

2021-08

Factors Affecting Fixed Broadband Service Demand: The Case of Bahir Dar Grand Shop

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**FACTORS AFFECTING FIXED BROADBAND SERVICE DEMAND: *THE
CASE OF BAHIR DAR GRAND SHOP***



**BAHIR DAR UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF MARKETING**

**A THESIS SUBMITTED TO COLLEGE OF BUSINESS AND ECONOMIC
POSTGRADUATE PROGRAM FOR PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF MASTER OF ARTS DEGREE IN MARKETING
MANAGEMENT**

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**JUNE, 2021G.C
BAHIR DAR, ETHIOPA**

DECLARATION STATEMENT

I, Zewditu Misganaw, declare that the thesis comprises my own work. In compliance with internationally accepted practices, I have dually acknowledged and refereed all materials used in this study work. I understand that non-adherence to the principles of academic honesty and integrity, misrepresentation/ fabrication of any idea/data/fact/source will constitute sufficient ground for disciplinary action by the university and can also evoke penal action from the sources which have not been properly cited or acknowledged.

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STATEMENT OF CERTIFICATION

Bahir Dar University

College of Business and Economics

This is to certify that the thesis prepared by Zewditu Misganaw entitled: ‘Factors Affecting Fixed Broadband Demand In Case Of Bahir Dar Grand Shop located in Bahir Dar City’ and submitted in partial fulfillment of the requirements for the Degree of Marketing Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ACKNOWLEDGMENT

First and foremost, I would like to thank the Almighty God who gave me power and patience in every endeavor of my life. Next, it is with a great pleasure that I acknowledge my advisor, Dr. Migbar for his valuable comments, encouragements and guidance at various stage of the study.

My special gratitude also extended to all customers of Bahir Dar grand shop which participates in responding my questionnaires and for their cooperation in providing me all the necessary data required for the study.

Finally, I would like to express my sincere thanks to my families for your moral support and constrictive advice to accomplish my task and to pass the challenges.

To all the above individuals, I will forever have indebted to them.

ABSTRACT

This study aims to analyze Factors Affecting Fixed Broadband Service Demand in Case Of Bahir Dar Grand Shop located in Bahir Dar city. The study answers the research questions, how covid19, internet speed, price and aftersales support affect fixed broadband demand? To answer the above questions, quantitative study was use to analyze the data gathered from grand shop broadband user customers. The primary data was collected from 350 respondents which is selected through simple random sampling methods from the total population and secondary data was gathered from different literatures, articles and from websites.to analyses the collected data Correlation analysis was implemented to assess the relationship between independent and dependent variables and multiple regression analysis also conducted to assess the influence of explanatory variables on the dependent variable and to test the proposed hypothesis. The findings confirmed that the independent variables (covid19, internet speed, price and aftersales support) have a positive and significant relationship with fixed broadband demand. Finally, the study recommended that ethiotelecom should give greater emphasis on solving and adopting the influential factors that affect the demand of fixed broadband to capture the potential customer and to create long last loyalty with the existing customers of fixed broadband.

Key Words: covid19, internet speed, price, aftersales support

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LIST OF ACRONYMS

ADSL: Asymmetric Digital Subscriber Line

DSL: Digital Subscriber line

EPON: Ethernet Passive Optical Network

ET: Ethio Telecom

EVDO: Evolution Data Optimized or Evolution Data Only

ETC: Ethiopian Telecommunications Corporation

FBBD: fixed broadband demand

FCC: Federal Communications Commission (United States)

Gbps: Gigabits per second

GPON: Gigabit Passive Optical Network

HER: Higher education and research

ITU: International Telecommunication Union

ISDN: Integrated services digital network

Mbits: megabits per second

MHz: Megahertz:

MENA: Middle East and North America

SMS: Short Message Service

SIM: Subscriber Identification Module

VSAT: Very Small Aperture Terminal

VDSL: Very high bit rate Digital Subscriber Line

VPN: Virtual private network

WCDMA: Wideband Code Division Multiple Access

WLANs: Wireless Local Area Networks

CHAPTER ONE

1. Introduction

1.1 background of the study

In the 21st century the use and importance of information communication becomes basic necessity to perform any activity in the world. Telecommunication service operators also offers voice, data, internet and SMS services for the client to facilitate communication in the global world. They include companies that provide access to internet; cable and satellite television services; wireless communication services like cellular telephony, paging, and messaging; and wire line communication services like local, long distance, and international telephony (Potluri and Mangnale, 2010).

