are concerns that the reliance on ICT4D as a tool for creating development in countries may increase the alienation of some vulnerable groups. Presently, there is a skill gap on implementing ICT4D interventions in Ethiopia. Besides, Doners and NGO'S are still grappling with the implications of ICT4D in the development process (Maung et al., 2019).The cost of implementing ICT4D can be high at times as an implementation challenge. Due to this most NGOs' unable to go straightforward, due to budget constraints and a shortage of qualified

manpower in developing countries like Ethiopia. Furthermore, since ICT4D implementation is normally expensive and time-consuming, lack of interest to use ICT4D for the benefit of the poor and marginalized community in Ethiopia.

The other challenge is our society's cultural context once it's been determined that this concept would have a large effect on ICT4D implementation as a large number of people, it's time to consider whether the target beneficiary for this initiative is afraid to use implemented ICT4D technology. No matter how good an idea is, if people are resistant to use and fearful of technology, this may be a contributing factor for the ICT4D implementation challenge and Opportunities in Ethiopia that needs to investigate.

1.4 Research Questions

While sustainability can be accomplished from the different viewpoints for ICT development projects, a recent study has shown that sustainability is not well researched concerning ICT4D implementation challenge and Opportunities in Ethiopia (Hatakka et al ,2021; Kaur ,2019). As Ethiopia is one of the developing countries and ICT projects are being funded from donors, implementation challenge should be further explored. As a result, the following question will be addressed in this research.

What are the challenges and Opportunities of implementing Information and Communication Technologies for Development (ICT4D) in Ethiopia?

1. What are the government perceptions about ICT4D implementation?
2. What are specific ICT4D implementation challenge and Opportunities in Ethiopia?
3. How to manage ICT4D implementation challenge in Ethiopia?
4. What government policy is in place to support ICT4D implementation as a country?
5. What possible opportunities are identified in relation to existing ICT4D implementation?

Existing literature mentioned that ICT4D implementation challenge and Opportunities in Ethiopia is often seen as a means to the cause of difficulty for information and communication technologies for development (ICT4D) projects. For example (Bailur, 2007) argued that it could be suitable to research ICT4D projects by taking both the viewpoint of implementation challenge theory and using the platform utilization analysis. His study also indicated that to this end, implementation challenge analysis could be used both as a benchmarked template to evaluate

what has been done to overcome these challenges on an ICT4D project. Besides, his work highlighted that the theory could also serve as a lens to understand who stakeholders are, their behaviors, and how they are managed the problem they faced. The existing literature of Nameere (2014) overcome the challenges of Sen's (1999) work and enhanced capability approach.

Accordingly, development through the use of ICT viewed as a process that comprises the provision of opportunities (capabilities) from an ICT resource, as well as exploiting the chances to understand development benefits. The conversion of resources to opportunities and opportunities to develop benefits is facilitated or inhibited by various contextual factors. Development from the capability perspective is both people-centered and multidimensional. Based on the stakeholder theory and the capability approach, the answer to these research questions contributes a theoretical proposition to the domain knowledge. Besides, the second question answer the magnitude of impact on sustainability. Thus, finally, a theoretical framework and proposition are proposed as to how to overcome the implementation challenge of ICT4D services about the role.

1.5 Objective

1.5.1 General Objectives

The main objective of the study is to examine the challenges and Opportunities of ICT4D implementation in Ethiopia.

1.5.2 Specific Objectives

There are three specific objectives that will be met in this research. These objectives have been formulated with the research problem in mind. The search objectives include:

1. To assess the government perceptions about ICT4D implementation regarding educational curriculum and policy formulation.
2. To define specific ICT4D implementation challenge and Opportunities in non-governmental organization
3. To make recommendations for ways to manage identified ICT4D implementation challenge

1.5.3 Scope of the study

The scope of this study is confined to assess the current, opportunities and challenges of ICT4D implementation in Ethiopia, the scope will be limited to Catholic Relief Service (CRS) which is the pioneer international organization implementing ICT4D in Ethiopia at large scale. Catholic Relief Service (CRS) Ethiopia based Addis Ababa, the capital city of Ethiopia and its implementing partners offices resides in different Ethiopian regions out of Addis Ababa which I believe reflect ICT4D implementation challenge in Ethiopia has been facing in Ethiopia, as a whole. And most of the organization implementing partners works in Ethiopia such as Oromia, Dire Dawa and Tigray Region, Amhara, SNNP and Somali regions, so that targeting CRS organization headquarters in Addis Ababa and sub office at different regions will have and show the reflection of ICT4D implementation challenge and Opportunities in Ethiopia this organization has been facing in different Ethiopia region.

CRS as organization fully integrated ICT4D with humanitarian and development operations implemented with all its various partner offices by using different ICT4D tools or applications to reach out beneficiaries for poverty alleviation services and responding emergency issues by humanitarian work.

Moreover, in order to address its very objectives and for the purpose of manageability, the research was held at three Oromia Zone and Nine woreda however the other Ethiopian regions and woreda CRS Operate humanitarian and development work as an organization follows and applies similar ICT4D implementation policy.

1.6 Significance of the study

This paper aim is to investigate the current situations as well as the confronting problems regarding the implementation of ICT4D and to come up with possible, attainable and relevant solutions. In general, the study will be important in the following ways. Identification of challenge can impact the implementation of ICT4D for poverty alleviation and realizing sustainable development in Ethiopia. The finding provides a framework for non-government and governmental organization for the design of their future directions, to adjust their goals, and objectives as per real opportunities and challenges. Additionally, it enables government,

development and humanitarian organizations to develop contextualized ICT4D that are designed to address the factors that will identified by this research.

Provide an opportunity for policy makers and managers of different aid organizations to consider and evaluate the opportunities and challenge observed in the existing practices, in order to take appropriate corrective measures in the area to scale-up the positive factors (if any) for involve and the implementation of ICT4D in sustainable development practice. The study serves as additional source for reference, and it will also serve as a springboard for other researchers and NGO's who want to conduct detailed research on the issue. So apart from providing a useful insight, is strongly expected to instigate other researchers to undertake a meaningful investigation by enlarging the scope of the issues.

IJSER

CHAPTER TWO

LITERATURE REVIEW

The ultimate goal of this chapter is to explain recent literature written to show IC4D implementation challenge in developing country and the way it is managed as their role is crucial for the saucerful implementation of ICT4D. This chapter starts by showing the progression of ICT4D, explain basic concepts of ICT4D project successfulness and failure, and how ICT4D implementation is integrated with success. The synthesis of this chapter continues to explore the capability approach, which is theoretical framework to see the implementation of ICT4D from humanitarian and development perspective in governmental and nongovernmental organization context.

2.1 The Progress of ICT4D

Information Communication Technologies for Development (ICT4D) is a concept that stands for "Information Communication Technologies for Development." Uwin and Tim used the terms "development," "growth," "change," and "globalization" to describe ICT4D. (2009). It is often viewed as an application for societal growth. Heaps (2016), ICT4D, on the other hand, is associated with "internet growth," according to Heeks (2006)'s previous works. ICT4D is drawn from ideas and concepts from a variety of disciplines, including sociology, economics, development research, library, computer science, and communication studies. ICT4D's historical development can be divided into three phases: ICT4D 0.0, ICT4D 1.0, IC4D 2.0 (Heeks, 2008).

Information Communication Technologies for Development (ICT4D) is a concept that stands for "Information Communication Technologies for Development." Uwin and Tim used the terms "development," "growth," "change," and "globalization" to describe ICT4D. (2009). It is often viewed as an application for societal growth. Heaps (2016), ICT4D, on the other hand, is associated with "internet growth," according to Heeks (2006)'s previous works. ICT4D is drawn from ideas and concepts from a variety of disciplines, including sociology, economics, development research, library, computer science, and communication studies. ICT4D's historical development can be divided into three phases: ICT4D 0.0, ICT4D 1.0, and ICTD 2.0. These are:

- **Sustainability:** The key reason for bringing the issue of sustainability to light was the high rate of failure of many ICT4D programs to provide services, as well as the question of survival. As a result, the core tone of ICT4D 2.0 and beyond is a recent effort aimed at ensuring the long-term viability of such an ICT4D enterprise.
- **Scalability:** To take one example from the ICT4D 1.0 tele center, few people who can reach the service site are the ones who prosper. Since individual telecentre programs have a small scope, this is the case. As a result, scaling up the program for those in need becomes the priority.
- **Evaluation:** Provided that the emergence of ICT4D 1.0 was typically based on propagandas and was not adequately supported with evidence, the actors were advocating their benefit as there was no accountability of evaluating the impact of the service beneficiaries. As a result, in ICT4D 2.0 and beyond, a new initiative for impact assessment becomes a priority. The new state of ICT4D has resulted in a paradigm change in the modern age, thanks to the use of big data. The latest evolution of ICT4D, according to Blumenstock et al. (2015) and Jane et al. (2016), is based on the use of big data for growth.

Then came AI4D (Artificial Intelligence for Development) as a result of the rapid evolution (Mann, 2021). In other words, the significance of Artificial Intelligence. Beyond sensing big data, intelligence becomes more feasible as a primary driver of creativity in the economy and society.

2.2 ICT4D Program

ICT4D programs, unlike other ICT projects, are focused on providing ICT resources and incentives to the vulnerable. As a result, the distance between the wealthy and the poor will be reduced. Such ICT programs, for example, will assist an individual in further developing, exchanging, and expanding information, as well as make processing and transactions more competitive and cost-effective, and encourage party networking. ICT4D programs also aim to close the "internet gap" in developed countries by providing access to information and services. the details available to those who need it. Furthermore, what distinguishes the ICT4D project is that project initiation is a demand-driven strategy that necessitates substantial input from stakeholders. the local community. (Dijkers et al., 2021).

2.3 Typical Nature of ICT4D programs

- The emphasis is on poverty according to the World Bank (1999), ICT4D programs aim to solve the issue of hunger, improve growth, and empower socio-economic transition.
- Designed to aid in the development of a developing country's capabilities. Many developed countries profit from the ICT4D programmed (UNDP, 2005).
- Pay special attention to the poor. According to Heeks (2008), the vulnerable are the winners of ICT4D programs, which sets them apart from other ICT projects.
- It would necessitate a significant amount of support as well as contributions from sponsors. Heeks (2008) has found out that, in addition to the conditions for foreign financing, the edition of ICT4D projects needs a significant amount of funding.
- In terms of complexity, delivery approach, analysis, and focus on effects beyond the use of ICT services, ICT4D is a modern model of architecture and academic discipline compared to conventional ICT project perspectives. Information and Communication Technology for Development (ICT4D), according to Walsham (2017), is a relatively recent term in scholarly and research circles dealing with the use of ICTs for international development.

The ICT4D project's implementation necessitates extensive interactions among numerous stakeholders. In contrast to other economies, developed countries face complex stakeholder interactions (Muranga Njihia and Merali, 2013; Kaur et al., 2019). The interest in and use of collaborations in ICT4D has grown significantly in recent years (Ismail et al., 2021; Kaur et al., 2019).

Unlike every other ICT initiative, the ICT4D project's life cycle stage focuses on the effect on individuals and society. Various literature, such as Bailure (2007), describes growth, implementation, usage, and effect as the four essential life cycle stages of ICT4D projects.

2.4 Related computing fields

The relationship between computing fields and ICT4D is first examined by looking at the relationship between Informatic Science and Computer Science. These two disciplines are included in the broad concept of computing, which includes "any goal-oriented operation that requires, benefits from, or creates computers" (ACM/IEEE 2005). In light of this, it's beneficial

to think about some of the more popular subject areas while trying to grasp the ICT4D landscape. This is not an exhaustive list of foundational disciplines, as mentioned in the introduction; however, they do correlate to some extent with the Informatics studies foundational disciplines overview of each of the relevant computing subject areas is provided. More information on the terms Community Informatics, Development Informatics, and ICT4D is now available. Group Informatics focuses on the community as a dynamic sociological phenomenon, with the term contemporary community referring to both physical and virtual communities, as well as a mix of the two. Development Informatics is based on the premise that the beneficial uses of ICT should be maximized in order to advance development and obtain local communities' and leaders' dedication to the project. Some researchers consider ICTD and ICT4D to be interchangeable, while others contend that ICTD is distinct from ICT4D.

2.5 ICT4D sustainability in Ethiopia

The idea of 'sustainable development' was the core concern on many international conference agendas at the time, and the topic of sustainability was first stressed and discussed within the environmental sphere at the conference held in Rio in 1992. Honest (Honest, 2007). Prior to addressing the demands of future generations, it is apparent that the new generation's aspirations must be properly met. ICT4D projects that ended in "unsustainability" with regards to their original goals culminated in unforeseen results, according to Ali (2007)'s extensive literature. Various aspects of sustainability contribute to the effectiveness of ICT4D programs.

As a result, the literature on ICT for growth distinguishes five forms of sustainability: economic, social, structural, technical, and, ironically, given the term's roots, perhaps the least-considered environmental sustainability. (Proenza, 2001; Delgadillo et al., 2002; Stoll and Menou, 2003; Kumar, 2005; Oyomno, 1996; Harris et al., 2003; Whyte, 1999; Baark and Heeks, 1998; Colle and Roman, 2003, Ali 2007). Is it a matter of money? Economic sustainability refers to an ICT project's potential to raise enough revenue over time to cover both operating and maintenance costs. Additionally, the revenue obtained from ICT programs should be adequate to offset the costs of damaged and redundant facilities (Proenza, 2001). Many ICT4D programs in developed countries face economic growth challenges because they are still financed by donors for a limited time (Harris et al., 2003). As a result, in order to resolve this obstacle, several funding sources must be secured in case any funders wish not to continue with the project (Tino, 2003).

Technological longevity refers to a technology's ability to deliver support and its ability to survive for a prolonged period of time. A major improvement in hardware or software should not be followed by the presence of technology. Furthermore, changes in hardware and software have little impact on the availability or reliability of the system (Misund and Hoiberg, 2003). Maintainability, organizational ease of use, stability, robustness, and the availability and capacity of both technological and managerial human restoration are also factoring to consider in technology sustainability, according to Kiggundu (1989). The most popular difficulties since the procurement and maintenance of ICT devices often involves a large capital as well as operating expenditure commitment, technological sustainability is linked to economic sustainability.

