

ADDIS ABABA UNIVERSITY

DEPARTMENT OF MANAGEMENT

**THE EFFECT OF TELECOM INVESTMENT FUND
THROUGH UNIVERSAL ACCESS PROGRAM IN THE
DEVELOPMENT OF RURAL CONNECTIVITY
(A CASE STUDY AT ETHIO TELECOM)**

BY
Yoseph Endale

**SUBMITTED FOR THE DEGREE OF MASTERS IN
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DECLARATION

I hereby declare that the thesis titled “**THE EFFECT OF TELECOM INVESTMENT FUND THROUGH UNIVERSAL ACCESS PROGRAM IN THE DEVELOPMENT OF RURAL CONNECTIVITY (A CASE STUDY AT ETHIO TELECOM)**” submitted for the award of degree in Master of Science in International Business at Addis Ababa University Faculty of Business and Economics, Department of Management is my original work and the thesis has not formed the basis for the award of any degree.

Name

Signature

Date

This Research Report has been presented for examination with my approval as advisor.

Advisor Name

Signature

Date

APPROVAL

Title: “THE EFFECT OF TELECOM INVESTMENT FUND THROUGH UNIVERSAL ACCESS PROGRAM IN THE DEVELOPMENT OF RURAL CONNECTIVITY (A CASE STUDY AT ETHIO TELECOM)”

Prepared by:

Name

Signature

Date

Approved by board of examiners:

Research advisor:

Advisor Name

Signature

Date

Internal examiner:

Name

Signature

Date

External Examiner:

Name

Signature

Date



The effect of Telecom Investment Fund through universal access
program in the development of rural connectivity
(a case study at Ethio telecom)

Yoseph Endale – GSE/3210/11

Submitted for the Degree of Masters in International Business

DEPARTMENT OF MANAGEMENT

FBE, Addis Ababa University

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To my Family

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Glossary

FBE	Faculty of Business and Economics
ETC	Ethiopian Telecommunications Corporation
ECA	Ethiopian Communication Authority
ET	Ethio Telecom
ICT	Information and Communication Technology
ITU	International Telecommunication Union
PPPs	Public, Private, Partnership
WB	World Bank
IMF	International Monetary Fund
UK	United Kingdom
USD	United States Dollar
LDCs	Least Developed Countries
NRI	Networked Readiness Index
VAT	Value Added Tax
CDMA	Code Division Multiple Access
WoredaNet	Woreda Network
SchoolNet	School Network
AgriNet	Agriculture Network
HealthNet	Health Network
UAF	Universal Access Fund
IBD	International Business Division
VAS	Value Added Service

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Abstract

The study aims to look into the correlation between telecom investment fund, the universal access program, and the rural connectivity development. It is also analyzing the effects of universal access fund through the universal access program to the development of rural connectivity.

Since the time which Ethiopia introduces the first telecommunication service in 1886 E.C., the telecom service has passed through different stages of growth, from the earlier long line connectivity between Dire-dawa and Addis following the railway development to the current wireless network.

However, no specific study has been conducted locally regarding the rural telecom access development enablers. i.e.: - the universal access program, and telecom investment fund. This study has reviewed the theoretical and empirical views of the related literatures done for other countries, and develops a conceptual model that shows the relationships between dependent and independent variables.

It has also uses the descriptive analysis technique and the research undertaken here has shown that the Universal Access Fund and Universal Access Program have a positive relation with rural connectivity development.

The study has recommended the regulatory authority to have its own access program, telecom investment fund policy framework, and rural connectivity development document.

CHAPTER-1

1. INTRODUCTION

This chapter is consisting of background statement, statements of the problem, objectives of the study, Significance, Scope of the study, Limitations, Operational Definition, and Organization of the study.

1.1 Background of the study

It is known that the nature of telecom service investment is capital intensive particularly in the developing countries as a nature of fact that, there is limited manufacturing capacity for telecom equipment therefore, telecom investment requires importing the telecom equipment as well as professionals for the network and Service deployment, and by default any investment focuses on profit as a return especially a privative investment, whereas the state owned companies are mainly a mission holders for the public interest set by the nation, in this regard Ethiopian telecommunication corporation the current Ethio telecom has tried to reach out the whole geographical coverage of the country but as a limited investment capacity still the rural area is not fully covered by the whole types of telecom services as needed as possible.

From the discussion point of view, the current opening of the Ethiopian telecom market will bring an opportunity to fill the gap in reaching out the rural area through universal access program.

This will probably change the health facility, the education sector, and the finance services in the area, but the challenge is how we should enforce telecom service investment framework to administer telecom operators to assure equitable telecom service access between urban and rural community by making a balance between operators' desire for profit and the need of making telecommunication access reachable to a nonprofit zone.

In this research document the main focus is to address the effects of telecom investment fund through universal access program to the growth of telecom services in the rural area.

In this regard the telecom privatization and the market liberalization are new practices in history to the country, from the telecom service expansion point of view there should exist a policy framework which could accommodate issues but exclusively the telecom service expansions towards the rural area needs special enforcements to be more practical.

So the study has focused on the regulatory authority and the past trends of the rural telecommunication development in the history of longtime state owned Telecom Company formerly called Ethiopian Telecommunications Corporation (ETC) and currently renamed as Ethio Telecom (ET).

1.2 Statements of the problem

In today's global business scenario, privatization or selling a state owned companies is very practical, especially following the effects of globalization the business flow is very complex, dynamic, competitive, and speedy, due to the reasons that government bodies are forced to apply either firm's privatization or liberalization of their market, in this regard telecom firms are highly vulnerable to such situation, it is because of two reasons primarily the dynamic nature of telecom technology that forced them to be competitive enough, secondly there is high demand for telecom service need in recent era, and following these two reasons operators have higher desire of residing in cities with high population density. In a recent survey, majority of the business owners whether large or small have a great need of gaining profit as their major priority of existence. So the problem is how the profit need of these telecom operators is going to be approachable to the service need of the community, especially the rural community, since the population density is low at the rural area than in urban which is a major factor for telecom operators to deploy huge investment, therefore, this research document will try to answer the following basic research questions:

1. How policy makers could enhance the situation that operators going to engage?
2. How the regulatory should act to regulate the telecom investment need in rural area?