Due to the importance of information technology, the development of broadband can bring substantial benefit to the communication, productivity, education and economic development of the society in general. And its key role is providing an effective way to deliver information and digital service to subscribers to either fixed line or wireless network. The traditional broadband which is fixed broadband has developed and upgraded from the dial-up telephone modem to (ADSL) assemetiric digital subscriber line. cheong and park (2005)

Fixed Broadband service is a broadband service by using cable technology (wire lined), which provides information and communication lines from the Central Office to users of the service (broadband). Rhee (2009)

Currently in Ethiopia ethiotelecom is the only company which provides fixed broadband service offer internet packages with wired access through fiber and copper cable based on the requested speed and other factors with the option of Limited Fixed Broadband Internet: is a packaged service based on volume mainly targeting residential customers and Unlimited Fixed Broadband Internet: It is unlimited in volume and sold with a fixed monthly rent with different access speed options. (www.ethiotelecom.et)

Additionally, even if it was the only telecom service provider in the country it implements different mechanisms to the customers to initiate and use the unlimited fixed broadband internet and connected them with global world through technologies. Like tariff reduction, free subscription

and maintenance cost. so due to this and many other factors fixed broadband subscribers increased specially in the last year. (www.ethiotelecom.et)

1.2 Statement of the problem

Dwivedi et al. (2007) cited in Syakir and Rafi (2011) confirmed that broadband, as a key enabling technology in the networked society, can help boost the economy at the national level as well as help to improve the lives of its citizens by facilitating delivery of education, health and telecommunications services at low cost and to a wider population. Internet plays a significant role as a medium to organize globalization and by increasing the frequency, speed and efficiency of information exchange in every field – commercial, industrial, educational, scientific, political, religious, recreational, etc. In addition, Internet also overcomes the limits of time and space by enabling instantaneous access to information around the world.

In spite of the above facts ITU (International Telecommunication Union) (2011) report shows that as of the end of 2011, internet penetration in Ethiopia stood at 1.1 percent, up from 0.75 percent in 2010 while fixed broadband subscriptions is only 0.01 per hundred inhabitants which is the lowest compared to the sub-Saharan African average which is 1.3 percent for internet service. Such penetration rates represent extremely limited access to information and communication technologies (ICTs) by global comparison.

Even if the former Ethiopian Telecommunication Corporation (ETC) launched broadband internet service, the rate of penetration is very low as discussed above and the company is receiving many negative feedbacks from the customers in terms of service provisioning, speed, price, quality, security and after sales factors. (www.ethiotelecom.et)

As part of rectifying the inherent problems that affect ethio product and service demand in general and fixed broadband internet subscribers in particular, Ethio telecom had made a three year strategy. in this strategy it implements different marketing strategies like tariff reduction that reaches on average 69% on monthly fee and free of subscription, relocation and installation fee for residential customer of fixed broad band. (www.ethiotelecom.et)

Previous researcher's find that fixed broadband have correlated with income, education, and greater use of other information technologies. Crandall et al. (2002), finds on his research income was a positive impact on fixed broadband demand which is higher-income groups are more likely

to subscribe to broadband than lower-income groups. Another researchers Goldfarb and Prince (2008) occurs education level had positive relation with broadband demand and the conclude that more highly educated consumers are more likely than less-educated consumers to subscribe broadband.

ICT use mostly measured by number of computers in a household was also found to be a factor for fixed broadband adoption. This is the most common if personal computer in home it wishes to have fixed broadband. Content also measured as the number of Internet hosts per 100 habitants, as a factor that contributes to broadband adoption. Internet hosts are computers that possess their own Internet Protocol (IP) address and are permanently and directly connected to the internet. Lee and Brown (2008)

But the researcher observed that there are another factors which affect fixed broadband. Accordingly, large number of customers' invite Bahir Dar grand shop and request to subscribe fixed broadband after the ministry of health announced that first corona virus patient enters to Ethiopia. This condition continued and the weekly as well as monthly report of the shop would be grater compared with before the pandemic.so the researcher observed that due to covid19 the need of fixed broadband increased in Bahirdar grand shop. In the opposite side some sales persons at the shop explains that subscribers of fixed broadband had a great complain about after sales support. For example, technicians cannot take proper installation after they subscribe and it is difficult to get maintenance service when service problem occurred due to this many subscribers forced to terminate the service. Similarly, the researcher observed that price and internet speed highly affected the demand of broadband.

1.3 Research questions

The following questions were formulated to be answered based on the data collected and presented:

- 1 How does covid19 affects the demand of fixed broadband?
2. How does the speed of internet determines the customer demand of fixed broadband?
- 3 How does price of fixed broadband affects the demand of the service?
4. How does after sales support services influence the customer demand of fixed broadband?

1.4 Objective of the study

1.4.1 General objective

The general objective of this study is to assess Factors That Affect Fixed Broadband Service Demand in Bahir Dar Grand Shop.

1.4.2 Specific objectives

In line with the main objective, this study has the following specific objectives: -

1. To assess the impact of covid19 on fixed broadband demand.
2. To investigate how internet speed affect fixed broadband demand.
3. To determine how price affects the demand of fixed broadband.
4. To determine how after sales support service affects the demand of fixed broad band.