Another issue with technology's long-term viability is the more regular shift in consumer specifications. For example, Ali and Bailure (2006) asserted that if infrastructure cannot keep pace with current change, the service's long-term viability would be jeopardized. Active involvement and user interaction are needed for social sustainability. Such aspects of sustainability take into account the following issues: accommodating local traditions, taking into account differences within communities, empowering the most marginalized groups, sharing and aligning ICT project goals with local beneficiaries, and continuing to adapt changes to the needs of the local community (Gómez and Casadiego, 2002; Harris et al., 2003; Stoll and Menou, 2003; Delgadillo, 2003). The popular and potential problems of social sustainability, according to Mansell and When (1998), occur if there is a conflict of interest between the parties.

Tensions between recipient classes may cause ICT programs to fail to be sustainable. Kumar (Stoll and Menou, 2003; Madon, 2005; Kumar and Best, 2006; Harris et al., 2003; Colle, 2005; Iyer, 2005). Evidence from Kuriyan et al. (2006) and Avgerou (2000) and Best (2006) (Kumar and Best, 2006).

Mansell and Wehn (1998) have argued that the extent of social sustainability effect is difficult to quantify due to the diverse existence of social impact success metrics. The idea of social sustainability is inextricably linked to the core theme of structural sustainability. Institutional sustainability necessitates stakeholder approval and participation in ICT ventures. Kuriyan et al. (2006) found that democratic structure and political actor acceptability are the foundations of institutional suitability.

Finally, one of the elements of green IT is ironic sustainability. Consideration of environmental friendliness and reusability at the time of disposal in the nature of ICT objects, for example, is one criterion for environmental sustainability, according to Kumar and Best (2006). According to current literature, “yet, much of this literature still summarizes failed ICT ventures as having collapsed in one or more of these areas,” according to Lessa (2015). Others, including Heeks (2003), say that the majority of ICT for construction projects struggle due to a “design-reality gap.” According to Lessa's (2015) research, ICT4D issues differ depending on the fields of intervention. For example, Dzhusupova et al. (2011) described seven key challenges affecting the feasibility of one of the ICT4D project intervention areas of e-government programs.

Ownership, leadership, vision and policy, structural capability, design versus practice, capacity and understanding, and reliance on external assistance are examples of such challenges. On the other hand, the position of the e-health donor is critical for long-term sustainability in the ICT4D intervention sector (Honest et al., 2007). Other researchers (e.g., Wood-Harper and Bell, 1990; Walsham et al., 1988; Mursu et al., 2000) pointed out that most development-oriented IT programs in developed countries are funded by financing agencies, and the government expects a lot of specialist and technical assistance from donors. This creates a substantial reliance on to maintain the service's long-term viability. As a result, sustainability in developing countries is very much at stake, particularly when it comes to donor funded IS projects.

2.6 ICT4D Success

Both areas of project management, as well as literature from Baccarini (1999), suggest that when dealing with the idea of project success, there are two wings to consider: project management success and product success. In the field of project management, performance is described as meeting the project's deliverables and goals while staying within the project's constraints, which include budget, time, quality targets, and the management style used to carry out the project. Quality success, on the other hand, is concerned with how well the finished deliverable satisfies the customer's requirements.

Freeman and Beale (1992) surveyed the project management literature and established seven standard indicators for measuring project efficiency, five of which seem to be used more often than the others: technical effectiveness, product quality, management, and market impact (primarily customer satisfaction), growth of individual and industrial and business results.

Different interest groups—stockholders, administrators, clients, staff, and so on may measure project performance in different ways. (Prabhakar, 2007; Stuckenbruck, 1986).

As a result, project success evaluation criteria must take into account a variety of viewpoints. When it comes to IS project management, there are seven standard metrics of ICT project performance that have been established. The sum of each division is used to determine the progress of an ICT project.

Good project proposal collection, project definition, project schedule, management engagement & support, project team formation, change management, project capital, and partnership management are all examples of good project management. In the other hand, by combining six pillars: human influence, knowledge quality, IS use company impact, device quality, and user satisfaction, they argued for their analysis and framed a functioning and wider concept of IS Success.

2.7 ICT4D Failure

According to Heeks et al. (1999), ICT project loss can be divided into four groups. Absolute failure, partial failure, replication failure, and sustainability failure are the four types of failure. The failure of sustainability has been described as an ICT initiative "...that succeeds at first but fails in the interim.... " Such a lack of feasibility in an ICT effort cannot be sustained in the long run. The inability of ICT programs to last is a major problem for developed countries (Heeks, 2002). The most pressing problem for ICT4D projects, unlike other types of ICT project failure, is sustainability failure. Various researchers, for example, (e.g., Badsar, et al., 2011; Braa et al., 2004; Heeks, 2008; Keniston, 2003a).

The topic of ICT project sustainability in developed countries is by far the most daunting agenda item, according to Keniston, 2003b; Marais, 2011; Walsham and Sahay, 2006). As a result, it must be thoroughly investigated. More work can be put into ensuring the long-term viability of ICT4D programs. The sole reason for seeking a solution for sustainability deficiency in developed countries, according to evidence from current literature by Heeks (1999) and Heeks (2002), is that the government and financing agency have a budget limit to execute ICT4D programs. As a consequence, the ICT4D project in developed countries is highly likely to fail.

" Projects with little interest in scope recognition risk a lot of backlashes during the development phase, as stakeholders are likely to disown it since they didn't feel like they were part of the effort from the beginning" according to the World Bank (2010). (as cited in Ouma,2017). As a result, the failure of the ICT4D project can be attributed to a failure to sustain such an ICT program, as well as a disdain for the position of relevant stakeholders who are at the center of the project's profit.

2.8 ICT4D's Role

The ICT4D literature covers a broad variety of development topics; however, most research does not objectively focus on what development actually entails or how IC4DTs play a role in these processes. It has been suggested that ICT4D researchers be more precise about what they mean by "growth" in ICT4D (Andersson &Hatakka, 2013); Brown & Grant, 2010; Thapa &Sæbø, 2014; Walsham & Sahay, 2006). Early ICT4D research often “implies the imposition of a development model” (Pieterse, 2010a, p. 170) that perpetuates Western ideals and encourages globalization and economic liberalization (Avgerou, 2003). (Pieterse, 2010a).

A great deal of research has been done on the digital divide, ICT readiness and access, and how ICTs can help businesses expand (Heeks, 2009). With the adoption of the Millennium Development Goals, ICT4D research began to move toward a more holistic view of development that went beyond economic growth. In ICT4D research, the Sustainable Livelihood Paradigm and Amartya Sen's human development perspective, expressed through his Capacity Approach, have been widely used (Andersson &Hatakka, 2013; Zheng, 2015).

However, this emphasis has largely remained stagnant, reflecting a notable lack of debate on other relevant issues such as neoliberalism and its repercussions, which is arguably the world's dominant development paradigm today. ICT4D debate, like conventional development theory, tends to view development from a temporal perspective, i.e., going along linear improvement trajectories. According to Andersson (2008):

2.9 Success of ICT4D Implementation vs. Long-Term Sustainability

Despite the fact that many journalists, academics, and scholars have contributed literature on the domain awareness of ICT4D project success and failure, a new topic of ICT4D project success and sustainability has emerged as a critical issue in the domain. For example, Lessa

(2015) found that effective and sustainable ICT4D project projects such as e-government are difficult to materialize and interrelate, especially in developed countries, for a variety of reasons. Such an initiative also has limited study focus as to how long-term sustainability is attained (Furuholt & Wahid, 2008). Scholars proposed a number of techniques and strategies for ensuring the effectiveness of ICT4D programs.

ICT4D initiatives are a demand-driven solution, according to Dijikrs (2014), and their mission is to cross the digital gap in developed countries. Consumer collaboration will help projects succeed. His research showed that Agile can only function and succeed if it improves team coordination, improves interpersonal learning, and delivers applications regularly. However, ICT4D ventures have a high failure rate (Marias, 2012). Failure in ICT4D project could also mean sustainability failure (Heeks et al. ,1999, Heeks, 2002; Badsar et al. 2011; Braa et al., 2004; Heeks, 2008; Keniston, 2003a; Keniston, 2003b; Marais, 2011; Walsham and Sahay, 2006), i.e., ICT4D project loss is due to lack of feasibility in the ICT4D domain. As a result, it is clear that the completion of an ICT4D project does not guarantee absolute sustainability. Sustainability remains important, and it is at the heart of the ICT4D agenda.

Table 2. 1 List of literature evidence on ICT4D implementation challenge and Opportunities in Ethiopia

| Description of | Literature Sources |
|---|--|
| Monitoring and evaluating project progress regularly | (James, 2004; Maepa, 2003; UNDP ,2001), |
| Align with demand-driven approach. | (Maepa ,2003; UNDP ,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |
| inclusion of relevant skills must be built and trained. | Conradie ,2003; Kora ,2002; Kumar, 2003), |
| Efforts must be made to retain staff. | (TinaJames,2004; Kumar, 2003), |
| Project ownership must be given to local parties. | (Maepa ,2003; UNDP ,2001; Kora,2002). |
| Establishing economic sustainability. | (Tina James,2004; Ravishankar,2015; Tina James ,2004) |
| Local partnerships must be built to achieve synergies. | (Maepa ,2003; UNDP ,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |
| The creation of local content must be facilitated. | (James, 2004; UNDP ,2001; Conradie, 2003; Kumar, 2003). |
| Political context must be analyzed and considered. | (James, 2004; UNDP,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |
| Project must have a project champion. | (Tina Jame, 2004; Maepa ,2003; UNDP ,2001) |

| | |
|--|--|
| The right technology must be chosen. | (James ,2004; UNDP ,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |
| Cultural understanding of the local community must be developed. | (Krauss,2016; Mursu et al,2013) |
| Trust between the local community and outside parties must be built. | (Krauss,2016; Sandep et al,2015) |

Marias (2012) argued that the long-term viability of ICT for Development (ICT4D) programs is a constant concern, and proposals struggle at a high pace. Since unsustainability is a type of failure, and this means that sustainability is not the same as performance, sustainability concerns have changed from requiring external assistance via governments or funding agencies to self-sufficiency (primarily) focused on economic viability. It is, however, necessary for success (Heeks, 2005). Finally, Lessa (2015) argued that the two terms (sustainability and success) are inextricably linked and should not be separated.

A particularly popular ICT4D project necessitates the service's long-term viability (Honest, 2007; Korpela et al. 1998; Misund and Hoiberg, 2003; Pieterse,2005; Hunter et al., 2016; Ali 2007). Proenza, 2001; Delgadillo et al., 2002; Stoll and Menou, 2003; Kumar, 2005; Oyomno, 1996; Harris et al., 2003; Whyte, 1999; Baark and Heeks, 1999; Proenza, 2001; Delgadillo et al., 2002; Stoll and Menou, 2003; Kumar, 2005; Oyomno, 1996; Harris et al., 2003

2.10 ICT Using Challenges in Developing Countries

Many of the problems with ICT usage in developing countries, such as insufficient physical infrastructure, lack of electric light, mismatches between social, economic, and political assumptions, and the lack of homogeneity in information needs, have already been addressed. However, there are a few issues that should be looked into further. One such problem is the question of access costs, though it's not clear if this plays a role. According to one survey, the expense of using cybercafé computers was only a minor deterrent to their use, with most users prioritizing Internet access (when it was available) (Clark & Gomez, 2011, p. 1). This may be

linked to the work of Dutta (2009), who found that education, rather than income, was the most important factor in choosing certain locations.

However, even when funded ICTs in Ethiopia, the total cost of provision on a wide scale, rather than at the market level, will continue to be an obstacle to the provision of computing services. Many cybercafés have some form of user fees (Clark & Gomez, 2011, p. 2). As a consequence, cost is likely to be a big impediment to successful implementation. Having symbolic recognition from the population, promoting useful social interaction in related social classes, creating linkage to viable revenue sources, and enrolling government funding are examples of other barriers 5). These elements are necessary to ensure that the project can be executed properly, and they are especially essential for digital inclusion projects (or those aimed at closing the digital divide) (Madon et al, 2009, p. 96-97). However, ensuring that they are present can be challenging. This is linked to the issue of information technology diffusion, or the distribution of IT within a society, to some degree (Shih, Kraemer, & Dedrick, 2008, pp. 43-44).

2.11 The Digital Divide and Appropriate ICT

The use of ICT in developing countries is growing, and there are high expectations for its role in accelerating socioeconomic growth (Walsham et al., 2007, McNamara, 2003). Until recently, major international organizations and foreign NGOs were the only ones using ICT in Africa and other developing countries (non-governmental organizations).

For installation and maintenance (Bruggink, 2003), as well as for conducting training above the basic level of Office applications, foreign ICT experts were hired (Heeks, 1998). To undergo training, local implementers had to travel to Europe or North America.

This has been rapidly evolving in recent years (Levey & Young, 2008). The digital divide has been elevated to the international agenda (and is often related to the eight Millennium Development Goals (MDG)), and the first programs and initiatives have been developed with foreign assistance. While some progress has been made, computer penetration remains poor in comparison to Western countries (Jensen, 2002). Even now, the majority of people in LDCs have never used a computer, and most small and medium-sized enterprises are computer-free.

The need to overcome the so-called "digital divide" between those who can easily access and use information technology and those who can't is a major challenge. The difficulty remains in

addressing and resolving such issues (Walsham et al., 2007). In order to close the digital divide, information technology must be accessible to the 'everyman.'

The ultimate goal, as it is in Europe, North America, and increasingly in Asia, is for all to have access to computers and knowledge at all times (Universal Access). Digital technology must be accessible not only in big cities, not only to the elite, but also to the rural population and those with a lower level of education. Developers and implementers of ICT technologies face daunting obstacles as a result of this.

The use of information and communication technology (ICT) to bridge the digital divide is not as simple as many international development organizations say. When industry, government, and development organizations do not collaborate, further technology does not necessarily lead to development (Avgerou, 2003).

Furthermore, implementing ICT without local support and without meeting a local demand/need would not result in long-term growth. After an initial phase of euphoria, the invention would be dismissed because it adds little value. Supporting donor agencies often neglect these aspects of ICT implementation in developing countries for a variety of reasons. A theory of effective ICT seeks to resolve these concerns and promote long-term design and implementation of ICTs in general, as well as in least developed country specifically. If there is no technical support, minor technical errors can quickly lead to a complete breakdown.