In general, the study will answer the question of how the telecom investment could facilitate or change the situation in rural area by creating a willing situation that operators will be passionate

to expand their service deployment to the area to fulfill the objectives of universal access program.

1.3 Objectives of the study

Telecommunication technology has a great role in the development of every sectors, in health, education, finance and others all these sectors are highly associated with the societal change in economy and urbanization, therefore a society with limited or no access to telecommunication will fallback not to get timely information about the economic activities, the political situation, and the social movements that took place in the country.

Since technology is impacting each sector of the economic activity indicates that people will be benefit from getting the access of it. But what strategic intervention will produce the highest results of that? The research initially examined the relationship between telecom investment fund for service expansion initiation towards the rural area, and the telecom connectivity development to the rural area will facilitate the economic growth of the country simultaneously it will change the life of the rural society but to bring these to reality operators has to be encouraged to expand their services to the minimum profitable zone called rural area.

Because most of the telecom operators are believing that the development of telecom infrastructure needs the highest peoples' settlement density in a particular area but in contrary to this people living in the rural area are highly dispersed so this could magnify the investment cost of telecom infrastructure and in return the profit will be insignificant.

However, the findings were not as straightforward as decreased feelings of operators resulting in decreased service demand. Therefore, the situations that the service providers, the regulatory authority, and policy makers found will matters to balance between the service demand and the planned return intended to be gained from the investment.

It is only when operators' insecurity is present and the positive feelings are reduced in some way that telecom service expansions will certainly suffer.

Even though there are lots of causes of declining the interest for operators not to go beyond the high profit zone, policy makers must apply other pulling mechanisms to attract and support operators as a compensation for their investment. Therefore, the benefit of nearest telecom infrastructures to the rural society and the expected investment return by the telecom operators will be balanced.

1.4 Significance of the study

At present, majority of the business globally run through a private ownership including the telecom sector, exceptionally in some developing countries which highly rely on their internal budget from the sector but for the developments and extra benefits of it better to set for a liberalized market.

In this regard competition between operators will be growing and the telecom service will be reachable to the societal need.

Regulatory could also try to help operators to manage uncertainties as part of their expansion plan. Within the context of uncertainty, efforts to increase perceptions of fairness between the societies may facilitate greater engagement from operators and increase efficiency.

In this regard the research document has addressed policy recommendations and practices to be applied in multi operator countries, since Ethiopia is joining a multi operator environment, the practice of managing the earlier trend for single operator significantly changed in respective of rural telecom development & regulation of rural telecom investment fund.

1.5 Scope of the study

The study has conducted for the purpose of identifying how telecom investment fund encourage and serve as a pulling factor for operators to bring their investment to remote areas in changing the telecom sector in service expansions across the rural area, and associated change of the daily lives of the society living at. Particularly in the context of uncertainty and paying adequate attention to service needs of minimum profit zone across the whole geographic of rural area of the country within the deployment period of the universal access program.

1.6 Operational Definition

Investment: An investment is an asset purchased with the hope that it will generate income at some point in the future.

Telecom: telecommunication also known as telecom, is the exchange of information over significant distances by electronic means, referring to all types of voice, data, and video transmission.

Privatization: It is selling state-owned assets to the private sector.

Liberalization: It is the process or means of the elimination of the control of the state over economic activities.

Fund: money collected and set apart its principal or interest for a specific objective.

Universal access: It is the way that a population has access to publicly available communication network facilities and services. Typically pay telephones, community tele centers and community internet access terminals.

Rural area: A geographical area outside of towns and cities.

Telecom service: It is a service provided by Communications Company that offers voice and data service over a large area.

Connectivity: The characteristic, state, or capability of being connected is referred to as connectivity.

Expansions: The process of becoming larger in size, number, or amount.

1.7 Organization of the study

The research document has classified into five chapters, the FIRST CHAPTER is consist of introduction, and it is subdivide into background of the study, statements of the problem, Objectives of the study, significance of the study, scope of the study, limitations of the study, operational definition, and organization of the study,

the SECOND CHAPTER consist of related literatures, the THIRD CHAPTER is of the research methodology, FOURTH CHAPTER is of data presentation, analysis, and interpretation, and the final chapter indicated as the FIFTH one is composed of summary statement, conclusions, and recommendations.

CHAPTER-2

2. LITERATURE REVIEW

2.1 Introduction

Under this section the literatures related to telecom investment fund, universal access program and the rural connectivity, the empirical theory, and the conceptual framework.

The research documents published on the subject matter has discussed how the rural connectivity helps to reduce poverty and how digitally connected society impacts the economic activity positively.

As the research handled in African continent indicates that major challenges for rural and remote area connectivity includes inadequate supporting infrastructure, difficult landscape, illiteracy, high cost of installation of information, infrastructure and policy issues related to information and communication technology (ICT).

A new study paper managed by ITU endorses ways that regulators, operators, and policymakers can change that.

Following the results of a workshop apprehended at ITU in Geneva in September 2019, makes 4 key recommendations for regulators and policymakers to be able to improve broadband developments and rollout in rural areas:

- 1) Regulatory requirements for community network operators should be simplified.
- 2) Encourage tax and customs duty breaks to encourage additional infrastructure investment.
- 3) Enhance transparency and ease of doing business to encourage investment in infrastructure.
- 4) Concentrate on supplementary access networks that serve markets that are underserved.

Governments, for example, should acknowledge that market mechanisms do not always handle rural and remote connections. As a result, governments should encourage investment – specifically, public-private partnership (PPP) models – in both supply and demand generation for broadband network infrastructure development, and remote areas.