1.5 Significance of the study

The study has significance for ethiotelecom since it deals with the factors affecting fixed broadband service demand in Bahir Dar grand shop. For the government also helps to use as an inputs to improve the telecom sector product and service by assessing and focused on the customer's demand. In general, the study of determinant factors for customer demand of the product and service widely recognized as a vital input to any strategy for customer focused business performance improvement. Based on this fact, this study is expected to have the following significance:

- ✓ The study can help for Ethio telecom to understand the factors that influence the demand of fixed broadband service subscribers and to formulate and take effective measures to achieve the target and to increase the new subscriber and to retain the existing one.
- ✓ The results of this study would have implications for the marketing section of the company as well as top level managements in enhancing their understanding and the reality regarding to factors affecting fixed broadband service demand and to pass decisions accordingly.
- ✓ The study would benefit the company to alter resources in areas that have greater influence on customer demand and used to unexpected phenomena as an opportunity to create demand for its product like covid19. Additional according to Ethiopian government the monopoly power of Ethio telecom becomes to an end in the current fiscal year. So understanding of customer demand is a significant role to compute and succeed over the new telecom operators.

- ✓ Finally, this study also helps for further researcher in the area that is not covered in this research that is any other factors that affect customer demand of fixed broadband and other ethiotelecom product and service.

1.5 Scope/delimitation of the study

In this section, scopes of the study including geographical and conceptual scopes were discussed. Geographically the study is limited to Bahirdar grand shop and focused on residential customer category, located in NWR region Bahirdar city. Conceptually, the study narrowed to the determinant factors of fixed broadband service demand. The study has dependent variable which is fixed broadband demand and the independent variables like covid19, speed of internet, tariff reduction, after sales support and coverage.

1.6 Definition of Terms

Broadband: ITU describe broadband as recent Internet connections that range from 5 times to 2000 times faster than earlier Internet dial-up technologies and it combines connection capacity (bandwidth) and speed.

Residential Customers: are those individuals who subscribe telecom services for their personal and/or family usage.

Download – This tells you how quickly information from external sources is received by your router.

Mbps – “Megabits per second” is how we gauge internet speeds. This number represents the bandwidth of an internet connection, which is how much data can be transferred each second.

Bit – Internet speed is measured in bits per second (bps). This is the smallest unit of computer information, so you’ll often see internet speeds referred to as megabits per second (Mbps).

Bandwidth – Bandwidth measures the total number of frequencies, or capacity, a network connection can handle at any given moment. The higher the bandwidth, the faster your internet speed.

1.7 Organization of the study

The study has been organized under five chapters. Chapter one is the introduction part, which contains statement of problem, objectives of the study, research hypothesis, scope/delimitation of the study and significance of the research paper.

Chapter two presents the review of related literature, which served as a basis for understanding the subject matter together with empirical studies.

The third Chapter focuses on the research and methodology part which incorporates the research design, sample and sampling techniques, data collection techniques and the method of data analysis.

Chapter four presents the results/findings of the data gathered through questionnaire along with discussions.

Finally, the last chapter, chapter five, provides summary of the findings, concise conclusions along with possible recommendations.

CHAPTER TWO

2. LITERATURE REVIEWS

2.1 Introduction

This study addressed the primary research question: “how covid19, internet speed, tariff reduction, after sales support and income affect fixed broadband service demand in Bahir Dar Grand shop?” The background information for this study came from researches in the areas of fixed broadband. The literature provides information on the determinants of fixed broad band service demand in depth and width.

This chapter was designed to discuss the concept of fixed broad band, the worldwide development of broadband as well as fixed broad band, and the determinants of fixed broad band demand. In addition, theoretical frame work, empirical studies, conceptual frame work of the study related with fixed broadband were mentioned under herewith.

2.2 Theoretical literature

2.2.1 The concept of Broadband

Different network operators, content providers and policy makers agreed that broadband does not have a single and standardized definition. Many countries have defined broadband based on speed, or on the types of services and applications that can be used over a broadband network (that is, functionality). Due to each country’s unique needs and history, including economic, geographic, and regulatory factors, definitions of broadband vary widely. Due to this and other verities various definitions were given by different bodies at different time. (Handbook, 2012)

Traditionally, however, broadband has often been defined in terms of data transmission speed (that is, the amount of data that can be transmitted across a network connection in a given period of time, typically one second, also known as the data transfer rate or throughput). Defining broadband in terms of speed has been an important element in understanding broadband, particularly since the data transfer rate determines whether users are able to access basic or more advanced types of content, services, and applications over the Internet (American broadband strategies handbook ,2012).

According to the handbook term “broadband” may refer to multiple aspects of the network and services, including (a) the infrastructure or “pipes” used to deliver services to users, (b) high-speed access to the Internet, and (c) the services and applications available via broadband networks, such as Internet Protocol television (IPTV) and voice services that may be bundled in a “triple-play” package with broadband Internet access.