2.12 ICTs in Ethiopia Context

This literature is look at the various studies that have been done on the use of ICTs in Ethiopia. While some studies have been conducted specifically in Ethiopia, this study has mainly been conducted in the sense of a multi-country analysis of its use and growth. This segment gives a summary of the research results over the last 15 years, including policy and practice-based research. Ethiopia was one of the first African countries to get a permanent real-time Internet connection (as opposed to earlier point-to-point links) (Alemna, 1999, p. 169).

In the mid-1990s, the early production of ICTs in Ethiopia appeared to be very promising, since Ethiopia (along with Egypt) had substantially higher levels of ICT skill in the population than many other African countries (Moyo, 1996, p. 118). Moyo argued that Ethiopia had a higher rate of indigenous ICT production potential than South Africa, which had a low level of ICT

development despite having a high level of human resource development. Early Internet access was still relatively inexpensive in the late 1990s, compared to other African countries (though still exceptionally so for the average person), at about 19 percent of GDP per capita; this can be compared to the highest fee, of 69.8% for Mozambique (Oshikoya& Hussain, 1998, p. 118). Investment in ICTs appears to be linked to economic growth in Ethiopia and other developing countries, according to evidence (Yoo, 2003). The usage of cell phones, higher education, and telemedicine are three fields of current concern in Ethiopian ICT research in the literature.

2.13 ICT Access Methods

A number of studies have been conducted on the implementation of different access methods that are widely used in developed countries for ICT access. First, a range of models are being designed to address a low-cost means of obtaining connectivity without the landline system that is commonly used in heavily populated and developed areas (James, 2010a, p. 372). For example, the African 'Wizzy Digital Courier' system uses physical data transportation to extend Internet connectivity between multiple locations; Drishtee, a private Indian company, uses a similar approach, and Computers on Wheels (also an Indian program) uses laptops mounted on motorcycles to share an occasional Internet link between multiple locations. The Indian system DakNet is one of the best created, incorporating short point-to-point links between locations and physical access in order to build a mobile Web (James, 2010a, p. 372). (James, 2010a, p. 372). ICTs in Ethiopia 17 There are also provisioning strategies that are not dependent on physical access or use. These so-called blending systems (James, 2010a, p. 373) have a single user at the center, who then distributes information to non-users through radio programs, phone calls, or in-person intermediation. Community institutions such as telecentres, where regional citizens can seek out information technology usage and training and sharing devices (which enable information to be exchanged between users as well as centrally from a Web resource) are other modes of ICT access (James, 2010a, pp. 374-5). computers that are not supervised. However, as James (2010a, p. 372) points out, the different forms of access used in any given location will differ significantly.

2.14 The Special Case of Mobile Phones

Because of their growing widespread proliferation in poorer parts of the world, mobile phones are a special case in expanding Internet access, even though they do not usually have the sort of

Internet access that many people in developed countries are familiar with. The usage of mobile phones can be mapped for comparison using a combination of current penetration and growth rate, allowing for consistent positioning for each country in comparison to others (James, 2010c, p. 137). Mobile phone use brings up a slew of new connectivity problems, including trends in knowledge seeking and consumer behavior. For example, in Niger, between 2001 and 2006, an increase in cell phone use resulted in a 16 percent decrease in price dispersion (the difference in prices between local markets) for commodity grain sellers (Aker, 2010, p. 46).

According to Aker (2010, p. 46), this has the net effect of reducing the extent to which current market structures exploit farmers (particularly those in rural or remote areas who may not have access to multiple market data). Mobile phone use is especially common in Africa. According to 2009 report by the International Telecommunication Union (ITU), 60 percent of Africa has cell phone coverage, with average subscription growth of 49 percent from 2002 to 2007. (Aker & Mbiti, 2010, p. 1).

This is significantly higher than the growth rates seen in more developed regions like Europe. In 2008, Africa had 376 million cell phone subscribers, and with such a high rate of growth, this number is only expected to rise (Aker & Mbiti, 2010, p. 5). Businesses are responsible for a large portion of the first wave of cell phone adoption, and the first personal adopters were likely to be male, skilled, young, affluent, and urban populations (Aker & Mbiti, 2010, p.). Widening information access, enhancing firm productivity, creating new employment due to demand for services, growing connectivity links, and opening up growth opportunities are all advantages of cell phone adoption in Africa (Aker & Mbiti, 2010, p. 8). Ethiopia's own growth rate is a bit of a mystery.

While James (2010c, p. 138) did not specifically rank Ethiopia in his study of penetration and growth rates, the current penetration rate of mobile phones is approximately 7.7%, according to existing figures provided. This places Ethiopia in the Low-High category (low penetration but high growth), which James (2010c, p. 142) states is common among African countries, with Chad, Burkina Faso, and Yemen all falling into this category.

2.15 Government Policy

Governments must provide a comprehensive policy framework for the acquisition and application of ICT for social and economic development. Because of bad policies and insufficient investments in the IT industry, developing nations have lagged behind established economies in terms of ICT infrastructure development (Laryea, 1999). The majority of developing nations have inadequate information technology policies, which has hampered the growth and use of IT. Although the governments of these nations recognize the value and relevance of information technology, little real action has been made in this field (Enakrire & Onyenania, 2007). Developed nations have made significant investments in IT infrastructure creation and upkeep, whereas poorer countries have done little.

The majority of developing countries lack the financial resources to develop information technology in their own country. Rather, to assure the growth of Information Technology, they rely heavily on foreign aid. Developed countries have likewise done little to help developing countries build their information technology infrastructure (Laryea, 1999). According to Nwaka (2005), financing from developed nations has been unproductive because it attempts to discover local issues that fit pre-packaged assumptions and answers while ignoring local knowledge in the problem-solving process. According to Akubue (2002), many emerging nations import technology and breakthroughs.

In 1996, the African Information Society Initiative (AISII) set a goal of establishing an African Information Infrastructure by gaining access to a global information infrastructure for development purposes while also developing their own national information and communication infrastructures. This has had only sporadic success. Nigeria's Information Technology Development Agency (NITDA) created a national IT policy with the goal of making Nigeria a major participant in information and computer technology by 2005. Developing IT infrastructure, integrating IT into the mainstream of education and training, and equipping Nigerians with competent IT skills are some of the policy's goals. These goals have not been fully realized. Aniebonam (2005), emphasizing the significance of effective national policy and appropriate IT training, advocated for a Nigerian Civil Service Enhancement, with a focus on IT capability, to boost productivity and make Nigeria more digitally competitive.

2.16 Infrastructure

Computers, software, and other components of telecommunication systems that are required for effective data transport and administration make up information technology infrastructure (Enakrire & Onyenania, 2007). It also comprises IT professionals who design, implement, manage, and repair systems, as well as experienced IT workers who can properly run the system (Laryea, 1999). The lack of basic information technology infrastructure is the primary reason of information technology development stagnation in Africa and other developing nations (Omekwu, 2003).

In poor nations, the necessary infrastructure and networks to allow IT transfer, implementation, and development are missing. This has made inexpensive telecommunications, computers, and Internet difficult to come by (NEPAD, 2003). Any country's basic national IT infrastructure, which is available to the public and connected to the rest of the world, is critical, and it should be properly incorporated into the country's socioeconomic and business life.

Many poor countries still lack access to IT resources, including hardware and software. Inadequate communications infrastructure, according to Omekwu (2003), is a key barrier to IT adoption in underdeveloped nations. There are only a few telephone lines in certain underdeveloped nations. These are only available in major cities and are unreliable. Depending on the level of development, these telecommunication issues differ from one country to the next. Despite recent substantial development, Nigeria still has one of the lowest tele densities in Sub-Saharan Africa (Akpan-Obong, 2007). While Africa's population is projected to be 1,073,380,925, data on Internet usage and population reveals that as of June 2012, the continent's internet usage was 167,335,676. With a user rate of 7%, this equates to 15.6 percent penetration (Internetworldstats, 2012).

2.17 Training and Qualification

Developing nations require well qualified IT people who can design, produce, install, administer, and manage information technology in an ever-changing field. The lack of competent and internationally recognized IT employees in this region is limiting IT adoption and growth. The development of some professional and technical skills by a few specialists in developing nations, as well as the migration of advanced technological equipment from rich

countries to developing ones, are not included in technology transfer. Technology transfer happens when the target country has the requisite technical information to run the hardware successfully and efficiently, according to Udo and Edoho (2000).

As a consequence, effective communication and exchanges with transferring agents would be considerably easier. Moving equipment is straightforward; but, transferring human-embodied capability is more difficult. Human skills are required for both, and development skills should be matched to development goals. Despite a growing awareness of the importance of information technology for development, developing countries lack sufficient science and technology graduates and technicians. Despite the Internet's global reach, universities and polytechnic institutions have limited access to it and modern technology (Mutula, 2003).

2.18 The Digital Divide

The usage of ICT in developing nations is growing, and there are great hopes for its role in speeding socioeconomic growth (Walsham et al., 2007, McNamara, 2003). Until recently, major multinational organizations and foreign NGOs were the only ones using ICT in Africa and other poor nations (non-governmental organizations). Foreign ICT professionals were engaged for installation and maintenance (Bruggink, 2003), as well as for giving training above the basic level of Office programs (Heeks, 1998). To obtain training, local implementers have to go to Europe or North America. This has been quickly evolving during the last several years (Levey & Young, 2002).

The digital divide has been elevated to the international agenda (and is frequently related to the eight Millennium Development Goals (MDG)), and the first initiatives and projects have been established with foreign assistance. Although significant progress has been made, computer penetration remains low in contrast to Western countries (Jensen, 2002). Even now, the majority of individuals in LDCs have never used a computer, and most small and medium-sized companies are computer-free. The need to bridge the so-called "digital gap" between those who can successfully access and use information technology and those who can't is a big problem.

The problem of addressing and resolving such issues persists (Walsham et al., 2007). In order to close the digital divide, information technology must be accessible to the 'everyman.' The ultimate objective, as it is in Europe, North America, and increasingly in Asia, is for everyone

to have access to computers and information at all times (Universal Access). Information technology must be offered not just in major cities, not only to the wealthy, but also to the rural population and those with a lesser level of education. Developers and implementers of ICT solutions face tremendous hurdles as a result of this. The use of information and communication technology (ICT) to bridge the digital divide is not as simple as many international development groups suggest. When industry, government, and development groups do not collaborate, more technology does not necessarily lead to development (Avgerou, 2003).

Furthermore, using ICT without local support and without meeting a local demand/need would not result in long-term growth. After an early moment of excitement, the technology will be discarded because it adds no value. When there is no technical assistance, minor technological issues might rapidly lead to a total breakdown. Supporting donor agencies frequently neglect these issues of ICT deployment in underdeveloped nations for a variety of reasons. A theory of suitable ICT seeks to address these challenges and promote long-term design and deployment of ICTs in general, as well as in LDCs specifically.

2.19 ICT4D Implementation Theoretical framework

This framework is presented against the backdrop of a retrospective look at how the focus of ICT4D research has shifted over time, from a 'readiness' phase focusing on infrastructure and from the digital divide to the phases of "availability" and "uptake," to the most recent "impact" phase, which focuses on results and development contributions (Heeks, 2010). The framework depicts a successful ICT4D project execution as the result of a set of criteria and inputs divided into three categories:

1. **Design:** engagement of local users, suitable technology mix to meet local circumstances, connection with local development goals, and consideration of project risks
2. **Governance** and actors: multi-stakeholder partnerships and an open and competitive environment
3. **Long-term financial and social viability**, local capacity building and institutional usage, and local ownership (Heeks, 2010, p. 636).

Heeks (2010) also advocates for more theory-based evidence on the influence of ICTs on development: "too little is understood about the real contribution that ICTs are making as a

result of present investments, either through macro-level study or the aggregation of micro-level research.”

2.20 Multidimensional Poverty Indicators

Earlier in the article, we discussed Alkire and Foster's (2009) Multidimensional Poverty Indicator (MPI). They remind out that the MPI is a non-profit organization "Diverse dimensions and indicators may be picked based on the objective at hand, making it extremely flexible to different circumstance and objective. It is "very flexible to different circumstances and determinations in that different dimensions and indicators can be selected depending on the condition at hand" and it is "very adaptable to different contexts and purposes in that different dimensions and indicators can be selected depending on the purpose at hand." "Different dimensions and indicators can be chosen depending on the purpose, making it highly adaptable to various contexts and purposes. at hand" and that it's "highly flexible to diverse contexts and purposes in that different dimensions and indicators can be picked depending on the purpose at hand" and "extremely applicable to different contexts and use in that different dimension. This implies that poverty indicators related to information, communication, and knowledge, as well as the specific context of implementation and the evaluation's focus, might be chosen for an ICT4D project or set of projects (Alkire and Foster, 2009; Urquhart et al, 2008; Kivunike et al, 2009).