The regulatory should also create an enabling environment that includes the elaboration and deployment of investment in broadband infrastructure in unserved and underserved areas.

Government authorities should make resources like land available for installation of mobile towers and have clear policies and strictness in the role of each department in the document approval chain for facilitating installations.

2.2 Theoretical Review

Telecom investment fund can be equivalently termed as universal service and access funds which are public funds financed primarily through contributions made by mobile network operators and other telecommunications companies anticipated to expand infrastructures to underserved areas and populations.

It is also defined as applying an encouraging factor like land for telecom equipment installation, financial support, tax exemption and so on to persuade operators to go further from their high profit zone to rural area.

Telecom was a natural monopoly, and any attempt by others to provide nearly any aspect of telecom services was immediately rejected. But as telecom activities have become increasingly integrated into the operations of companies, government agencies and most other organizations, as well as the economic and social behavior of individuals, there is a growing realization that an effective telecom infrastructure is critical to the overall productivity of the economy. It must be responsive to a variety of changing demands and new technological opportunities. [William H. Melody 1997 by Schultz DocuCenter, Denmark, ISBN 87-7381-071-1]

Market liberalization followed by privatization has been a key component of structural reform programs in both developed and developing economies.

This economic policy for privatization and market liberalization is a product of neoliberal economic reforms that becomes popularized and globalized through the World Bank (WB) and the International Monetary Fund (IMF).

The aim of such programs is to achieve higher microeconomic efficiency and foster economic fulfillment, as well as reduce public sector borrowing requirements through the elimination of unnecessary subsidies.

Both wealthy and developing countries have been involved in ambitious such programs for more than a decade.

From this point of view the Ethiopian government is going to establish a partial privatization on the long term state owned telecom firm called ethio telecom through an implementations of 55% government ownership, 40% private ownership, and the rest 5% ownership to the public in promoting investment– that is, public, private, partnership models (PPPs), as the term defined this proportion keeps the state ownership without transfer of control from the state to private but the 40% private ownership is expected from investments through privatization and similarly two independent telecom firms will join the market following the market liberalization.

In the current news of the ongoing process of the Ethiopian telecom privatization & liberalization announced in mid May, 2021 it is officially recognized that a company named “Global partnerships for Ethiopia,” a consortium of Kenyan Safaricom, Japan's Sumitomo, South Africa's Vodacom, and the UK's Vodafone group, has won the proposal to host the event and join the Ethiopian telecom market officially with a license fee of USD 850 Million and a total investment proposal of USD 8.5 Billion, similarly the partnership for ethio telecom is probably goes to France telecom called Orange. [[Business Column, the Reporter Amharic, 23 May 2021, By Yohannes Anberbir](#)]

Since the control of the state is very limited the operators may deploy their investment at the locations where they demand higher profit with relatively low cost of investment like metropolitan investment, in this regard the regulatory authority must intervene through policy enforcement to protect the rights of their people to get the telecom facility based on a universal access program for telecommunication.

The theoretical arguments against the universal access and the telecom investment assumes that telecom operators will engage to the telecom investment to the rural area without any regulatory enforcement but in contrary the regulatory authority or telecommunication administrative enforcement is believed to be a must.

2.3 Empirical Review

2.3.1 Telecom investment fund

Telecom investment for a state owned operator is mainly funded from taxation or borrowed from multi-lateral and bilateral agencies [[Merna & Njiru, 1998](#)]. The level of fund provided from national budget financing will depend on the priorities of the national government and its total

tax resources. Most developing countries rely on borrowing from multilateral and bilateral organizations to fund infrastructure development due to low levels of public revenue obtained from general taxation. As a result, most developing countries are heavily in debt and are spending a huge percentage of their limited resources to satisfy debt obligations, causing emerging countries to suffer borrowing to service debts and not financing infrastructure developments projects. In recent years, the amount of money available for borrowing from traditional sources has decreased [[Merna & Njiru, 1998](#)]. When introducing telecommunication into a country, financing it from state fund is probably the easiest method to use [[ITU, 2002](#)].

New technological solutions and liberalization of telecom markets in Africa have led to an average annual growth of 78 % in mobile telephony. In Ghana a case study by Overå [[2003](#)] shows that, these developments save traders' time and transportation cost. Mobile telephony makes it possible to maintain a wider network of suppliers and customers, resulting in higher incomes and expansion. More efficient long-distance communication makes it easier to check information and to build relations of trust between trade partners.

The benefits of investing in telecommunications infrastructure are the primary motivations for doing so.

as a result of the services used [[World Bank, 1998](#)].

The economic welfare in rural area and poverty reduction and following that there will be improvements in education, health and other economic growth factors.

2.3.2 Rural connectivity developments

The lack of infrastructure in the least developed countries (LDCs) can be described in part by rural life. Transportation, electricity, water, and communication infrastructures (among others) are generally quite limited; in fact, the World Bank's Human Developments Index is indirectly a measure of infrastructure deployment and correlates other more direct measurements, such as the Networked Readiness Index (NRI) [[GITR](#)], are also useful. There many other problems beside infrastructure even within the "digital divide" — content, policy, cultural factors among them — but here the research will focus on telecom infrastructure.

and the absence of infrastructure in rural areas follows directly from the low population density: the cost of infrastructure is generally proportional to the area covered, while the benefit depends

on the number of people affected. As a result, unlike urban areas, the cost of infrastructure per person is simply too high: even if capital is plentiful and government barriers are minimal, the net increase in productivity due to infrastructure is limited by density, and thus the investment cannot be sustained solely on the basis of return.

Africa has become the fastest growing cellular market. But even this revolution has been primarily an urban phenomenon, the rural area is not much benefited from that, therefore the economy impact on the overall growth is insignificant or less contributing.