According to Shekher (2012) broadband refers to a telecommunication bandwidth that is at least 256Kbps. A single broadband communication channel is 6 MHz wide and the voice grade is greater than 20KHz. Broadband uses a wide range of frequencies to seamlessly transmit and receive information between networks and it offers more speed than a traditional dial up internet connection because data and information can be multiplexed and transmitted on different communication frequencies and channels.

According to the FCC, the definition of broadband internet is a minimum of 25 Mbps download and 3 Mbps upload speeds. Broadband provides high speed internet access via multiple types of technologies including fiber optics, wireless, cable, DSL and satellite. But recently according to JuliaT (2020) Keeping in mind the rapidly evolving nature of the digital economy, we propose that the federal broadband definition should be raised to at least 100 mbps download and 25 mbps upload.

Broadband is a high-speed internet connection which allows you to enjoy everything the online world has to offer. Before broadband, internet access was achieved with ‘narrowband’ dial-up connections that were very slow by today’s standards. Broadband is much quicker and allows us to do more on the internet (Matt, 2021).

Not only countries individuals’ also understanding broadband with a particular speed of transmission or a certain set of services, such as digital subscriber loop (DSL) or wireless local area networks (WLANs). However, since broadband technologies are always changing, the definition of broadband also continues to evolve. Today, the term broadband typically describes recent Internet connections that range from 5 times to 2000 times faster than earlier Internet dial-up technologies. However, the term broadband does not refer to either a certain speed or a specific service. Broadband combines connection capacity (bandwidth) and speed. Recommendation I.113 of the ITU Standardization Sector defines broadband as a “transmission capacity that is faster than

primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2.0 Megabits per second (Mbits)". (IUT, 2003)

From the above different point of view about broadband definitions we can have the general view that broadband is a high speed internet connection that is always on, could enable to transfer data faster than the former dialup technology and access everything that the online world offers.

2.2.2 Benefit of Broadband

In the era of information technology and rapidly changing environment of world everybody was agreed that the importance of broadband internet is crucial like other infrastructures like transportation, electricity, roadways. According to NEO connect broadband has a benefit for both households and business. For businesses, robust bandwidth is the foundation for innovation as well as the key infrastructure needed to succeed and capitalize on the Internet's applications and benefits. Research demonstrates a direct correlation between businesses' use of Internet applications and revenue growth and productivity. And for households for businesses, robust bandwidth is the foundation for innovation as well as the key infrastructure needed to succeed and capitalize on the Internet's applications and benefits. Research demonstrates a direct correlation between businesses' use of Internet applications and revenue growth and productivity.

According to Benmin S (2019) the main advantage of a broadband connection is speed. Because it will download faster than with a dial-up connection and using email is a snap because you do not get disconnected in the middle of composing your message. And no need to use a separate telephone line because broadband utilizes a dedicated line that always leaves you connected to the Internet. There is no need to sign on like you do with a dial-up connection. You just click your browser on your computer and you have an instant connection to the Internet.

Today in America High--speed Internet has transformed nearly everything about modern society, including education, industry, government, entertainment, and more, often with powerful effects. Our economy is stronger and educational opportunities are greater, thanks in part to high--speed Internet access. However, though broadband Internet access is no longer considered a luxury but rather a necessity in the lives of most Americans, the benefits of high--speed Internet are still not universally shared. (Kids action, 2015).

Broadband enables job creation through three main channels: (1) direct jobs created to deploy the broadband infrastructure, (2) indirect and induced jobs created from this activity, and (3) additional jobs created as a result of broadband network externalities and spillovers. (Broadband strategies handbook, 2012).

Roberto G, Brian W and Alison G (2018) on their findings summarized the importance of broadband in different sectors of the world as below

- **Education-** Regarding education, broadband applications affect both K-12 and higher education
- **Telework-**Closely related to improving digital skills and broadband is telework or telecommuting. Telework is defined as “Working away from the traditional office using computers and telecommunications facilities to maintain a link to the office.
- **Telehealth-**Aside from telework, broadband can also provide health care services through telehealth. According to the U.S. Department of Health and Human Services, telehealth is defined as “use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health related education, public health and health administration.

Whereas the Federal Communication Commission of America (2010) indicated in its national broadband plans that broadband can provide access to a wide range of resources, services, and products that can enhance the life of the society in a variety of ways. These resources, services, and products include, but are not limited to the following:

- ✓ Broadband can overcome geographical and financial barriers to provide access to a wide range of educational, cultural, and recreational opportunities and resources.
- ✓ Broadband can facilitate provision of medical care to underserved populations through remote diagnosis, treatment, monitoring, and consultations with specialists
- ✓ Broadband can promote economic development and revitalization through electronic commerce (e-commerce) by creating new jobs and attracting new industries, providing access to regional, national, and worldwide markets.