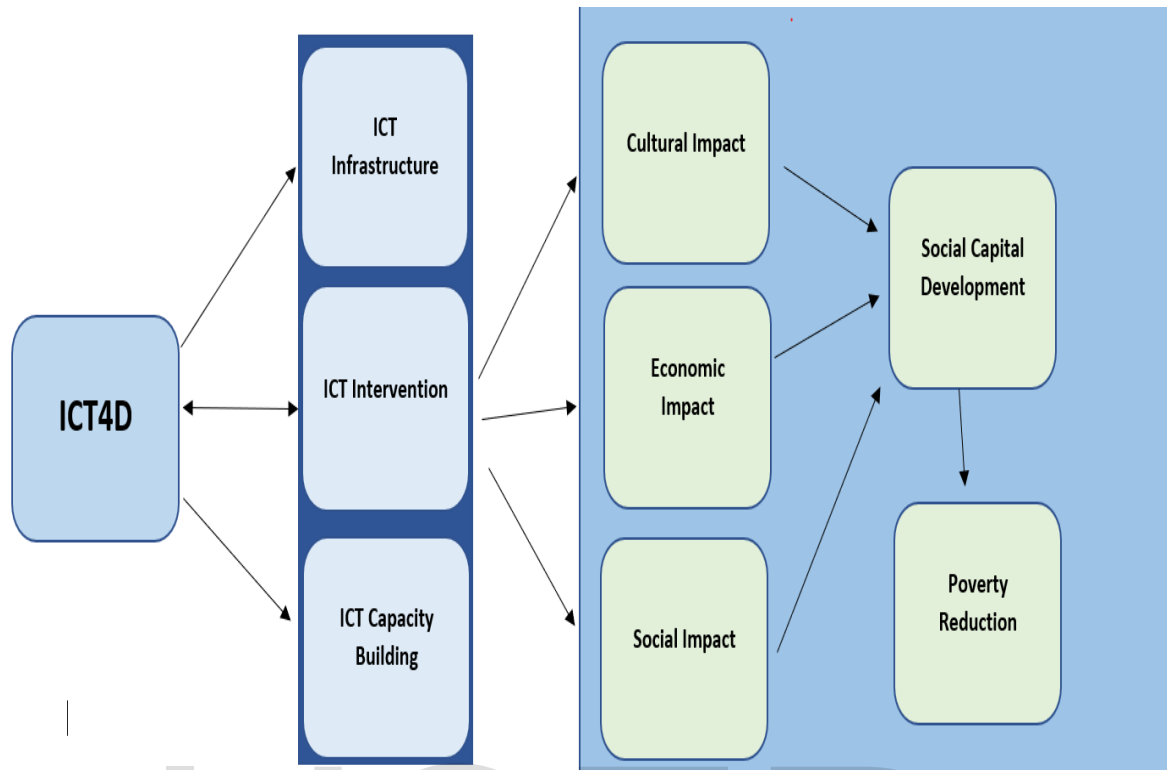
Furthermore, we mentioned Urquhart et al. (2008)'s methodology for ICT evaluation, which included a set of holistic poverty metrics. These include concerns about information access, social networks, and knowledge creation, as well as their impact on education, health, and other services, as well as income. The authors explain how they want to develop policies based on the concept that some poverty is caused by a lack of access to information and knowledge, as well as other resources such as social networks. The metrics were created particularly for use with the [framework for ICT intervention and assessment] and so presuppose the implementation of an ICT network. We previously discussed how Kivunike et al. (2009) utilized the capacity approach (Sen 1982) and the multidimensional freedoms that underpin it (Sen, 1999) as the foundation for analyzing the potential impact of ICT on the quality of life of people in rural areas in Uganda. The researchers assessed the beneficial impact of ICTs on quality of life using multidimensional

variables they had developed, mostly linked to information, communication, and knowledge and their direct influence on the day-to-day lives of individuals in the communities.

Given the criticism leveled at the UNDP poverty indices for focusing solely on human deficiencies (Schimmel, 2009), Kivunike et al (2009) might be credited for successfully demonstrating the opposite approach. Urquhart et al. (2008) and (Kivunike et al., 2009) illustrate the inherent need for multidimensional indicators to more effectively evaluate the impact of ICT4D initiatives on poverty alleviation, whereas Alkire and Foster (2009) present a general (and useful) framework for evaluating the impact of ICT4D projects on poverty reduction. (and more theoretically robust) template that can be used to create such multidimensional poverty indicators driven by the desired evaluation criteria.

2.21 A comprehensive framework for sustainable technology to alleviate poverty

‘The aforementioned "border objects" (Mollinga, 2010) all provide useful views and instruments for guiding and evaluating the development and assessment of ICT4D targeted at poverty alleviation. Each, however, just targets a portion of the ICT4D for poverty initiative. We believe that combining the frameworks and participatory procedures we've discussed into a complete framework that may serve as a development and assessment "toolkit" for ICT4D initiatives to relieve poverty would yield significant benefits. Communities, organizations, and agencies participating in ICT4D, as well as scholars and policymakers, could benefit from this. The following figure depicts our complete framework.



Source Capability approach perspective (Zheng, 2009)

Figure 2. 1 Comprehensive theoretical framework for sustainable technology-supported participatory development to alleviate poverty

This theoretical framework shows a 'bird's eye' perspective of the key stages and components of a multidisciplinary ICT4D development and assessment process for poverty alleviation. This can help all stakeholders in an ICT4D implementation project to have a shared knowledge of the process, academics to conceptualize their research emphasis and questions, and policymakers to fill policy gaps. The framework's sub-components provide real methodologies and instruments for the creation and assessment of ICT4D implementation that aim to alleviate poverty the country like Ethiopia. The framework's foundation in the human-centered capability approach to poverty alleviation, as well as good practice and sustainability guidelines for ICT4D implementation projects derived from lessons learned in development and humanitarian projects over many years and in various contexts, provide solid guidance for maximizing the likelihood that ICT4D-related projects will be effective in alleviating poverty.

CHAPTER THREE

RESEARCH METHODOLOGY

This section explains the methods used in the rationale of the study design, questionnaire design, sampling procedure, data collection, management, and review approach. The purpose behind this research was to ascertain the opportunity and challenge of using ICT4D implementation in the poverty alleviation of developing countries, like Ethiopia. For research surveys to be effective, they need to be correctly targeted at individuals or organizations levels that can provide the information we need to explain the phenomena.

3.1 Research Design

A research design is described as "a collection of advance decisions that makes up the master plan outlining techniques and processes for obtaining and reviewing the essential data," which is a function of the study goals." (Burns & Bush, 2002, p.120). The quality of data, the data collection process, the sampling methods, and the budget are all determined by the study design (Hair et. al., 2003). In an attempt to assess ICT4D implementation practices, opportunities and challenges of ICT4D implementation in Ethiopia, the researcher used descriptive type of research design. Descriptive analysis is a method of study that focuses on explaining the essence or state of the current situation in as much detail as possible. The descriptive method of analysis is used to collect knowledge about the current or historical situation, according to Creswell (1994).

3.2 Sampling technique and size determination

The sample sizes of 110 were chosen from the population size 150; as I try to engage people from different parts of the sample office location and organization such as from CRS and IP implementing partner head and woreda and sub-office staff. Technique analysis discussed in the methodology part of this study, data were collected by using different techniques such as questionnaire, observational during the field visit, key-informant interview, and analysis by using by different triangulation methods. A total of 110 questionnaires will be distributed to CRS head office staff, partner office staff, implementing partner 9 woreda sub-office staff. To analyze the research results, The Statistical Package for the Social Sciences (SPSS) program is used to analyze the research findings. The sample size is determined by the concept of selecting a

sample that scientifically represents the wider population. As we attempted to elicit as many different responses as possible. The sample size would be chosen to engage people from different geographical locations as parts of the sample location. Main target people essentially from the CRS(Catholic Relief Service) head office, implementing partner head (MCS) Meki Catholic Secretariat, and woreda sub- office using ICT4D platforms at that particular time.

The level of implementing ICT4D varies a great deal among organizations staffs mainly due to the working nature of these organizations the size of the organization, the capacity of the fund, different poverty alleviation sectors, motivation, mode of organization, location, knowledge base and the like (Taylor and Murphy 2004, p. 281). ICT4D stands in different levels of organization“ implementing based on the technical capacity, IT infrastructure, financial or human capital on top of the preceding factors and the end-users“ extent of ICT4D implementation. The method of choosing a suitable part of the population to generalize the results is referred to as sample size. The aims of using the sampling method according to adequately manipulate the large number and reduce the time and cost of producing the questionnaire to the entire population. This study used Yaro Yamane's (1969) formula for estimating sample size, which was quoted by Obasi and Ekwueme (2011).

Where n = sample size N = population 1 = constant e = error estimate (0.05%) at 95% confidence interval. The sampling process involves the drawing of individuals or entities in a population about the phenomena of ICT4D implementation challenge and Opportunities in Ethiopia from the sample of the population or entity. The most critical element of sampling is choosing the sample frame in such a way that it is representative of the population and entity from which it is drawn. Sampling is used usually where the population of interest to the researcher is too large or where the researcher has limited time, finance, or human resources to be able to investigate every element within the selected population or entity.

3.3 Data type and source

In order to conduct this research basically primary data collection from CRS (Catholic Relief Service) head quarter, MCS head office and 9 woreda sub office n“ involved in general ICT4D implementation for routine day to day activities. In addition, secondary data used in support of primary data mainly reviewing ICT4D government policy and educational curriculum secondary as well. The questionnaires were used to gain general picture of ICT4D

implementation experience, opportunities and challenges. In order to gather relevant information with respect ICT4D implementation opportunities and challenges in Ethiopia, the questionnaires will be distributed to CRS and MCS organization higher officials and other staff, ICT4D, technical advisor, MEAL staff, and top-level management of respective organizations which are included in the sample.

To achieve the aim of this research, 32 quantitative and two qualitative questions will be designed and administered to the employee of CRS and MCS. The first part of questionnaire is used to collect demographic data such as gender, age, level of education and experience. The second part of the questionnaire was designed with the purpose of collecting data about ICT4D implementation experience, opportunities and challenges of in Ethiopia and national level imp. In order to ensure the comprehensiveness of data, these questionnaires will consist of open ended and close ended statements. Closed questions obtain responses by selecting from a given set of options such as yes or no, I don't know, or by checking preferred answers.

For example, government departments undertake surveys and publish official statistics covering social, demographic and economic topics. Initial or primary data can be accessed and collected in a number of ways, according to Collis and Hussey (2003). These may include observation, interviews and questionnaires, conversation and discourse relative to a specific research study. For example, through questions requiring particular responses, such as opinions and attitudes, or observed behaviors", question should be answered by chosen sample staff.

3.4 Data collection technique

Questionnaires are prepared in, google form and survey monkey data collection tools, the questions have spaces for respondents to fill up in order to answer the questions. Statistics software and also used descriptive analysis and simple relative percentages to get an accurate interpretation of the responses; this is because of the peculiar nature of the questions. Our aim is to get a wide opinion of (CRS) Catholic Relief Service organization staffs views in order to be able to get as many and varied opinions as possible thus our choice of CRS partner staff mainly (MCS) Meki Catholic Secretariat office which contains more than 150 staff. The questionnaires were created after careful reading of a variety of literature. To make easy the interpretation, the following values are assigned to each scale, which was used to interpret the

total responses of all the respondents for the survey question by computing the yes = 1 No = 2 and don't know.

3.5 Data analyzing technique

The data were collected from the respondents and cleaned, coded and then entered into SPSS computer software. The data were then analyzed, organized, tabulated and described quantitatively, using frequency and percentage. The data are presented in the form of text, tables and figures. The qualitative data will be coded according to the various themes and analyzed to produce text reports. The questionnaire was designed, and it will be distributed. An analysis of the interview data and observation issues will identify the main issues. These will compare the issues discussed in the literature review. These issues will investigate and explore the researcher and designed the questionnaire. Considering the peculiarity of this research work, the questions carefully selected and designed to feel the pulse of the organization that really implements ICT4D platforms that indicated opportunity and present trend, examined ICT4D implementation challenge and Opportunities in Ethiopia found out in Ethiopia.

In other to avoid complexities and ensure thoroughness in this research work, I decided to design the questionnaire and analyzed data of CRS and its which allowed us to know the organization ICT4D platform implement challenge more; organization staffs which gave me which particular uses ICT4D plat-forms for his particular job more frequently, why?, and the relationship that exists among these organizations due to using ICT4D platform, education qualification, experienced and non-experienced on the study subject, and also ICT4D system developer or owners are also considered, grouping data this way, able to have a clearer view of about ICT4D implementation for poverty alleviation in Ethiopia Quantitative and qualitative analysis with mixed research method were performed. Quantitative data using SPSS soft were analyzed. Rationality of the data were achieved using triangulation methods by comparing woreda frontline workers, MCS woreda office coordinator, CRS staffs and CRS project higher officials and ICT4D senior officers and technical advisor experts' perspective and researcher observation. Finally, conclusion was made based on the result of the analysis.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Data Presentation

This chapter deals with the presentation and analysis of the data collected from sample staff of respondents: CRS Catholic Relief Service staff, implementing partner office staffs(MCS Meki Catholic Secretariat staff, partner woreda office coordinators and staffs . The data from these groups were collected through questionnaires, interview, observation of ICT4D infrastructure. All the data gathered through observation, key interview, and questionnaires developed by google form were organized and analyzed in tabular form and interpreted using percentage and frequency. The qualitative data gathered through open-ended questions, interviews, and observation were narrated and interpreted to support the quantitative information.

CRS (Catholic Relief Service) has different projects which perform their humanitarian activities through implementing partner. Among the project DFSA, LRO and JEOP projects are support the implementation of many projects in MCS operational areas which consists of up to 890 staffs in three Oromia zones, nine woredas and funded by USAID. LRO (Livelihood Resilience Oromia) supports the implementation of projects in all the nine woredas while DFSA (Development Food Security Agency) and JEOP (Joint Emergency Operation program) projects support in some of them. As the result of the implementation of the projects data are generated and collected by sub-offices located in these woredas. These projects want to have access routine day to day project implementation data associated with them. In order, to access to the data these projects have been implement ICT4D in all their operation area.

ICT4D tools such as laptops, desktops, tablets, smartphones, etc. and the internet play important roles in collecting and speeding up data collection and transfer. Power backup devices such as generator, inverter/chargers and UPSs also play, equally, important roles by minimizing the interruptions between computers and the main power supply and support in making the data entry and transfer process smoother. The implementation of ICT4D for data quality infrastructures has huge importance to achieve high data quality which in turn enables the programs to make informed decisions.