In recent years, the developments of telecommunications networks and services have led not only to more connected and serviced communities, but also to the addition of new services and applications that have a direct impact on the well-being of users and entire communities. However, there are still parts of the world's population who haven't benefited from connectivity and access. Approximately 3.8 billion people (roughly half of the world's population) lack Internet access. Due to a lack of digital knowledge and the high costs of service acquisition and infrastructure development in developing nations, a major portion of the rural population has been left behind.

In 2005, there was no a single telephone line and service in the country's village and people in rural area used to go far distance to get the service. Even at the time, it was unthinkable that rural residents would be able to obtain a telephone line in their hamlet and be able to utilize it within a short period of time. But in 2009, above 12,000 Kebeles have already been benefited from getting access to telephone services in their localities. The plan was to reach 15,000 kebeles. In 2010, 80% of the plan was accomplished. Taking the past performance of the operator's activity in addressing access to the rural areas, there is a hope that the target will be met in time. There was also a strict plan by the Government to address at least 5 telephone lines in each village until 2015 focusing on community administration institutions like High Schools, Healthcare stations, Police Stations and Agriculture Developments Offices with the target to foster social and economic developments of the nation.

The Government of Ethiopia is encouraging the operator to expand the rural telecommunication services by giving an opportunity to reuse its profit for infrastructure developments and rural

telecom expansion activities. As a result, the rural population is not forced to pay anything for telephone connectivity other than fair and appropriate usage costs that are also VAT-free.

CDMA technology has been used in remote communities, and it does not require the government to spend a lot of money to improve access to remote areas. Without the government's full commitment and technology preference, it would have been very hard to meet the target as planned.

In terms of its business strategy, the local community administration is given complete responsibility and management of the terminal equipment and accessories deployed at rural telecom service centers. This has been implemented based on agreement between the local administration and the Operator. If any technical assistance is required, it is the Operator's duty. The responsible person assigned as a service attendant by the local administration collects usage bills or fees, and the time of charge is determined per minute basis. Initially, the Operator received monthly usage charges from the local community administration as part of a postpaid settlement, however due to the reason of simplicity, later it was changed in prepaid voucher cards.

By the end of 2010 which is after completion of rural connectivity project, it was planned to have 450k network capacity for rural Kebeles which will give them an opportunity not only to have access to telephones in public places, but also to provide home telephone services to anyone who is interested and can afford the service and installation fees.

The government of Ethiopia, in its pace of rapid economic developments strategy launched in 2004, has initiated a starting point for ushering e-governance, and proposed the following three primary projects, which can be considered as what the universal access fund has achieved to date WoredaNet which would link nearly 600 local 'woredas' and 11 regional government offices across the country with each other and with the federal government headquarters in the capital, Addis Ababa. The project would provide these offices with videoconferencing, e-mail, Internet access, and file sharing capabilities—creating a foundation for e-government.

SchoolNet which would provide more than 700 secondary educational institutions with access to general ICT, email, and the Internet. Most crucially, it would allow these schools to acquire educational content from education media firms via streaming Internet and broadcast TV, laying the groundwork for e-learning.

AgriNet which would link more than 30 research and operational agricultural centres to stimulate the growth of this cornerstone of the economy.

In addition, a healthcare network was proposed as an extension of the three primary projects. ‘HealthNet’ would connect all major referral hospitals around Ethiopia and form the basis for a nationwide telemedicine infrastructure.

So far, the project has connected and helped 565 local weredas, 669 high schools, and 49 agricultural institutes around the country. VSAT communication is the technology that has been employed to deploy this service.

2.3.3 Universal access program

The universal access program is designed to assure the basic telecommunication service to remote areas. Universal access and service has seen massive change prompted by privatization and liberalization of telecommunications in the developed world. The policy on universal access/service helps to achieve affordable and equitable access by everyone to information and communications services.

Universal access and service policies include investment plans, referred to as Universal Access Service programs, which include details for financing and implementation.

The telecommunications infrastructure and services, whose effects cannot be immediately perceived in the economy, it may not be so. Nevertheless, telecommunications infrastructure has a profound effect on production and markets.

Information and access to it are necessary for making investments, increasing labor productivity, meeting consumer demand, and supplying other businesses. Telecommunications provides for more efficient and widespread information transmission between enterprises, within firms, and between enterprises and consumers [Wellenius, 1989; Shapiro, 1976; Hudson, 1989].

During the 1980s and 1990s, several international studies were conducted to determine the impact of telecommunications upon developments. A conclusion of these studies is that telecommunications contributes to the developments of a country by means of various mechanisms [Graham et al., 1996; Hudson, 1995; Hudson, 1989; The World Economic Forum, 2002], which can be summarized as follows:

- Economic effects of telecommunications: facilitating the flow of information between firms and markets (market and economic integration). This is deemed to increase efficiency of the developments process.
- Social effects of telecommunications: integrating isolated, rural communities to urban centers at national and international level (social and political integration).

2.4 Conceptual Framework

The conceptual framework is the center of the study that shows in which direction the study moves, and in the conceptual framework below they are indicated by universal access program, and telecom investment fund are an independent variable whereas rural connectivity developments is an outcome or dependent variable, that are going to be evaluated.

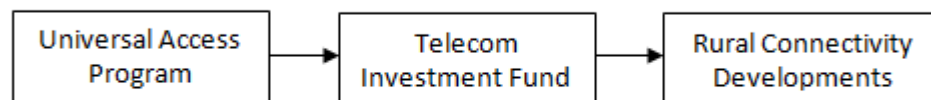


Figure 2.1 Conceptual Framework

CHAPTER-3

3. RESEARCH METHODOLOGY

3.1 Introduction

The research procedure that could be applied for this study would be a review of documents of regulatory authority, and primary information will be gathered through an interview, a visitation, and including other tools that could possibly provide reliable and valid information.

all possible input information which addresses the final outcomes that conclude to the need for telecom investment fund in effects of rural connectivity developments before or during the application of universal access program.