- ✓ Electronic government can help streamline people 's interaction with government agencies, and provide information about government policies, procedures, benefits, and programs.
- ✓ Broadband can help protect the public by facilitating and promoting public safety information and procedures, including, but not limited to:
 - Early warning/public alert systems and disaster preparation programs.
 - Remote security monitoring and real time security background checks.
 - Backup systems for public safety communications networks.

According to government of Ethiopia ministry of affairs the government of Ethiopia also believes ICT (information communication technology) is essential to creating new jobs, new business opportunities, to modern education, and to improving the effectiveness of government administration and service delivery. So using broadband as a means of people 's interaction to the delivery of services and administration of government, to improve effectiveness and reduce costs via School Net – to transform education by connecting 600+ high schools; Woreda-Net – interconnecting over 600 woreda offices and the 11 regional headquarters with high-speed broadband to greatly increase the flow and speed of information needed to administer the decentralized system (including, for example, the essential management of staffing, supplies, expenditure, and reporting.); Agri-Net, to facilitate resource sharing and communication between over 50 agricultural research centers nationwide; HER Net (Higher Education and Research Net), an educational and research network interconnecting all institutions of higher learning in Ethiopia; Revenue Net – an integrated network to assist the Federal Inland Revenue Authority and the Customs Authority in tax identification and collection; and Health Net, which will interconnect all, major referral hospitals and form the basis for a nationwide.

2.2.3 Difference between mobile and fixed broadband

Globally there are two popular ways of connecting internet that is through mobile data connectivity, we can connect to the Internet at any location with useable speeds and it has good signal and coverage in most of the locations and this needs a SIM card with data plans and a compatible device which we can carry easily to any place. And secondly connecting internet through fixed

broadband get Gigabit speeds with symmetrical download and upload speeds for a permanent and dedicated Internet connection for regular work and online activity. Vasudha A (2019).

2.2.4 Overview of fixed broadband in Ethiopia

The introduction of telecommunication service in Ethiopia started during the period of emperor Menilik II in 1884 who introduced telephone technology with the installation of 477 km long telephone and telegram line from Harer to Addis Abeba (tele negarit, 2007) .in 1993 Ethiopian Telecommunication Corporation introduced another telecom service which is internet and commercialized in 1997 with narrowband technology. While in 2005 starts broadband (ethiotelecom report 2013) through wired and wireless means of connection. The wired broadband internet is delivered via ADSL (Asymmetric Digital Subscriber Line), VDSL (Very high bit rate Digital Subscriber Line), EPON (Ethernet Passive Optical Network) and GPON (Gigabit Passive Optical Network) technologies while the wireless means of connections includes AIRONET, VSAT (Very Small Aperture Terminal), EVDO (Evolution Data Optimized or Evolution Data Only) and WCDMA (Wideband Code Division Multiple Access)/3G (Third Generation) mobile. (Ethiotelecom report, 2013)

2.3 Factors affecting fixed broadband service demand

As we discussed on the above perceived benefits such as fast-speed, convenience, broadband consumption needs and other essential leisure choices, such as entertainment, have contributed to examine the broadband adoption (Bhattacharjee et al., 2018).in general the below are some factors that affect fixed broadband demand.

2.3.1 Covid19

In general telecom sector exempted from major COVID-19-related restrictions, such as stay-at-home orders and quarantine requirements, as it is recognized as an essential service sectors increased use of broadband services, as more people are working in the home (IFC, 2020)

According to Boutheina G (2020) during the time of covid19 Digital connectivity become a lifeline for using data, consuming content and engaging in digital applications by individuals, governments and businesses to ensure continuity of economic and social activities in light of social distancing and the complete lockdown in most countries of the world. Parallel to the expansion of

the pandemic in MENA region increasing demand for video and other high-bandwidth entertainment services, demand for videoconferencing and cloud services, Distance learning by students of all ages and Lack of sufficient capacity for consumers through international gateways (i.e., access points where Internet enters the country).as a result the demand for broadband service and data has increased significantly.

COVID-19 situation brings increased demands in teleworking, virtual learning and even telemedicine Rachel L (2020). due to the occurrence of the pandemic the habit of millions of intranet users dramatically changed and the government also mandated to announce lockdown and the population had to depend on their residential Internet connectivity for work, education, social activities, and entertainment.as a result the unique phenomena create unforeseen demand on internet as well as fixed broadband (Anja F, Daniel W, Oliver G, Matthias W, Oliver H, Franziska L, Christoph D, Juan T, Georgios S oct ,2020).

Additionally, Michael K (2020) describes the covid19 global shock needs people stay at home if possible otherwise keep social distance from others when they are out of home not only this businesses, industries, schools and governments also closed in many countries, limiting the ability to earn a living, gain an education, and provide important government services. But broadband connectivity allowing family and friends to communicate and entertain themselves, enabling people to work at home, helping students do virtual learning, and providing online tools, including health advice, to help fight the pandemic.as a result the demand of broadband especially fixed broadband increased dramatically in MENA countries.