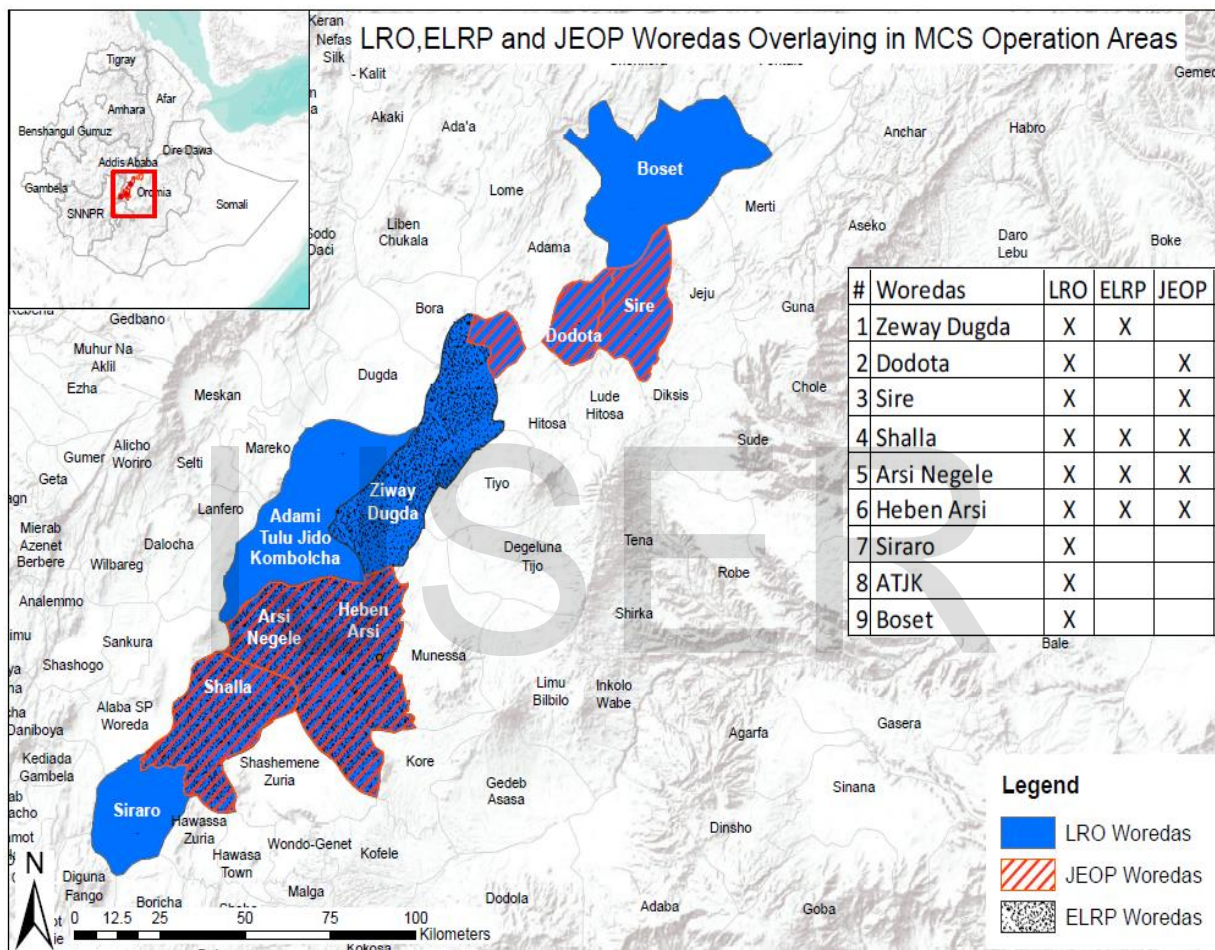
Cognizant to the importance of ensuring data quality in the electronic data collection and submission through ICT4D system, the researcher carried out observational assessment to meet. The researcher conducted observational assessment of the way partner implemented CT4D system and ICT4D materials at sub-office level. The researcher was made data collection by key informant interview with implementing partner sub office coordinator

The researcher started to identify exhaustive list of information that needs to observe and collected to fulfill the successful implementation of ICT4D. After identifying the ICT4D systems and tools observed, the researcher developed open ended questionnaire to ask the woreda coordinators. The questionnaire had been sent and reviewed by research advisor before the assessment was conducted.

This analysis summarizes the observations of the researcher during the field visit to the woredas listed below, major findings, severity of conditions, priorities, interventions required, key informants, etc. The first part of this chapter focuses on the characteristics of respondents from sample implementing partner front line sub office-woredas and CRS head office while the second part deals with the analysis of the data corresponding to the basic research questions. Analysis and interpretation of the data were made based on the responses obtained from responses and the data obtained from observational.

4.2 Geographic Coverage of the research

The geographic coverage of the assessment extends from Boset woreda of East Shoa to Siraro of West Arsi. The woredas included in the assessment are: Boset, Sire, Dodota, Ziway Dugda, Adami Tulu Jido Kombolcha (ATJK), Heben Arsi, Negele Arsi, Shalla and Siraro. The geographic coverage is shown in the picture given below.



Source (CRS Ethiopia ICT4D team ArcGis electronic map)

Figure 4. 1 Geographic Coverage of the research

4.3 Process and Methods of Observation data collection

The ICT/ICT4D implementation assessment for MCS operational areas of nine woredas:-

1. Primarily the researcher discussed with front line woreda coordinators as a key informant.
2. Observe ICT4D system and resource at woreda level

4.4 Field Visit Scheduled while doing

The researcher visited the sub-office of the nine woredas of MCS while he went for other organization task according to the following schedule.

- Monday, May 13, 2021 – Sire and Dodota
- Tuesday, May 14, 2021 – Boset
- Wednesday, May 15, 2021 – Ziway Dugda and ATJK
- Thursday, May 16, 2021 – Heben Arsi, Negele Arsi and Shalla
- Friday, May 17, 2021 – Siraro

During the field visit the researcher discuss with the key informant person which is the MCS woreda sub-office coordinator mainly what kind of ICT4D implementation challenge and Opportunities IN ETHIOPIA they have been faced for the last five years since they have started to implement ICT4D for their entire project and how they did they overcome to the challenge they faced?

All those key informants interviewed primarily raised the main challenges they faced unable to get ICT4D skilled manpower. The staff MCS head quarter hired to them ninety percent of them didn't have ICT4D knowledge which is highly required for ICT4D system integrated with their project. To overcome this problem, they have been collaboratively working with CRS headquarter. In consultation with CRS, they have prepared short-term training that has been conducted by CRS ICT4D technical advisors or other ICT4D senior project officers. They have filled the skill gaps they confronted by preparing short-term and refresher training.

The other issue they mentioned as an ICT4D implementation challenge and Opportunities in Ethiopia is the internet problem. Even though they got broadband internet service from ethio telecom due to poor telecom infrastructure they have been stacked when they want to sync data with the CRS ICT4D system. As a solution the action they took to overcoming this ICT4D implementation problem was, they have used a 3G dongle instead of using the broadband connection for routine project implementation progress monitoring data synchronization for three or fewer devices.

4.5 Characteristics of Respondents

Description of the characteristics of respondents gives some highlights about the sample population. The following sections deals with demographic characteristics of sample CRS staffs, MCS staffs. The major characteristics of sample CRS and MCS staffs include sex, chronological age, years of working experience, position in the organization, closeness to ICT4D department by office

4.5.1 Characteristics of respondents of CRS and MCS staffs

Table 4. 1 Characteristics of respondents, CRS and implementing partner MCS

| SN | Level | Alternative | Frequency | Percent |
|----|---------------------------|--------------|-----------|---------|
| 1 | Sex | Male | 54 | 43.8% |
| | | Female | 42 | 56.3% |
| | | Total | 96 | 100% |
| 2 | Age | 18-25 | 7 | 7.3% |
| | | 26-30 | 19 | 19.8% |
| | | 31-35 | 35 | 36.5% |
| | | 36-40 | 23 | 28.1% |
| | | >40 | 8 | 8.3% |
| 3 | Educational qualification | Certificate | 2 | 2.1% |
| | | Diploma | | |
| | | Degree | 72 | 75% |
| | | MSc/MA | 22 | 22.9% |
| | | Total | 96 | 100% |
| | | Below 1 year | 3 | 3.1% |

| | | | | |
|---|------------------------------|------------------------|----|-------|
| 4 | Year of working experience | 2-5 year | 46 | 47.9% |
| | | 6-10 year | 35 | 39.6% |
| | | 11+ Year | 9 | 9.4% |
| 5 | Position in the organization | CoP, DCoP | 3 | 3.1% |
| | | Data Management | 6 | 6.3% |
| | | Project Officer | 13 | 13.5% |
| | | Technical Advisor | 8 | 8.3% |
| | | Senior Project Officer | 12 | 13.5% |
| | | MEAL Expert | 4 | 4.2% |
| | | Project Assistant | 6 | 6.3% |
| | | Mid-level Management | 14 | 14.6% |
| | | Senior Management | 10 | 10.4% |
| | | IT Expert | 6 | 6.3% |
| | | Project Manager | 12 | 12.5% |
| | | Other | 1 | 1% |
| 6 | Employment status | # of Employee | 96 | 100% |
| | | # of not employee | 0 | 0 |

Source: Own Survey result (2021) SPSS Output

The above table shows that the CRS(Catholic Relief Service) and implementing partner head office MCS(Maki Catholic Secretariat) and front line sub-office staff response frequency. Accordingly, the organization's higher officials eg CoP or DCoP, and other staff respondents show 54 (43.8%) male and 21(13.5%) female. In comparison to females, males made up the majority of the responders. This implies that the ICT4D implementation-related job positions were dominated by males in which females were underrepresented in CRS and MCS staff leadership positions in the area under investigation. But from the ICT4D implementation perspective, different studies (Key, 2006, Wozeny et al, 2006, cited in Abraham, 2016) reported that male staffs used more ICT4D in different humanitarian and development jobs than their female counterparts. Thus, the greater number of males in the sample does not influence the validity, reliability, and trustworthiness of the data.

The data revealed that the participation of females in development and humanitarian job position in the different non-governmental organizations of the area of the study was low. On the other hand, the table above clearly shows that out of 96 CRS and MCS staffs 7(7.3%) of them were in age group 18-25years, 19(19.8%) of staff were in the age group 26-30 years, 35(36.5%) of staffs were in age group 31-35years, and 23 (28.1%) of staffs were in the age group 36-40 years. The remaining 8(8.3) % sample staffs consist of above 40 years respectively.

Concerning educational qualification and working experience of the CRS and MCS organization staffs are important to ICT4D implementation at full potential. According to table 4.1a above, the organization worker respondent qualification consisted of 72(75%) have BSC/BA of sample 9 implementing partner woreda sub-office and CRS staffs have a first degree and above 22(22.9%) have MA / MSC or above. The data indicate that majority of the two organizations' sample staff were first-degree holders. Hence, from these data, one can conclude that in recent years the minimum requirement to be a nongovernmental organization employee is first degree almost satisfied in sample woredas and the two head offices. This could contribute significantly to success in the implementation of ICT4D at implementing partner woreda sub-office level. From this, one can conclude that the respondents were well qualified and experienced in working with the nongovernmental organization for a number of years which help them to understand the whole questions concerning ICT4D implementation in development and humanitarian work context.

Table 4. 2 Characteristics of staff position ICT4D experts in CRS and MCS office

| | Characteristics | CoP and Dupty chief of parties | ICT4D technical advisor | Senior Management | Middle level management | Program Manager |
|---|-----------------|--------------------------------|-------------------------|-------------------|-------------------------|-----------------|
| 1 | Gender | | | | | |
| | Male | 2 | 3 | 5 | 7 | 7 |
| | Female | 1 | 5 | 5 | 7 | 5 |
| | Total | 3 | 8 | 10 | 14 | 12 |
| 2 | Experience | | | | | |
| | 11+ Years | 1 | 1 | 3 | | 4 |
| | 6-10 Years | | 3 | 6 | 6 | 4 |
| | 1-5 Years | 2 | 3 | 1 | 8 | 4 |
| | <1 Year | | 1 | | | |
| 3 | Qualification | | | | | |
| | BA/BSc | 1 | 3 | 7 | 14 | 9 |
| | MA/Msc | 2 | 5 | 3 | 0 | 2 |

| | | | | | | |
|--|-------|---|---|----|----|----|
| | Total | 3 | 8 | 10 | 14 | 11 |
|--|-------|---|---|----|----|----|

Source: *Own Survey result (2021)*

The table clearly shows sample respondents of CRS (Catholic Relief Service) and MCS Meki Catholic Secretariat head office leadership consisted of 2(18.2%) male and 1(9.1%) female. From middle level manager those who are responsible to coordinate woreda level implementing partner sub-office were 7 male and 7 females in this response the sample offices are 9, but 5 Other woreda level project coordinator participated on this survey. Based on the above table at CRS level the primary focal person directly work ICT4D jobs are 5(45%) male and 3(27%) females. The table also reveals that 5 (62.5%) of ICT4D technical advisors have MA/Msc while 3(37.5%) have first degree. In working experience nearly 4(36.4%) of program managers who are using ICT4D for their routine program actives they do have 11+ years while the rest 8(36.3%) of them have 6-10 Years and 1-5 Years.

The data revealed that the participation of females in IC4D jobs related leadership and expertise in CRS (Catholic Relief Service) as well as implementing partner office level of the study was near to equal. Qualification and working experience of ICT4D technical advisors are important to implement ICt4D program and create favorable condition at partner office woreda level implementation.

4.6 Data Analysis

The status of ICT4D application on humanitarian and development job, perception and challenges for implementation among CRS chief of parties, implementing partner higher organization officials, ICT4D technical advisors were considered to be the basis ICT4D implementation challenge and Opportunities in Ethiopia in the sample donor origination and implementing partner in woreda offices. In order to determine the level of ICT4D application to bridge the digital gaps among marginalized population, perception and challenges ICT4D implementation challenge and Opportunities in Ethiopia in Ethiopic, arithmetic means, standard deviations, rank, frequencies, and percentages, p-value (type I error value) and t-value were calculated to measure the level of significance. The researcher used qualitative description regarding ICT4D infrastructure, practice, perception, educational plasma contents and challenges in ICT4D implementation for donor and implementer organizations, chief of parties,

organization higher officials and ICT4D technical advisors. Organization decision makers and other staffs' responses on ICT4D infrastructure, equipment and implementation challenge.

It was tried to collect data on ICT4D skilled manpower, ICT4D government policy, using ICT4D for the execution different project activities, reason for ICT4D failed developing country like Ethiopia. the availability of telecom infrastructure, and Internet connectivity in sample implementing partner office. The following table shows the response.