3.2 Research Design

The research design focuses on identifying the research problem, and justify its selection, review a research work published before in association with the problem area and clearly and explicitly specify the research question called the hypotheses, also describe the data adequately useful to test the hypotheses and where these data can be found, moreover it describes the method of analysis applied to prove the hypotheses are whether or not true or false.

The core of the problem that is going to be analyzed in this research is how the rural connectivity developments can be effective in relation to the telecom investment fund due to the universal access program coming through companies' privatization, or market liberalization.

This research problem has selected because currently these rural connectivity has significantly disregarded.

3.3 Target Population

The intervention's target population is the group of people with whom it will conduct research and develop findings.

(Cost-effectiveness Louise Barnsbee, ... www.sciencedirect.com, 2018)

Target populations of this study are employees of Ethio Telecom working under International Business Division (IBD) which is composed of four departments, Business Developments department, Wholesales marketing department, Roaming & VAS solutions department, and Network & Services department. Thus the target population of this study will be 120 permanent employees worked under the division. The detail is shown on table1 below.

3.4 Sample Size and Sampling Techniques

A sample size is a subset of a population which is helpful to gain an information and draw a conclusion based on a sample size calculation developed by Int J Ayurveda Res. 2010 Jan-Mar; 1(1): 55–57.

Depending on the type of data or study design, there are numerous ways for calculating sample size. The sample size is calculated using the following formula:

$$\text{Necessary Sample Size} = \frac{(Z\text{-score})^2 \times \text{StdDev} \times (1 - \text{StdDev})}{(\text{margin of error})^2}$$

Source: www.qualtrix.com

No.	Name of Departments	Number of participant
1	Business Developments department	10
2	Wholesales marketing department	30
3	Roaming & VAS solutions department	20
4	Network & Service Department	60

Source: Division headcount

Table 3.1 Population size in each department

The above equation is recommended for an unknown population size or a very large population size. But for population size which is smaller and know the online sample size calculator is suggested; here the online sample calculator has applied for a population size of 120 respondents.

Here the standard deviation has taken 0.5, a margin of error +/- 5%, and the confident intervals are 90% confident, 95% confident, and 99% confident, which is turn into a Z-score of most common confidence levels. (www.qualtrix.com, a resource owned and hosted by SJSU.edu)

- + 90% --- Z Score = 1.645
- + 95% --- Z Score = 1.96
- + 90% --- Z Score = 2.576

Confidence Level:

95%

Population Size:

120

Margin of Error:

5%

Ideal Sample Size:

92

Source: Sample Size: Calculate the Number of Needed Respondents | Qualtrics
Table 3.2 Sample size determination

For each department within the division a cluster sampling technique has applied to determine the number of employees involved in the study, accordingly the sampling interval is determined 1.30 using a mathematical division of total population size by the sample size which is 120/92.

3.5 Data Collection Tools

The research instruments which is going to be applied for this study carried out through the topic entitled by: -

“the effects of telecom investment fund through universal access program in the developments of rural connectivity, a Case study at Ethio Telecom (ET)” is going to be performed by a mixed approach of qualitative & quantitative research method which is generally used to explore opinions, and feelings of an employee’s working in Ethio telecom towards the rural connectivity using an investment through universal access.

It is known that researchers using qualitative methods are concerned with individuals’ perceptions of specific topics, issues or situations and the meanings they assign to their lives. From the view point of the research methods can provide context, a deeper understanding of stakeholders’ needs and participants’ perspectives, and the result expected as a recommendation and suggestion to be important for generating theory, developing policy, improving working practice, justifying change for a particular practice, and illuminating social issues.

In relation to this the below research data gathering tools and techniques will be applied

1. Interview Schedules (if necessary)
2. Rating Scale, and
3. Reference Documents

These tools and techniques can be helpful to obtain information on the same phenomena in a variety of ways, and it allows us to triangulate the data, and adding rigor to the research.

Qualitative data collection tools	
Summary	
1. Interview schedules (if necessary)	Interviews will be held based on its necessity in relation to the impact that could be raised due to the investment fund through universal access program.
2. Rating Scale	Questionnaires based on a rating scale using

	Likert is going to be designed, which is possibly defining the individuals' perceptions of specific topics, issues or situations and the meanings they assign to the lives of community in rural area.
3. Reference documents	Documents that are possibly showing the historical background of investments for the rural connectivity developments & universal access.

Table 3.3 Qualitative data collection tools

Having all these the research work is mainly focuses on Questionnaires based on Likert rating scale.

3.6 Data Analysis Tools

The data analysis is going to be applied to determine the exact number of respondents. The data is going to be analyzed using an SPSS software and descriptive statistical techniques such as mean, standard deviation, coefficient of correlation and regression.

No.	Department	Number of Employees	Sample Size (division by sampling interval)
1	Business Developments	10	8
2	Wholesales marketing	30	23
3	Roaming & VAS	20	15
4	Network & Services	60	46

Source: own research

Table 3.4 Sample size

3.7 Reliability Test

The stability or consistency of test scores is measured by reliability. There are many statistical tools that can be used to measure reliability. Here **Cronbach's alpha** is going to be applied, and known that it is the most widely used internal consistency coefficient and a measure of an internal reliability for tests with multiple possible answers.

Cronbach's alpha, α (or *coefficient alpha*), developed by Lee Cronbach in 1951, measures reliability, or internal consistency.

Cronbach's alpha (α) can be calculated using a formula: -

$$\alpha = \left(\frac{k}{(k-1)} \right) * \left(1 - \left(\frac{\sum s_i^2}{s_t^2} \right) \right)$$

The reliability of the score has been tested by applying fifteen sample questionnaires having respondents of ten participants, and the finding for α indicates **0.8599**, and

As the rule of thumb interpreting the result for alpha using Likert scale questions between (**0.9 > $\alpha \geq 0.8$**) considered to be **Good**, therefore the test result found for α indicates the questionnaires prepared are internally consistence for what we want it to measure.