According to Emily A. Vogels, Andrew , Lee R and Monica A(2020) The outbreak of coronavirus has driven many commercial and social activities perform through the online and for some the internet has become a more crucial link to those they love and the things they need.

According to grand shop sales person in Ethiopia also new internet service customers at the state monopoly Ethio Telecom has tripled during the covid19. similar to the global world for some weeks and for selected peoples it takes about 3 month implemented stay at home principle and schools are temporary lockdown and continue the teaching learning process through the online internet users visit ethio shop and subscribe fixed broadband service.as a result the demand for fixed broadband increased for enterprise as well as individual users.

2.3.2 Internet speed

Internet speed refers to the speed which data or content travels from the World Wide Web to your home computer, tablet, or smartphone. David A (2020) Internet speed is determined by how much data the connection can download (download speeds) or upload (upload speeds) per second. It also measured in Kbps or Gbps too. These are also measurements of speed and refer to kilobits per second and gigabits per second, respectively. And 1,000 Kbps equals 1 Mbps, while 1,000 Mbps equals 1 Gbps. (Catherine M, 2020)

In ethiotelcom the customer often complains about various elements of internet service in the country including the slow speed of the connection, constant breaks in service, and ineffective customer service. Additionally, Ethio Telecom does not provide the speed of connection we subscribe for. For example, if you subscribed for a connection with 256 kbps speed, it is very likely that the best speed your connection will get to will be half of that speed. Due to this problem many customers forced to terminate the service (Meron T, 2011)

2.3.2 Price

Price is the sum of all the values that a customer gives up to gain the benefits of having or using a product or service. Thus, customers exchange a certain value for having or using the product. law of demand explained relation between price and demand as If all other factors remain the same, when the price of a good or service increases, the quantity of demand decreases, and vice versa. Several studies also prove that broadband price level is significant factor in determining broadband demand in any given country.

ITU (2012) in its telecommunication development sector report indicate that the affordability and accessibility of broadband services are largely determined by the prices that are charged for those services. Broadband internet price might be a key industry factor in promoting broadband internet demand. It is assumed that lower prices can contribute for higher broadband adoption and in return higher prices may bring lower broadband adoption

Broadband pricing is varied within and across the world. Because Operators tend to include different components in the price structure, ranging from speed (download and upload), limits on content download (known as CAPs), hardware costs (such as the modem and router), and activation costs (including installation charges). In addition, monthly prices can include voice subscription charges if broadband is offered within a service bundle. World Bank group (2021)

According to Galperin & Ruzzier (2013) an average price reduction of 10% results in an increase in broadband demand of almost 22% in the penetration rate in LAC, equivalent to almost 8.5 million additional broadband connections. In addition, Lin & Wu (2013) have shown in their analysis of broadband adoption in the OECD from 1997 to 2009 that broadband price levels have been especially important for late adopters.

By considering the price impact on broadband demand the state owned telecom operator ethiotelecom makes massive tariff reduction on fixed broadband which is reducing it up to 72 percent for enterprise VPN service users, while a 69 percent reduction has been made for residential fixed broadband internet users and a 65 percent reduction for enterprise fixed broadband customers. Residential customers will have access to 1 megabyte per second (Mbps) only for 499 birr against the previous 978 birr paid for half of the internet speed per month. There are 42,700 residential broadband internet customers. If one wishes to use 2Mbps speed of broadband, will be required to pay 699 birr reduced from the previous 1768 birr. With that, the speed for fixed broadband internet has been upgraded to three times faster than the current speed. Birhanu F (2020).

The services improvement on fixed broadband includes improving the existing broadband infrastructure capacity, deploying new infrastructure, expanding reliable and secure broadband services and major tariff reduction, among others. With the tariff reduction, existing fixed broadband internet service subscribers will be upgraded to a minimum of three times higher than the current internet speed, and the new entrants also increased according to Firehiwot Tamru the CEO of ethiotelecom.

2.3.4 After Sales Support

According to Aashish P (2020) After-sales services constitute all the services and support provided after the product sale. These include

- Usage: Guidance on how to use the offering.
- Education: User training, courses, etc.
- Assurance: Guarantee, Warranty, Upgrade, Return, Replacement, etc.
- Assistance: Product configuration, installation, reinstallation, relocation, etc.
- Support: Online and offline support,

- **Reward:** Loyalty rewards, offers, referral rewards, etc.

According to Goffin (1999), there are seven main elements such as installation, product warranty, online help, repair service, user training, documentation, and up gradation of aftersales support that must be offered to the customer. So After-sales services are essential to satisfying and retaining the customers unless the customer will forced to migrate to other competitor or substitute products or totally terminated the service.