4.6.1 Perception and engagement in ICT4D implementation

Table 4. 3 Perception and engagement in ICT4D implementation among donor and implementing partner staff

| S.No | Activities | Yes | No |
|------|--|-------|-------|
| 4 | Does your organization have an IT program department? | 91 | 4 |
| | | 94.8% | 4.2% |
| 5 | Do you have awareness and knowledge about ICT4D? | 94 | 2 |
| | | 97.9% | 2.1% |
| 6 | Have you ever been done ICT4D or a related job before? | 77 | 19 |
| | | 80.2% | 19.8% |
| 7 | Does your organization is using ICT4D? | 93 | 2 |
| | | 97.3% | 2.1% |
| 8 | Do you use ICT4D for different project activities execution? | 89 | 6 |
| | | 92.7% | 6.3% |
| 9 | While you were at College or University, have you received ICT4D related course? | 36 | 58 |
| | | 37.5 | 60.4 |

Table 4 above shows the responses on availability of IT department at organization level, ICT4D skill or knowledge, ICT4D experience, ICT4D usage at organizational level and usage of ICT4D for project execution. Response on Question 4 about having an IT program department at organizational level 91(94.8%) were “yes” and 4(4.2%) were “No”. Hence, from these data one can conclude that there is IT department at organization level for CRS (Catholic Relief Service) and MCS (Meki Catholic Secretariat) side there is no problem for related IT department for ICT4D implementation. Next, the response for having awareness and knowledge about ICT4D 94(97.9%) responded “Yes” and 2(2.1%) responded “No”. Here there is no problem on about ICT4D awareness and skill among CRS and partner MCS staff.

Concerning the use of ICT4D for different project activities execution, respondents 89(92.7%) said “Yes” and 6 (6.3%) said “No”. This response implies both donor organization and implementing partner organization use ICT4D for their humanitarian and development program implementation. On the other hand, for the question related to ICT4D experience, have you ever been done ICT4D or a related job before responded 77(80.2%) “Yes” and 19(19.8%) “No”. This shows that most respondents have done ICT4D job in different organization but 19.8% of respondents didn’t do any ICT4D job before joining CRS (Catholic Relief Service) and implementing partner MCS (Meki Catholic Secretariat Service) majority of the staff had experience on ICT4D is essential for the execution of ICT4D as a donor and implementer office. Over 60.4% of staffs witness that not getting ICT4D training at college or University level one of the challenges of ICT4D implementation on their ICT4D related working.

As IT or computer science professional not getting curriculum oriented formal ICT4D training from different college and university in Ethiopia had contributed to ICT4D implementation challenge and Opportunities in Ethiopia for different humanitarian and development jobs in remote and rural part of Ethiopia. This was because most of the university and college in Ethiopia are having ICT4D curriculum. Sundén and Wicander 2006) was conducted to determine the root causes of IT project failure in developing countries.

Finally, response on the use of ICT4D for different project activities execution were 89 (92.7%) and 6 (6.3%) for “Yes” and “No” respectively. This shows that for the usage of ICT4D for humanitarian and development work is high as CRS (Catholic Relief Service) and implementing partner MCS (Meki Catholic Secretariat) offices.

Table 4. 4 Application used for ICT4D Platform

| S.No | ICT4D Application list | Percentage of Usage | |
|------|----------------------------------|---------------------|-------|
| | | Yes | No |
| 10 | CommCare | 71 | 25 |
| | | 74% | 26% |
| 11 | ODK Aggregate | 69 | 27 |
| | | 71.9% | 28.1% |
| 12 | Interactive voice response (IVR) | 69 | 27 |
| | | 71.9% | 28.1% |
| 13 | Power BI | 59 | 37 |
| | | 61.5% | 38.5% |
| 14 | SAVIX MIS | 54 | 42 |
| | | 56.3% | 43.7% |
| 15 | Kobo toolbox | 37 | 59 |
| | | 38.5% | 61.5% |
| 16 | SQL | 34 | 62 |
| | | 35.4% | 64.5% |
| 17 | Aric GIS | 24 | 72 |
| | | 25% | 75% |

| | | | |
|----|------------------------------|-------|-------|
| 18 | MS Teams | 22 | 74 |
| | | 22.9% | 77.1% |
| 19 | CSPro | 18 | 78 |
| | | 18.8 | 81.2% |
| 20 | Jasper Report | 1 | 95 |
| | | 1% | 99% |
| 21 | Other iFormBuilder and excel | 1 | 95 |
| | | 1% | 99% |

Source: Own Survey result (2021) SPSS Output

As can be exhibited from the above table, response for question 16 about “CommCare application used for ICT4D implementation” 71(74%) were “yes” and 25(26%) were “No”. Hence, from these data one can conclude that there is high utility of CommCare application in sample woredas and head offices. On the other hand the response about the usage of ODK aggregate as ICT4D implementation tool 69(71.9%) responded “Yes” and 27(28.1%) responded “No”. Here also there is good utility for ODK in sample woreda front line staff and donor and IP offices as ICT4D tools.

Concerning the utilization of Interactive voice response (IVR), respondents 69(71.9%) said “Yes” and 27(28.1%) responded “No”. Also, the same to ODK app there is good utilization Interactive Voice Response. On the other hand, utilization of Power BI for project implementation staffs responded 59(61.5%) “Yes” while 37 (38.5%) said “No”. This shows that staff witnesses there is good utilization of Power BI application tool for ICTD implementation.

For question14 from the above table, respondents answered about SAVIX MIS implementation in the sample woredas and offices 54 (56.3%) “Yes” and 42 (43.7%) “No”. This shows that the response of the majority implied that the respondents had used SAVIX MIS in the ICT4D implementation of in sample woredas. But on the other hand, respondents acknowledged the usefulness of ICT4D applications for project implementation.

Generally, among the different ICT4D application the organizations used CommCare takes the top rank among the other ICT4D application used by sample office front line worker staff. This is because of CommCare is an open-source cloud-based, mobile and web platform for non-programmers that lets you make apps that you can deploy on android devices as well as in the cloud and other cell phone devices. Data collection is a vital part of any developmental work. In previous year's data collection used to be done on paper and pen which was prone to a lot of errors and difficult to conduct on a large scale. However, the current ICT tools now allow us to create surveys, collect, manage and upload data to storage facilities in real-time.

4.6.2 Opportunities of using ICT4D platform concerning the expansion of mobile phone Ethiopia

In rural Ethiopia, the use of mobile phones is fast increasing. Mobile phone coverage is available in all Ethiopia regions. Even the 90% of the rural and urban areas which CRS operate humanitarian and development program we didn't come across a village that didn't have a mobile phone. At least one mobile phone is owned by nearly half of all households. Some families have as many as six cell phones. The level of network coverage and rates of mobile phone uptake, on the other hand, vary by place. Three-quarters of the families in some districts own a cell phone. In some areas, only one-quarter of households have access to a mobile phone. The penetration percentage in rural and urban varies between 23 and 88 percent. Individuals can actively participate in political, social, and economic life, which is seen as a anticipated goal for CRS as organizations. Based on these findings, ICT4D is a novel approach to closing the digital divide, empowering rural communities and household beneficiaries, promoting marginalized groups' inclusion in society, and alleviating poverty. As an innovative ICT4D method, ICT4D mobile platforms such as CommCare, Odk Collect, IVR, and ArcGis that make digital services available via mobile devices are thought to give a tremendous chance to bridge the digital divide. The mobile platform connects multiple actors and facilitates digital transactions and interactions between them. It must also address how ICT4D is used and interacted with rural and urban poor populations, as well as the empowerment and rewards processes that lead to users' participation in society.

Table 4. 5 Challenges on ICT4D implementation on sample donor and implementing partner offices and Sample woreda front line worker

| S.No | Item | Response | |
|------|---|----------|-------|
| 21 | Do you think using ICT4D technology implementation more expensive than mainstream (ICT) media? | 78 | 17 |
| | | 82.1% | 17.9% |
| 22 | Does poor organizational management one of the ICT4D implementation challenge and Opportunities in Ethiopia? | 93 | 3 |
| | | 96.9% | 3.1% |
| 23 | Do you think in Ethiopia ICT4D skill gaps considered as implementation challenges? | 95 | 1 |
| | | 99% | 1% |
| 24 | Do you think poor telecom infrastructure especially out of the main cities as the cause of ICT4D implementing challenge? | 96 | 0 |
| | | 1000% | 0% |
| 25 | Do you think ethio telecom internet price one of the causes of ICT4D implementation challenge and Opportunities in Ethiopia? | 89 | 5 |
| | | 92.7% | 5.2% |
| 26 | Do you think technology acceptance resistance among the staff in your organization as one of ICT4D failed to achieve the desired outcomes? | 89 | 5 |
| | | 92.7% | 5.2% |
| 27 | Do you think as a country lack of written policy or document on ICT4D implementation framework one of the reasons for ICT4D implementation challenge and Opportunities in Ethiopia? | 88 | 8 |
| | | 91.7% | 8.3% |

| | | | |
|----|--|-------|-------|
| 28 | Do you think ICT4D implementation request huge investment cost? | 87 | 9 |
| | | 90.6% | 9.3% |
| 29 | Do you think the existing Government complex bureaucracy for information sharing is a reason for ICT4D implementation challenge and Opportunities in Ethiopia? | 89 | 7 |
| | | 93.7% | 6.4% |
| 30 | Do you think existing ICTs/ICT4D platforms are not compatible with the needs of organizations in Ethiopia context? | 86 | 10 |
| | | 89.6% | 10.4% |
| 31 | Do you think budget constraint is one of the reasons for ICT4D implementation challenge and Opportunities in Ethiopia in your organization? | 85 | 11 |
| | | 88.5% | 11.5% |
| 32 | Due to society's culture, have you faced any difficulty from the beneficiary side refused to use the ICT4D platform? | 81 | 15 |
| | | 84.4% | 15.6% |

Source: Own Survey result (2021) SPSS Output

It is notable from table 6, question 21, nearly 78(82.10%) of CRS head office and implementing partner office and 9 sample woreda front line staff to respond on using ICT4D technology implementation more expensive than mainstream (ICT) media one of the main reason for ICT4D implementation challenge in Ethiopia. This data shows that the expensiveness of ICT4D tools such as purchasing some open source for some company and materials necessary for ICT4D implementation is one of the reasons of ICT4D implementation in Ethiopia.

In table 4.13 above, question 22, especially front-line partner office staffs were requested to express their concern on poor organizational management, 93 (96.9%) of the staffs were mentioned the management issue is one of the reasons for ICT4D implementation problem.

Based on this data one can conclude that the sample office staffs were their concern as a one implementation obstacle. This shows that staffs agree on lack of good internal organizational management is create obstacle to use ICT4D system.

It is notable from table 4.13, question 23, in Ethiopia ICT4D skill gaps considered as a one of ICT4D implementation challenge in Ethiopia show 95 (99%) “Yes” and 1 (1%) “No”. This response implies ICT4D skill gaps of information technology and computer science professionals as a county one of the main ICT4D implementation challenge and Opportunities in Ethiopia frequently raised from donor and implementing partner side.

On the other hand, for the question related poor telecom infrastructure especially out of the main cities as the cause of ICT4D implementing challenge responded 96(100%) “Yes”. This implies the lack of basic telecommunications infrastructure is one of the main reasons for ICT4D implementation challenge and Opportunities in Ethiopia. a severe hindrance to the growth of the information and communications technologies (ICT) in most developing like Ethiopia. While telephone lines have traditionally been utilized for voice communications, as the market good enough for such a necessity, they finally became the national backbone of the ICT4D implementation issue in practically every country across the world. As a result, robust telecom infrastructure remains a key indicator of ICT4D deployment success.

For question 25 from the above table, respondents answered about ethio telecom internet price one of the causes of ICT4D implementation challenge in Ethiopia 89 (92.7%) “Yes” and 5 (5.2%) “No”. This shows that the response of the majority implied that the respondents internet price is one of the main challenging reasons for ICT4D implementation in Ethiopia. According to a survey issued by the International Telecommunication Union (ITU), Ethiopia has the world's second most costly fixed broadband service. In Ethiopia, a broadband service that is taken for granted in much of the industrialized world would cost an arm, a leg, and some money. According to the International Telecommunication Union, it would cost roughly 21 times the average monthly wage in Ethiopia.

Central African Republic has the costliest broadband. Ethiopia, which was recently rated second poorest country in the world behind Niger, has one of the world's lowest mobile and internet subscriber ratios. Less than 1% of Ethiopians use the internet, according to global internet users.

Concerning technology acceptance resistance among the staff in donor, implementer partner head offices and sample woreda front line staffs as one of ICT4D failed to achieve the desired outcomes, respondents 89(92.7%) said “Yes” and 5(5.2%) responded “No”. This implies introducing new technologies in organizations is not an easy task for non-governmental organizations like CRS often face a lot of resistance during the adoption of new technology like ICT4D. The result shows us challenges in the usage of IT systems in organizations have led to the investigation of how different individuals interact with the new information technology system in their work environment. NGOs are organizations that rely on IT to implement their development and humanitarian work, such as handling a large number of beneficiary routine day to day and provide real-time data within short periods of time for an informed decision.

The introduction of new technology in an organization provides a number of benefits such as sustainable competitive advantage, lower production and labor costs. This in turn adds value to products and services, and generally improves the business. Technological changes are often driven by either an emphasis on improving efficiency and business expansion, or a pressure to meet certain requirements from customers and industry standards (Nguyen, 2009). Nguyen, et al (2013) referred to these drivers as part of an innovation decision process, where management and organizations assess the advantages and disadvantages of adopting the new technology.

Information Technology (IT) on the one hand facilitates fast communication in organizations and on the other it automates business processes. They also state that technology reduces user’s task through computerization processes and allows the users to do their task differently. However, introducing new technologies in companies is not a straightforward task and companies often face a lot of resistance during the adoption of new systems. These challenges in the usage of IT in organizations have led to the investigation of how different individuals interact with the new technology in their work environment. Organizations that rely on IT to implement its processes, such as handling a large number of beneficiary data and provide real-time data within short periods of time for informed decision.

Response on Question 27 about as a country lack of written policy or document on ICT4D implementation framework one of the reasons for ICT4D implementation challenge and Opportunities 88(91.7%) were “yes” and 8(8.3%) were “No”. Hence, from these data one can conclude that, the study evaluates the lack of ICT4D policies ICT4D implementation in Ethiopia

by extending and utilizing the design-actuality gaps framework. A quantitative analysis of Ethiopia government's ICT4D policy documents (i.e., design) and interviews. The analysis shows that not only there are gaps between policy design and actuality but also the dimensions of design and actuality are different. The causes of these gaps are discussed along with implications for practitioners and a theoretical extension of the design actuality gaps framework. This research contributes to the literature on design-actuality gaps, ICT in developing countries, and government policy evaluation.