#items/Questions/Components	15
sum of the items variances	5.1700
variance of Total scores	21.81
Cronbach's α	0.8174

Table 3.5 Calculation of Cronbach's alpha

3.8 Ethical Consideration and Consent

The research work is going to be conducted by informing the participants and the respondents of the questionnaires under the study that ethical issues of seeking permission, maintaining confidentiality, respecting the privacy, and protecting the secrecy of all participants will be considered. It is a must to consider ethical laws of research on conducting a research with permission.

CHAPTER-4

4. DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1 Introduction

This chapter presents a review of the rationale behind universal access fund and universal access program to the development of rural telecommunication, the definition of universal access used alternatively to telecommunication for all and the universal access fund is substituted for telecom investment fund which helps to execute the universal access program. The analysis also presents the implementation of universal access policies and programs in Ethiopia with emphasis in the rural community and highlights the three success cases of largescale universal access projects, which are described as Wereda-Net, School-Net, and Agri-Net, and in all cases the rationale remains the same, but the universality objective and its goal differ according to telecom investment characteristics and penetrations. Moreover, the universal access framework and the universal access fund regulation of the Ethiopian Communication Authority draft document of the 2020 have carried out in the document review and tried to relate with the conclusion and recommendations of the original research work.

4.2 UNIVERSAL ACCESS FUND AND UNIVERSAL ACCESS PROGRAM TO RURAL TELECOMMUNICATIONS IN ETHIOPIA

4.2.1 Historical background

The introduction of telecommunications services in Ethiopia begins dates back to 1894, during this time of the twentieth century beginning the company was placed under government control, and was later brought to operate under kind endorsement of the Ministry of Post and Communications.

In 1952 the Imperial Board of Telecommunications (IBTE) was established through a proclamation No. 131/52. The Board had full financial and administrative autonomy and was in charge of the provision and expansion of telecommunications services.

In the same year, telecommunications services were separated from the postal administration, and structured under the Ministry of Transport and Communications.

The Imperial Board of Telecommunications of Ethiopia, which became the Ethiopian Telecommunications Authority in 1981, was placed in charge of both the operation and regulation of telecommunication services in the wake of the market reforms.

Under the Dergue Regime the Ethiopian Telecommunications was reorganized as: Ethiopian Telecommunications Service from October 1975 to February 1981; and Ethiopian Telecommunications Authority (ETA) on January 1981. It retained this name until November 1996.

In 1996, the Government established a separate regulatory body, the Ethiopian Telecommunication Agency (ETA) by Proclamation 49/1996, The Ethiopian Telecommunications Service as well as the Ethiopian Telecommunications Authority (ETA) was in charge of both the operation and regulation of telecommunications service in Ethiopia, and by regulation 10/1996 the Council of Ministers set up the Ethiopian Telecommunications Corporation (ETC).

The Ethiopian Telecommunications Authority was replaced by the Ethiopian Telecommunications Corporation (ETC) to which all the rights and obligations of the former Ethiopian Telecommunication authority were transferred to the Corporation.

The Ethiopian Telecommunications Corporation was the oldest Public Telecommunications Operator (PTO) in Africa.

Lately in 2010 the Ethiopian Telecommunications Corporation (ETC) were transferred to Ethio telecom through a proclamation stated by "Ethio-Telecom Establishment Council of Ministers Regulation No. 197/2010". and it was accountable to Ministry of Information and communication.

Prior to the opening of Ethiopian telecom market Ethiopia has established the Ethiopian Communication Authority by Proclamation No. 1148/2019 to be in charge of the regulation of telecommunications service and operate under kind endorsement of Ministry of Innovation and Technology.

4.2.2 Universal Access: a growing concept in Ethiopia

In 2005, there was no a single telephone line and service in the country's village and people in rural area used to go far distance to get the service. Even at the time, it was unthinkable that rural residents would be able to obtain a telephone line in their hamlet and be able to utilize it within a short period of time. But in 2009, above 12,000 Kebeles have already been benefited from getting access to telephone services in their localities. The plan was to reach 15,000 kebeles.

In 2010, 80% of the plan was accomplished. Taking the past performance of the operator's activity in addressing access to the rural areas, there is a hope that the target will be met in time. There was also a strict plan by the Government to address at least 5 telephone lines in each village until 2015 focusing on community administration institutions like High Schools, Healthcare stations, Police Stations and Agriculture Developments Offices with the target to foster social and economic developments of the nation.

The Government of Ethiopia is encouraging the operator to expand the rural telecommunication services by giving an opportunity to reuse its profit for infrastructure developments and rural telecom expansion activities. As a result, the rural population is not forced to pay anything for telephone connectivity other than fair and appropriate usage costs that are also VAT-free.

CDMA technology has been used in remote communities, and it does not require the government to spend a lot of money to improve access to remote areas. Without the government's full commitment and technology preference, it would have been very hard to meet the target as planned.

In terms of its business strategy, the local community administration is given complete responsibility and management of the terminal equipment and accessories deployed at rural telecom service centers. This has been implemented based on agreement between the local administration and the Operator. If any technical assistance is required, it is the Operator's duty.

The responsible person assigned as a service attendant by the local administration collects usage bills or fees, and the time of charge is determined per minute basis. Initially, the Operator received monthly usage charges from the local community administration as part of a postpaid

settlement, however due to the reason of simplicity, later it was changed in prepaid voucher cards.

By the end of 2010 which is after completion of rural connectivity project, it was planned to have 450k network capacity for rural Kebeles which will give them an opportunity not only to have access to telephones in public places, but also to provide home telephone services to anyone who is interested and can afford the service and installation fees.

The government of Ethiopia, in its pace of rapid economic developments strategy launched in 2004, has initiated a starting point for ushering e-governance, and proposed the following three primary projects, which can be considered as what the universal access fund has achieved to date

1. Woreda-Net which would link nearly 600 local ‘woredas’ and 11 regional government offices across the country with each other and with the federal government headquarters in the capital, Addis Ababa. The project would provide these offices with videoconferencing, e-mail, Internet access, and file sharing capabilities—creating a foundation for e-government.