Similarly, Ruben, (2012) explains after-sales services is the sum of activities taking place after the purchase of a product which ensure that a product is available for trouble-free use over its useful life span and guarantee the continuous availability of goods (preventive maintenance), replace failed products in a timely and cost-effective manner (reactive maintenance) and create competitive advantage for the customer (value added services).

To understand how after sales support affects the demand of products needs to understand the implication of demand in after sales service support. Yavas and Ashill (2009), explained that customer satisfaction and customer loyalty are two factors of measuring customer demand. Customer satisfaction is a product of the performance to meet customer expectations, which is the basis for customers to buy again. Customer loyalty refers to the customer for a product with attachment or affection behavior of repeat purchasing the enterprise products as a habit. It is more practical to measure the consumer demand for the product through these two factors. From this we the researcher conclude that good after sales supports lead to satisfy the customer as a result the customer become loyal and demand to repurchase the product unless and other wise their demand will be discontinuing.

2.4 Empirical literature

Even though fixed broadband service is a recent phenomenon and low rate of adoption in Ethiopia, there are many studies conducted on fixed broadband demand which had countries high rate of usage of broadband. Among all others the following studies were believed to relate with this study.

Sangwon Lee and Justin S. Brown conducted a research to find out broadband adoption factors between countries. The researcher employed regression analysis and one-way ANOVA (Analysis of Variance) to assess the influential factor of fixed broadband.

Finally, the researcher found that broadband speed, ICT use and content were influential factor for global broadband adoption. The result imply higher level of broad band speed could be driver of global broadband demand. And customers may ready to migrate to costly broadband services if the internet speed is more abundant. Additionally, the researcher considers the price as one independent variable which influence the broadband demand but the researcher find that price relates with global broadband adoption but statistically were not significant.

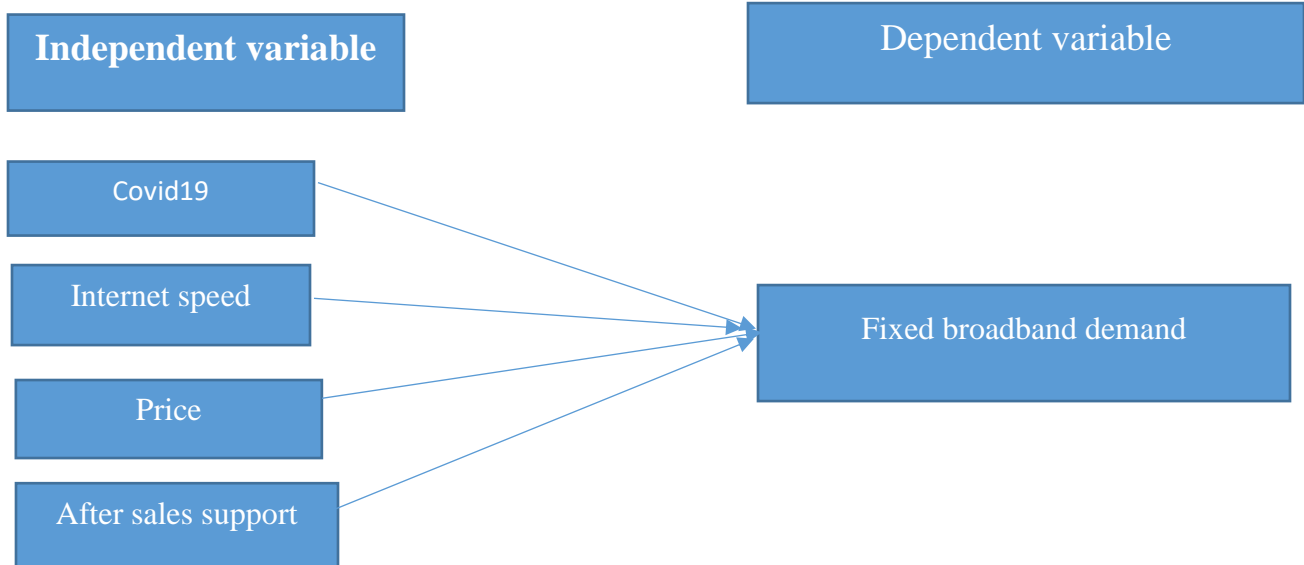
Another researchers Hernan G and Christian A. (2013) conducted a research on price elasticity of demand for broadband: evidence from Latin America and Caribbean. to find out the results the researcher takes initial sample from 23 Latin America and 29 Caribbean countries and observed penetration data from ITU databases then analyze the data through simple regression model to isolate the effect of price on broadband demand.

Finally, the researchers found that broadband penetration was strongly and negatively correlated with price. This means that countries with low price have higher penetration or demand for broadband.

A research conducted on International Journal of Scientific & Engineering Research (2018) on The Effect of Price, Brand, and After-Sales Service to the Purchasing Decision Motorcycles Yamaha Matic at PT. Hasjrat Abadi Branch Kendari and finds that after sales service variable affects significantly on purchase decision. Better after sales service given will lead to higher level of purchase decision at PT. Hasjrat Abadi Branch of Kendari. This fact shows that after sales service given has contribution to improve the level of purchase decision.