The Ethiopia government is still in the early stages of ICT policy development. There is a shortage of skills in various areas, namely ICT-related services, ICT4D, and other professions. The major challenge is the lack of ICT4D developed policy on how to implement, monitor, and evaluation ICT4D program. As a result, lack of policy and the skills shortage in the country, ICT4D implementation cannot take place. In addition, respondent staffs have limited knowledge and skills within the ICT4D implementation framework. Even the government's effort is ineffective in resolving the problem.

It is notable from the above table, ICT4D implementation request huge investment cost show 87(90.6%) "Yes" and 9 (9.3%) "No". This response implies ICT4D investments in terms of costs and benefits have rarely been carried out. For example, although many international organizations such as the World Bank fund nearly 1 billion US dollars of ICT investments as a part of their lending programs and grant assistance to various countries, the evaluation of the ICT components of these programs in terms of overall impact has been weak (World Bank, 2003). However, given the numerous obstacles that emerging countries such as Ethiopia confront, the question of vertical versus horizontal growth continues to be a concern. The challenge of providing access to basic services such as health, education, and water, as well as infrastructure such as roads, telecommunications, and electricity, necessitates large investments, and there is always a big debate about whether ICT investments divert resources and attention away from more basic needs. That is why when the issue of ICT raised, they relate with the investment required for this sector.

Response on Question 29 about as a country the existing Government complex bureaucracy for information sharing is a reason for ICT4D implementation challenge and Opportunities in Ethiopia 89(93.7%) were "yes" and 7(6.3%) were "No". Hence, from these data one can

conclude that, findings showed that government officials misunderstand the basic conditions of their local jurisdictions with half of public officials making errors that were at information sharing acting this way as a government officials potential for errors can lead to significant operational mistakes and misallocation of resources when it is the primary source of information especially for in relation to poor marginalized community.

IJSER

Chapter Five

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the findings, conclusions and recommendations of the research. The title of this research is: “ICT4D implementation challenge and Opportunities in Ethiopia”. The main objective of the study is to examine the challenges of ICT4D implementation in Ethiopian currently implemented by non-governmental organization used for humanitarian and development work. It has also four basic research questions.

To answer these research questions the researcher derived twelve sub-questions, all of which were addressed through the questionnaire for CRS (Catholic Relief Service) and MCS Meki Catholic Secretariat) head office staffs also supplemented by the use of interview sample front line woreda office coordinator including other program staffs the challenges faced the while ICT4D implementation. This section summarizes major findings, draws conclusions and forwards possible recommendations to overcome the problems mentioned in the previous sections. The findings have significant impact on successful ICT4D implementation as country, efficiency, returns to investment, etc. but due ICT4D implementation challenge and Opportunities unable to bridge the digital gaps between poor and marginalized community in addition to that the data quality (timeliness, accuracy, completeness, consistency, integrity, validity, etc.) suffers a lot.

5.1 Summary of The Major Findings

The findings revealed that ICT4D implementation challenge and opportunity in CRS (Catholic Relief Service) and MCS(Meki Catholic Secretariat) head office and front line woreda offices. This summary is in agreement with the basic research question. These include the extent of ICT4D implementation challenge and Opportunities in Ethiopia in the sample CRS headquarter and MCS headquarter and front line woreda offices, the perceptions of organization higher officials’, implementing partner senior management staff’ and front-line sample woreda staffs on the challenges for successful implementation of ICT4D.

1. The Researcher observed, most sub-offices have enough number of ICT4D equipment in relation to the office they run. During discussion no complaints presented on shortage of ICT4D resources except two offices (Shalla and Siraro) requested laptops for new staff joining them soon. Selected front line sample Woreda (MEAL) Monitoring, Evaluation Accountability and Learning staffs' lack of ICT4D staff skills: MEAL staffs have no training in ICT4D because all of them not taken any training in ICT4D from university.
2. Concerning ICT4D training, staffs responded 58(60.4%) of them not receiving ICT4D training while they were at college or university. 36(37.5%) of those staffs receiving ICT4D training. Hence one can conclude that staffs have ICT4D training gaps. There is coupled by lack of enough time for in-service training. There is lack of ICT4D professional at partner offices one of challenge. Providing Technical help from CRS side is inadequate despite regular ICT4D application using challenge for their routine data collection. This not only wastes time but also leaves the woreda front line staffs unable to continue using different ICT4D tools or application for their routine day to date job.
3. Poor management practices: The management practices include leading the date to day front line office activities. The ICT4D using is an element of it. This makes partner main officed and woreda office managers giving less attention to ICT4D. especially front-line partner office staffs were requested to express their concern on poor organizational management, 93 (96.9%) of the staffs were mention the management issue is one of the reasons for ICT4D implementation problem. Based on this data one can conclude that the sample office staffs were their concern as a one implementation obstacle. This shows that staffs agree on lack of good internal organizational management is create obstacle to use ICT4D system.
4. Implementing partner (MCS) Meki Catholic Secretariat) should organize training that can address identified problems. The curriculum must be tailored to issues specifically listed in the findings. CRS/ET should be involved in tailoring the curriculum and funding the training.
5. MCS should hire two persons who can give technical support to sub-offices. One support staff can be stationed at Dodota while the other one can be stationed at Shashemene. The one stationed at Dodota can cover Dodota, Sire and Boset. The one stationed at Shashemene can cover Heben Arsi, Negele Arsi, Shalla and Siraro. Ziway Dugda and ATJK can remain

under Meki or MCS HQ. CRS/ET programs operating in these areas should cover fair share of the salaries of the technical persons.

6. During discussion with key informant interviews issue woreda coordinators raised about ICT4D technical person reside in their office, based on that there were no technical persons giving support in the implementing partner sub-offices, for minor problems devices are dismantled and put aside in most sub-offices.
7. The Researcher observed there were high power interruptions plus fluctuations, no power backup and surge protection in most sub-offices. Though four sub-offices have generator but only two are functional.
8. The Researcher observed 3G service does not work in Siraro, Sire, and Boset implementing partner sub-offices.
9. The Researcher observed five sub-offices have internet connection, but the connectivity is very poor (low speed, high interruption, and no backup)
10. There is no computer network in sub-offices and as a result no resources are shared.
11. All implementing partner MCS sub-office computers are not protected from computer viruses; no computer runs licensed version of anti-virus and nearly all of them are highly hit by computer viruses – there are also complaints on this issue at all sub-offices.

5.2 Conclusion

The ICT4D implementation has great advantage in improving all scope of work including humanitarian and development work. In Ethiopia ICT4D were not implemented adequately hence slowed the use of ICT4D in humanitarian and development in non-governmental organization. The above data suggest the unavailability and inappropriate ICT infrastructure rural and urban area far from Addis Ababa, budget constraints for ICT4D implementation; limited ICT4D knowledge and skills for both implementing partner head office and front line woreda office worker staff ; limited technical support from CRS side during ICT4D implementation for day to day activities, and restrictive management practices mainly limited budgetary allocations and lack of proper ICT4D policies as a country. Therefore, there has been limited use of ICT4D for humanitarian and development work in woreda level.

The researcher therefore concludes that the inadequate practice, and also mentioned different challenges hindered ICT4D implementation in the different remote woredas. The findings have

significant impact on successful ICT4D implementation, efficiency, returns to investment, and especially as country, but due to ICT4D implementation challenge and Opportunities in Ethiopia hinder the bridge of digital gaps between poor and marginalized community in addition to that the data quality (timeliness, accuracy, completeness, consistency, integrity, validity, etc.) suffers a lot.

5.3 Recommendations

Based on the findings of the study, it is recommended that:

- Implementing partner (MCS) Meki Catholic Secretariat) should organize training that can address identified problems. The curriculum must be tailored to ICT4D usage issues specifically listed in the findings. CRS (Catholic Relief Service) should be involved in tailoring the curriculum and funding the training.
- The government has invested in its capacity to construct good ICT infrastructure in the rural area and remote urban towns to help to use ICT4D without any problem and also enhance internet connection in different rural woredas to ensure easy use of different internet dependent ICT4D tools. CRS (Catholic Relief Service) should purchase generators for implementing front line woredas sub-offices (Dodota and ATJK) and MCS should repair for other two sub-offices (Heben Arsi and Shalla).
- Ministry of innovation and technology (MINT) and the Ministry of Education should cooperatively work for developing ICT4D curriculum design for higher education institution that helps for successful ICT4D implementation as a country.
- CRS (Catholic Relief Service) and MCS (Maki Catholic Secretariat) as non-governmental organizations should enhance their staffs 'in-service staff training programs that are tailored to the ICT4D jobs to keep front line works up to date with the technological update which will promote the proper implementation of ICT4D.
- At implementing partner office-level more staff should be encouraged to the CRS to train and coach them. Staff should be encouraged to use ICT4D applications including SAVIX MIS, Power Business Intelligence, and CommCare application to increase their confidence when using ICT4Ds for any program implementation. There should be strengthening management information systems and front-line MEAL staff at woreda office levels to help other program staff with the available developed application and

tablet device or the software. They would also assist the teachers to handle any ICT4D system problem. Moreover, the staff's ICT4D competency framework has to be developed to make front-line staff capable to integrate ICT4D with daily routine activities at the field office setting.

- The ministry of education and ministry of innovation and technology (MINT) should inform themselves with another country's national ICT4Ds policies adoption and especially in education for them to develop as a country national ICT4D policy that would enable them to integrate ICT4Ds within teaching and learning in Ethiopian higher education.

Continuous monitoring and evaluation of ICTD implementation at partner office. After setting the goals for the projects and making things ready for implementation, and then continuous monitoring and evaluation should be part of the process.

Implementing partner MCS (Maki Catholic Secretariat) should hire two persons who can give ICT4D related technical support front line sub-offices.

One support staff can be stationed at Dodota while the other one can be stationed at Shashemene. The one stationed at Dodota can cover Dodota, Sire, and Boset. The one stationed at Shashemene can cover Heben Arsi, Negele Arsi, Shalla, and Siraro.

Ziway Dugda and ATJK can remain under Meki or MCS HQ. CRS(Catholic Relief Ethiopia) projects operating in these areas should cover a fair share of the salaries of the technical persons.

A computer network should be installed for five front-line implementing partner sub-offices (Dodota, Ziway Dugda, ATJK, Negele Arsi, and Shalla).

1. This study was carried out in three Oromia zone and nine woredas which CRS has been doing humanitarian and development work with a partner; a similar study could be carried out in the other regions zone and weredas.
2. A comparative study can be carried out on the impact of ICT4D for different development works in Ethiopia.

Reference

Ethiopia ICT Performance Review 2009//2010 (Adam, L., 2009/2010). Publications /Policy_Paper_Series_Towards_Evidencebased_ICT_Policy_and_Regulation__Volume_2/Vol 1%202%20Paper%209%20-%20Ethiopia%20ICT%20Sector%20Performance%20Review%202010.pdf.

Information from markets far and near: Mobile phones and agricultural markets in Niger. American Economic Journal: Applied Economics, 2, 46-59 (Aker, J. C., &, 2010).

Mobile phones and economic development in Africa. Center for Global Development (Aker, J. C., &, 2010).

Basic needs to globalization: Are ICTs the missing link? Information Technology for Development, 10 (4), 261-274. Akpan, P. I. (2003)

Bridging the digital divide and the impact on poverty in Nigeria. Computing, Information Systems & Development Informatics, 3(4), 2-85 (Akanbi, B., & Akanbi, C., 2012).

Rural development in Nigeria: A review of pre- and post-independence Practice. Journal of Sociological Research, 3, 2-14. <http://dx.doi.org/10.5296/jsr.v3i2.2302> Akpan, P. I. (2012)

Bridging the digital divide in Nigeria: A study of Internet use in Alabar Metropolis, Nigeria. Library Management, 24, 355-365 (Ani, O. E., Uchendu, C., 2007).

. Developing nations, the digital divide and research databases, (Brooks, S., Donovan, P., & Rumble, C., 2005)

ICTs and social and economic inclusion. Retrieved from <http://www.med.govt.nz/pbt/infotech/ictinclusion/ictinclusion.pd> (Doczi, M., 2000).

Digitizing resources for University of Nigeria repository: Process and challenges. Webology, 8(1) (Eke, 2011). Retrieved from <http://www.webology.org/2011/v8n1/a85.html>.

Valuing Freedoms: Sen's Capability Approach and Poverty Reduction (Alkire, 2002).

Oxford: Oxford University Press (Arunachalam, 2002). "Reaching the Unreached- an Indian experience in empowering people through information access", MS Swaminathan Research Foundation, Vadra, Press.

"Developing Methodologies for Livelihood Impact Assessment: Experience of the African Wildlife Foundation in East Africa" ODI Working (Ashley C. and K. Hussein, 2000).

Association of College and Research Libraries, "The Significance of Context in Information Systems and Organizational, (Avgerou, C., 2001)

Change." Information Systems Journal, Information Systems and Global Diversity: Oxford University Press (Journal, 2002).

Introduction: IT in developing countries. In *Information Technology in Context: Studies from the perspective of developing countries*, edited by C. Avgerou and G. Walsham, Ashgate Publishing Limited, (Hants Avgerou, C. and Walsham, G., 2000).

"Framing IS Studies." LSE: Department of Information Systems: Working Paper Series. Argyris, C., Putnam, R. and McLain Smith, D. (1990) Action Science: Concepts, Methods, and Skills for Research and Intervention. Jossey-Bass, San Francisco (Series Argyris, 2003).

Information Technology in Context: Studies from the Perspective of Developing Countries. Ashgate. Vagarious, C. (2003) IT as an Institutional Actor in Developing Countries, in: Krishna, S. and Madon, S. The Digital Challenge: Information Technology in the Development Context. (Avgerou, 2000).

Investigating Information Systems with Action Research, Communications of the Association of Information Systems, 2, 9. (Brandon, D., 2006) Project Management for Modern Information Systems. IRM Press/Idea Group (Basjevukke, 1999).

Open Source in Africa: A Global Reality; Take It or Leave It? IICD Research Brief – No UICT01. International Institute for Communication and Development, <http://www.iicd.org>
Collins, H.M. (1992) Artificial Experts: Social Knowledge and Intelligent Machines. MIT Press (Bruggink, 2003).

Information and Communications Technologies and Development: Help or Hindrance?
Australian Agency for International Development (AusAID), www.developmentgateway.com.au/jahia/webdav/site/adg/shared/CurtainICT4DJan04.pdf (Curtain, 2004).