2. School-Net which would provide more than 700 secondary educational institutions with access to general ICT, email, and the Internet. Most crucially, it would allow these schools to acquire educational content from education media firms via streaming Internet and broadcast TV, laying the groundwork for e-learning.

3. Agri-Net which would link more than 30 research and operational agricultural centers to stimulate the growth of this cornerstone of the economy.

In addition, a healthcare network was proposed as an extension of the three primary projects. ‘Health-Net’ would connect all major referral hospitals around Ethiopia and form the basis for a nationwide telemedicine infrastructure.

So far, the project has connected and helped 565 local weredas, 669 high schools, and 49 agricultural institutes around the country. VSAT communication is the technology that has been employed to deploy this service.

4.2.3 Universal Access Program

The universal access program is designed to assure the basic telecommunication service to remote areas. Universal access and service has seen massive change prompted by privatization and liberalization of telecommunications in the developed world. The policy on universal access/service helps to achieve affordable and equitable access by everyone to information and communications services.

Universal access and service policies include investment plans, referred to as Universal Access Service programs, which include details for financing and implementation. The telecommunications infrastructure and services, whose effects cannot be immediately perceived in the economy, it may not be so. Nevertheless, telecommunications infrastructure has a profound effect on production and markets.

4.2.4 Universal Access and Service framework 2020, The case of Ethiopia

The universal access and service framework (UASF) document drafted for stakeholder consultation in October 2020 which is divided into nine independent chapters has discussed about universal access, its objectives, universal access fund, license issue related to universal access, fund governance and management, scope of UAF, financial requirement and LEVI plan, guiding principles of UAF operation and lastly it has discussed about project planning and implementation.

From the discussion point of view of the UASF draft document and from the conclusion and recommendations given in the research document presented for thesis defense the comparison has been made on the topics of scope of UAF and fund governance and management.

In this regard the draft document has presented about fund governance that: - “The Fund shall be governed by the Authority through an operating Directorate with oversight by the Authority’s Board of Management.

The functions of the Authority related to the UAF shall be carried out through its Universal Access and Service Directorate. The functions shall include collection and accounting for the funds as provided by the Universal Access Fund Regulation, the Development of UAS Policy and Funding Strategy, Program and project development and disbursement of the funds within

the provisions of this Universal Access Framework, and Monitoring of Programs and Projects.”

[UASF-p10, Ethiopian Communication Authority DRAFT FOR STAKEHOLDER CONSULTATION, October 2020]

The draft document also states about the transparency of fund management by saying

“The ECA Board of Management shall ensure the Fund resources are properly used for the intended purpose in accordance with the UAF Regulation and will be the approval body for UAF strategic plans, program and project implementation plans, and major Fund disbursement decisions.”

This is what have been mentioned in the thesis document whereas the recommendation has put very differently in specific manner of showing that the stakeholders are identified as the public, and the operators, “The regulatory authority must be transparent and accountable to the public and the operators regarding fund administration.” [P-40, Thesis Final _ID-GSE-3210-11]

In same manner the draft document has mentioned that

The Authority shall ensure that utilization of the Fund is transparent to the public and to the sector industry, and shall be subject to independent audit. The award of disbursements shall be conducted through a transparent, nondiscriminatory, and competitive process. It is the Authority’s intention to disburse funds in the form of non- reimbursable grants and credits for the purpose of underwriting or subsidizing the capital and operating costs of projects to be implemented by Fund recipients, who shall be industry entities or related service provision organizations, in accordance with the framework described herein.

The primary objective of the Fund shall be to disburse “smart subsidies” as onetime financial contributions which shall catalyze the provision of infrastructure or services in otherwise financially unviable situations, but will be commercially sustainable in the long run.

Moreover, it indicates that there will be an advisory committee for fund administration and states that: - “The Fund shall also have an Advisory Committee, which shall have representation from key stakeholders such as government, industry, consumer and regional organizations. The “Universal Access Advisory Committee” shall be consulted, be invited to review and provide inputs on UAF Fund Strategy and Programs, as well as feature its presence in public consultation events.”

Most likely the idea stated for fund resource collection in both documents are similar both the draft document and the thesis document have tried to indicate all the source of fund collection

resources. [P39-40, Thesis Final _ID-GSE-3210-11 and UASF-p11, Ethiopian Communication Authority DRAFT FOR STAKEHOLDER CONSULTATION, October 2020]

4.2.5 Universal Access Fund Regulation 2020, The case of Ethiopia

The universal access fund regulation document looks into the amount, and variations of the universal access levy including use of universal access fund, way of management and the role of advisory committee in the fund governance role moreover there is in depth look into the objectives of the regulation as indicated below

- 1) The primary objective of this Regulation is to put into place a regulatory framework for the design and implementation of universal access and service provision and for the administration of the Universal Access Fund in the Federal Democratic Republic of Ethiopia (“Ethiopia”).
- 2) Without prejudice to the generality of Article 49 of the Proclamation, the objectives of the Universal Access Fund shall include the following:
 - a) Promote the extension of communications infrastructure and services to all administrative levels of human population in Ethiopia, in particular to rural, remote and under- served areas;
 - b) Promote and facilitate the national integration of networks and services, e.g., by the improvement of backbone facilities, to reach a more ubiquitous quality of service delivery deemed to be the minimum for achievement of Universal Access;
 - c) Promote and support activities assuring availability of services to all socioeconomic segments of society, in particular person with disabilities, women and other vulnerable or marginalized groups;
 - d) Support the development of capacity building in ICTs and technological innovation, where gaps in user capacity needing financial support are observed and identified;
 - e) Support sectoral expansion of ICT services, including, but not limited to schools and higher education, health facilities and other organizations serving public needs; and,

- f) Facilitate content development which will provide improved and beneficial access to under- represented people and socio- economic activities.

From the research point of view, the Ethiopian communication authority regulation document has also gives an emphasis to the objectives of the Universal Access Fund to Promote the extension of communications infrastructure and services to all administrative levels of human population in Ethiopia, in particular to rural, remote and under- served areas;

4.2.6 Overview of success-cases of rural telecommunication projects in Ethiopia

There are 966 public service stations and exchanges across the country. The number of rural kebeles - the lowest administrative unit - with telephone access increased from only 60 in 2004/05 to 8 676 in 2007/08, and the target is to provide access to telecom services to all 15 000 rural kebeles by 2010. By the end of 2007/08, the number of cellular telephone (mobile) subscribers increased nearly five times from the 2004/05 level, reaching 1 954 527; the number of broadband customers reached 1 496, up from only 65 in 2002/03; and the dial-up Internet subscribers were 34 110, almost twice the number in 2004/05. Tele density, excluding mobile phones, has tripled since 2000/01 to reach 1.23 per 100 households in 2007/08. Including mobile phones, tele density reached 3.88 in 2007/08 from only 0.48 in 2000/01.

In 2005, ETC installed a national fiber optic backbone comprising 4 000 kilometers radiating out in six major directions from the capital (to Dire Dawa, Djibouti, Dessie Mekele, Bahir Dar- Nekemte, Jimma and Awassa), laying a foundation for delivering current and future services including digital radio, TV, Internet, data and other multimedia services.

In order to increase the service capacity, reliability, quality, speed and size of data transfer, ETC transferred from narrowband to broadband service in January 2005. The introduction and installation of broadband Internet, broadband VSAT and broadband multimedia infrastructure are among the major achievements of the past 12 years. Currently there are 1318 submarine gateway circuits that connect Ethiopia with the rest of the world.

CHAPTER-5

5. SUMMARY, CONCLUTIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter is going to discuss summary of findings, the conclusion, and the final recommendations which will be helpful to regulators, policymakers and operators would use not to affect the societal rights of the rural people negatively from using telecommunication services.

5.2 Summary and Conclusions

The findings of this study have established that telecom investment fund could positively affect the rural connectivity developments where it shows that there is a direct relationship between telecom investment fund and rural connectivity developments, explain that effective telecom investment fund could have positive effects on rural connectivity developments if managed properly.

The benefits of investing in telecommunications infrastructure are the primary motivations that occur from the services used and following that there will be improvements in education, health and other economic growth factors.

A study carried out by ITU, [2002] establish that when introducing telecommunication into a country, financing it from state fund is probably the easiest method to use. explain that effective telecom investment fund could have positive effects on rural connectivity developments if managed properly.

World Bank, [1998] in its study on how to achieve economic welfare in rural area and poverty reduction.

The benefits of investing in telecommunications infrastructure are the primary motivations that occur from the services used and following that there will be improvements in education, health and other economic growth factors.

This present study establishes that telecom investment fund has positive effects on rural connectivity developments that telecom investment fund is a major contributory factor to increase telecommunication access and it increases rural connectivity developments, telecom investment fund has a direct effects on rural connectivity developments these are in consonance with this present study which also established that telecom investment fund positively affects rural connectivity developments and induced telecommunication access. Some other studies however show that telecom investment fund could actually enhance improved telecommunication access.

The factors that could influence telecom investment fund should be noted and properly addressed with the intent of ensuring improved rural connectivity developments and thereby drastically increase telecommunication access. The regulatory authority has to establish a policy based incentive framework, which is transparent to telecom operators that gives opportunity to be included in some of the decisions that will govern by the universal access fund advisory committee. The telecom investment funds are finance through a contribution mechanism from telecommunications service providers. The universal access fund contribution methodology can be addressed in several different ways. In some cases, the contributions are fixed monthly, quarterly or annual fees whereas, in others, the fees are calculated as a percentage of gross revenues (often with some define exclusions in the calculation of the revenues).

There may be a requirement for service providers to pay predicted amounts based on revenue estimates, with retroactive changes made once the year end audited yearly financial data are made available, similar to revenue sharing systems.

In some countries, the telecom investment fund fee is not a separate fee but rather, a portion of an overall regulatory or licensing fee. In such cases, the portion of the fee to be directed to the universal access fund may be fixed, but in other cases, it could be subject to annual review.

The fees may go directly to the telecom investment fund or telecom investment fund administrator, or the fees may be collected by the Regulatory Authority and then subsequently transferred to the fund manager/administrator.

In addition to a service provider's direct or indirect contribution mechanism,

Other funding may be available, including as full or partial revenue from spectrum auctions, license fees, direct government donations, private industry contributions, and so on.

5.3 Recommendations

This study has established that telecom investment fund or the universal access fund leads to greater rural connectivity development and telecommunication access. The review of the literatures undertaken in this study shows that the telecom investment framework must be enhanced with a policy framework.

The findings of some other research work carried out by other scholars reviewed under this study and the findings of the study itself have established that the collaboration between regulators, policymakers and operators can change that, therefore key recommendation are given below

1. The regulatory authority must develop official roadmap about the universal access program at the national level.
2. The regulatory authority must develop policy documents that declare the road map where the universal access program, rural connectivity development, and the telecom investment fund to be harmonized with each other.
3. The regulatory authority must have defined regulations about telecom investment or universal access fund collections and disbursements.
4. The regulatory authority must be transparent enough and accountable to the public and the operators regarding the fund administration.
5. Policy makers should enforce the Public, Private Partnership model especially for rural telecom development.
6. Policy makers should enhance a roadmap for the expansions of corresponding access networks to speed up the development of rural telecommunication service.
7. Policy makers should enhance ease of doing business for investments in rural telecommunications infrastructure.

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APPENDICES:

- Universal-Access-and-Service-Framework-UASF-Draft-for-Consultation
- Universal-Access-Fund-UAF-Regulation-Draft-for-Consultation-2