The Complete Appropriate Technology Sourcebook. www.villageearth.org/atsourcebook/
Systems Analysis and Design, (Wiley Darrow K. and Saxenian, M. , 1986). (Dennis, A., Wixom, B. and Tegarden, D., 2001, 2001)

Self-determination and Information." In computers and Society Citizenship in the Information Age, edited by C. Beardon and D. Whitehouse. Oxford: Intellect Ltd. , (Ballantyn, P. , June 2002)

"Collecting and propagating local development content", in: INASP Newsletter No. 20.),
"Integrated Rural Development through Telecommunications," In: (D. Barr, D., 1998)

Richardson and L. Paisley (editors). The First Mile of Connectivity: Advancing Telecommunications for Rural Development through a Participatory Communication Approach. Rome: FAO, Knowledge and Attitudes — Assessing Latent Constructs Chapter, (pp. 152-167 (Adam Zwickle and Keith Jones , 2021)

<https://www.researchgate.net/publication/320674427> Sustainability DOI: 10.1007/978-3-319-67122-2_25 (ADB, 2005), The role Project implementing unit, The Africa Development Bank. Online available at <https://www.oecd.org/derec/adb/35249987.pdf>

Approaches for Setting-up Multi-Stakeholder Platforms for Agricultural Research and Development, World Applied Sciences Journal 16 (7): 981-988, (Adekunle, A.A., and A.O. Fatunbi. , 2012).

Using Nvivo For Data Analysis in Qualitative Research Ministry of Education, Sultanate of Oman Alabri International Interdisciplinary Journal of Al Yahmady, (Hamed and Hilal Saleh Said, 2003)

Knowledge Management and Knowledge Management Education –Volume 2, Issue 2. Pp 183-186. (Alavi Maryam and Leidner Dorothy , 2001)

The challenge of “sustainability” in ICT4D—Is bricolage the answer? Systems: Conceptual Foundations and Research Issues. MIS Quarterly, Vol. 25 No.1, pp 107-136. Ali, M., & (Bailur, 2006)

Factors affecting the successful adoption of management information systems in organizations towards enhancing organizational performance. American Journal of Systems and Software, 2(5), pp 121–126, (Al-Mamary, Y.H., Shamsuddin, A. & Aziati, N. , 2014)

ICT Barriers and Critical Success Factors in Developing Countries. The Electronic Journal of Information Systems in Developing Countries 56, 1 (2013), 1–17, (Almamy Touray, Airi Salminen, and Anja Mursu. , 2013)

PRISM framework: A paradigm shift for designing, strengthening, and evaluating routine health information systems. Health Policy and Planning, (Aqil, A. Lippeveld, T. & Hozumi, D., 2009)

Multi-stakeholder Perspectives are influencing Policy-Research-Practice, Journal of Linking research to practice: strengthening ICT for development research capacity in Asia / edited by Arul Chib and Roger Harris. © 2012 Institute of Southeast Asian Studies, Singapore, 24(3), pp 217–228. (Arul Chib, Komathi Ale, and May-Ann Lim , 2013).

Analyzing documentary realities. In D. Silverman (Ed.), Qualitative research: Theory, method, and practice (2nd ed.), London: Sage, 56–75 (Atkinson, P. A. & Coffey, A., 2004).

Counting and Multidimensional Poverty, in von Braun, J.; Hill, R. V. and Pandya-Lorch, R., (eds), *The poorest and hungry: Assessments, analyses, and actions: An IFPRI 2020 book*, IFPRI, chapter 3, pp. 77-89, (Alkire, S. Foster, J., 2009)

The digital divide: global and regional ICT leaders and followers, *Inf. Technol. Dev.* **16**(4): 304-319, (Ayanso, A., Cho, D. I. and Lertwachara, K., 2010).

Brown, A. E. and Grant, Gerald G. (2010). Highlighting the Duality of the ICT and Development Research Agenda, *Information Technology for Development* **16**(2): 96-111.

Paradigms, Poverty and Adaptive Pluralism, *IDS Working Papers* **2010**(344): 01-57, (Chambers, R. , 2010)

ICTs and rural development: review of the literature, current interventions and opportunities for action, Working Paper 192. Overseas Development Institute, Chapman, R. and Slaymaker, T. (2002). (Chapman, R. and Slaymaker, T., 2002)

UNDP (2010). Human Development Report 2010 —20th Anniversary Edition - The Real Wealth of Nations: Pathways to Human Development, Technical report, United Nations Development Program (UNDP).

ICT4D: Information and Communication Technology for Development, Cambridge University Press, (Unwin, T. ed. , 2009)

ICTs and poverty reduction: a social capital and knowledge perspective. *Journal of Information Technology*, 23(3), 203–213, (Urquhart, C., Liyanage, S., & Kah, M. M. , 2008)

IJSER

APPENDICES

IJSER

Appendix I Appendix I – List of literature evidence ICT4D implementation challenge and Opportunities in Ethiopia

| Description of | Literature Sources |
|---|--|
| Monitoring and evaluating project progress regularly | (James, 2004; Maepa, 2003; UNDP ,2001), |
| Align with demand-driven approach. | (Maepa ,2003; UNDP ,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |
| inclusion of relevant skills must be built and trained. | Conradie ,2003; Kora ,2002; Kumar, 2003), |
| Efforts must be made to retain staff. | (TinaJames,2004; Kumar, 2003), |
| Project ownership must be given to local parties. | (Maepa ,2003; UNDP ,2001; Kora,2002). |
| Establishing economic sustainability. | (Tina James,2004; Ravishankar,2015; Tina James ,2004) |
| Local partnerships must be built to achieve synergies. | (Maepa ,2003; UNDP ,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |
| The creation of local content must be facilitated. | (James, 2004; UNDP ,2001; Conradie, 2003; Kumar, 2003). |
| Political context must be analyzed and considered. | (James, 2004; UNDP,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |

| | |
|--|--|
| Project must have a project champion. | (Tina Jame, 2004; Maepa ,2003; UNDP ,2001) |
| The right technology must be chosen. | (James ,2004; UNDP ,2001; Conradie, 2003; Kora ,2002; Kumar, 2003) |
| Cultural understanding of the local community must be developed. | (Krauss,2016; Mursu et al,2013) |
| Trust between the local community and outside parties must be built. | (Krauss,2016; Sandep et al,2015) |

IJSER

Appendix II – Consent Form

Dear Study Participant,.....

My name is Yidnekachew Abebe, and I am a postgraduate student at SRI SAI College, School of Postgraduate. Mob.: +251911719110, email: yidnekachewabebe@gmail.com, I am conducting research on the area ICT4D implementation challenge and Opportunities in Ethiopia. This consent form contains details of the purpose of research, a description of the involvement required from you & your rights as a participant, and the interview question. The research focuses on one of the existing ICT4D projects currently CRS has been implementing all of humanitarian and development project. The questionnaire will take 30 minutes, depending on the level of clarification and back & for questions.

The purpose of this study is:

☐ To identify the main ICT4D implementation challenge and Opportunities in Ethiopia in Ethiopia and propose solution

The benefit of this research is to provide a general recommendation that will give an excellent insight into how government and different stakeholders ICT4D projects that are driven towards development and humanitarian work. Besides, the finding of this study benefits different nongovernmental organizations how to strategically position themselves toward aligning their interests, power, strategies, and objectives among themselves to ensure the successful implementation to bridge poor and marginalized community gaps

long term successful sustainable ICT4D projects.

By signing this consent form, I certify that I _____ agree to

(Print full name here) the terms of this agreement:

☐ I agree to participate in this study that I understand will be submitted in partial fulfillment of the requirements for the degree of Masters business administration information system at SRI SAI college

☐ I understand that my participation is voluntary.

☐ I understand that all data collected will be limited to this use.

☐ I understand that I will not be identified by name in the research report.

☐ I understand that I may withdraw from the study at any of them with no adverse repercussions.

_____(Signature) (Date)

Appendix III Survey Questionnaires

SRI SAI COLLEGE

GRADUATE PROGRAM IN INFORMATION SYSTEM MANAGEMENT

Survey Questionnaires Over ICT4D implementation challenge and Opportunities in Ethiopia in Ethiopia

Dear Participant,

I would like to extend my thanks for being willing and participate in undertaking this survey. I would like to ask your kind cooperation in answering the questions as truthfully and as completely as possible. I want to assure you that all answers you provide will be kept confidential and used only for this academic purpose. This is, therefore, to kindly request you to take 15 minutes to fill out the questionnaire as genuinely and completely as possible.

General information

1. Sex:

☐ Male

☐ Female

2. Age (Years):

☐ 18-25

☐ 26-30

☐ 31-35

☐ 36 -40

☐ >40

3. Educational Qualification

☐ Certificate

☐ Diploma holder

☐ First Degree

☐ Masters or more

4. Are you currently employee?

☐ Yes

☐ No

5. Your current position in the organization

- ☐ CoP, D/ CoP ☐ HoP, D/HoP ☐ Mid-level Mgmt ☐ Senior Mgmt ☐
☐ Project Manager ☐ S/Project Officer ☐ Project Officer ☐ Data Management
☐ Project Assistant ☐ Technical Advisor ☐ Telecom Network Engineer ☐ IT Expert

5. Your work experience in the organization with this position

- ☐ Below 1 Year ☐ 1-5 Years ☐ 6-10 Years ☐ 11 + Years

6. While you were at College or University, have you received ICT4D related course?

- ☐ Yes
☐ No
☐ Do not know

Organization Information

7. Does the organization have an IT program department?

- ☐ Yes
☐ No
☐ Do not know ☐

8. Do you have awareness and knowledge about ICT4D?

- ☐ Yes
☐ No
☐ Do not know

9. Have you ever been done ICT4D or a related job before?

- ☐ Yes
☐ No
☐ Do not know

Where did get the knowledge of ICT4D?

- ☐ From College
☐ Through work Experience
☐ Short course training
☐ Through personal effort from different learning source
☐ I don't have knowledge about ICT4D

9 Do you use ICT4D for different project activities execution?

- ☐ Yes
☐ No

☐ Do not know

10. Among the following which application your organization been using for

☐ CommCar

☐ ODK Aggregate

☐ Interactive voice response (IVR)

☐ Power BI

☐ SAVIX MIS

☐ Kobo toolbox

☐ SQL

☐ GIS

☐ MS Teams

☐ CSPro

☐ Jasper Report

☐ Other

If other specify?

11. Do the ICT4D platform helpful to bridge the digital gaps of poor and marginalized community

☐ Yes

☐ No

☐ Don't know

12. Does your organization is using ICT4D?

☐ Yes

☐ No

☐ Do not know/ cannot say ☐

13. Does your organization have information systems management strategies to support the overall ICT4D implementation?

☐ Yes

☐ No

☐ Do not know/ cannot say

Do your organization use ICT4D to address the digital gaps created between poor and marginalized community

☐ Yes

☐ No

☐ Do not know/ cannot say

14. Regarding your organization In which sector ICT4Ds can play a key role in the context of development

☐ capacity building

☐ in human resources

☐ poverty reduction

☐ education

☐ healthcare

ICT4D implementation challenge and Opportunities in Ethiopia **related question**

15. Do you know in Ethiopia from government and private university or college teaches ICT4D education field?

☐ .Yes

☐ .No

☐ I don't know

16. In developing country like Ethiopia why ICT4D failed

☐ When they don't adapt the technology to local conditions

☐ When their choice is not appropriate technology for their project context

☐ When they can't get professional person having ICT4D knowledge and skills

☐ Other

If Other, please specify

17. Do you think using ICT4D technology implementation more expensive than mainstream (ICT) media?

☐ Yes

☐ No

☐ I don't know

18. Do you think the ICT4D cover up the limitations of mainstream media such as radio, TV, tele center?

☐ Yes

☐ No

☐ I don't know

19. Do you think digital technologies offer potential benefits to improve the livelihood of the less privileged community?

☐ Yes

☐ No

☐ I don't know

20. Is it possible to explain the usage of ICT4D in terms of economic profitability, low initial cost, real time data for informed decision, decrease in discomfort, savings in time and effort?

☐ Yes

☐ No

☐ I don't know

21. Do you think ICT4d plays a vital role in advancing economic growth and reducing poverty in developing country like Ethiopia.

☐ Yes

☐ No

☐ I don't know

22. Do you think ICT4D directly influence the productivity, cost effectiveness and competitiveness in industries?

☐ Yes

☐ No

☐ I don't know

22. Does poor organizational management one of the challenges of ICT4D implementing?

☐ Yes

☐ No

☐ I don't know

22. Do you think in Ethiopia ICT4D skill gaps to be considered as implementation challenges?

☐ Yes

☐ No

☐ I don't know

23. Do you think poor telecom infrastructure especially out of the main cities as the cause of ICT4D implementing challenge?

☐ Yes

☐ No

☐ I don't know

24. Do you think ethio telecom internet price one of the causes of ICT4D implementation challenge in Ethiopia?

☐ Yes

☐ No

☐ I don't know

26. Do you think technology acceptance resistance among the staff in your organization as one of ICT4D failed to achieve the desired outcomes?

☐ Yes

☐ No

☐ I don't know

27. Do you think as a country lack of written policy or document on ICT4D implementation framework the one of the reasons of ICT4D implementation challenge and Opportunities in Ethiopia?

☐ Yes

☐ No

☐ I don't know

28. Do you think ICT4D implementation request huge investment cost?

☐ Yes

☐ No

☐ I don't know

29 . Do you think existing Government complex bureaucracy for information sharing as a reason for ICT4D implementation challenge and Opportunities in Ethiopia?

☐ Yes

☐ No

☐ I don't know

30. Do you think existing ICTs' /ICT4D platform are compatible to the needs of organizations in Ethiopia context?

☐ Yes

☐ No

☐ I don't know

31. Do you think budget constraint is one the reason of ICT4D implementation challenge and Opportunities in Ethiopia in your organization?

☐ Yes

☐ No

☐ I don't know

32. Due to society's cultural, have you faced any difficulty from the beneficiary side refused to use the ICT4D platform?

☐ Yes

☐ No

☐ I don't know

Key informant interview with CRS Organization higher officials and implementing partners higher officials.

- What are the main ICT4D implementation challenge and Opportunities in Ethiopia's from your experience?
- What mechanisms are you propose to overcome these implementation problems? Please explain.