2.5. Conceptual framework

The conceptual framework was developed by showing the relationship of independent variables and the dependent variable which is fixed broadband demand.



2.6. Hypothesis

H1: covid19 pandemic have a positive and significant impact on fixed broadband demand.

H2: internet speed has a positive and significant relationship with fixed broadband demand.

H3: price has negative and significant impact on fixed broadband demand.

H4: after sales support have positive and significant relationship with fixed broadband service demand.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Introduction

Research methodology is the philosophy or general principle which guides the researcher. It provides an understanding of how the research will be conducted and organized in order to obtain information. This section presented the detail methodology which applied to obtain representative data from actual and previous residential customer of fixed broadband and had shown the logical frame work that discussed especially on research approach, design, and definition of the target population, sampling technique, method of data collection, and data analysis methods.

3.2 Research approach

The researcher employed quantitative research approach. Quantitative research involves counting and measuring of events and performing the statistical analysis of a body of numerical data. Its purpose is to generalize from a sample to a population so that inferences can be made and it is also economical and rapid turnaround in data collection (Creswell, 2003).

Quantitative research as an approach quantifies problem by generating numeric data or information that can be transformed in to useable statistics .it is used to quantify categories, attitudes, opinions, behaviors and other defined variables and uses measurable data to formulate facts and uncover patterns in research. (Wyes, 2011)

Being deductive and particularistic, quantitative researcher is based up on formulating the research hypothesis/questions and verifying them empirically on a specific set of data. Scientific hypothesis is value free; biases, and subjectivity preferences have no places in the quantitative approach. Researcher can view the communication process as concrete and tangible and can analyze it without contacting actual people involved in communication (Ting-Toomey, 1984).

3.3 Research design

The research design used in this study is explanatory. This is because the interest of the researcher is to examine the existing relationship between the dependent variables (which is covid19, internet speed, price and after sales support) and the dependent variable fixed broadband demand. In other

words, the researcher was intended just to explore and predict the relationship between the two variables.

In line with the above correlation, Creswell (2012) contends that correlational research is used when the study seeks to identify the extent to which two or more variables co-vary. In other words, change in one variable leads to change in the other variable. The basic objective of correlational design is to explain and predict the association between variables. Lodico, Spaulding & Voegtle (2010) held similar position by stating that “the purpose of correlational research is to measure two or more variables and examine whether there are relationships among the variables”. In addition to this, Fraenkel and Wallen (2009) stated that the major purpose of correlational research is to clarify our understanding of important phenomena by identifying relationship.

3.4 Data Collection Instruments

For the purpose of this study a quantitative methodology involving both open ended and close-ended questionnaire was used as the measuring instrument. The close-ended questionnaires were administered to groups of people simultaneously, since they are less costly and less time consuming than other measuring instruments.

The primary data was collected through questionnaires with open and close ended questions. Closed ended questions whereby the questions were provided with multiple or limited choices to answer for the respondents. The close ended questions were developed in five point Likert-scale where; strongly Agree (SA) = 5, Agree (A) = 4, Neutral (N) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1. The use of Likert scale is to make easier for respondents to answer question in a simple way. The questionnaire had two sections. Section 1 of the questionnaire consisted of general information about the respondents, while Section 2 covered factors influencing the demand of fixed broadband in Bahirdar grand shop.

Generally, the researcher personally distributed questionnaires when the customer come to the shop to settle their monthly bill and providing other services and through phone call for each respondent this made that the respondents have more understanding about the questions and easy to fill the questioner.

3.5 Population, Sample size and Sampling Technique

3.5.1 Population of the Study

Ethiotelecom has 4 shops in Bahirdar city which serves residential customer. As defined in the scope, the study assessed that factors affecting fixed broadband service demand in Bahirdar grand shop. This entails that the total population taken for this study from Bahirdar grand shop which includes new subscriber of fixed broadband which counts 4486 and customers which unsubscribe (terminated) the service which is 341 totally counts 4797 in 2020 fiscal year.

The researcher takes the population from only one-year data. The intention behind taking one-year data was some variables like covid19 and price reduction the new phenomena which happens in 2020 G.C. additionally on the shop history 2020 fiscal year was a year of recording large number of customer compared with before and after fiscal year.

3.5.2 Sample Size of the Study

Samples were chosen to represent the relevant attributes of the population. The researcher also notes the caution by Graziano and Raulin (1997) where the samples are not perfect representative of the population from which they are drawn, therefore the researcher unlikely to be able to generalize the conclusions to the entire population.

To determine the sample size and representative of the target population, the study used statistical instrument formula. The mathematical formula is adopted from Glenn D. (Israel, 1992).

$$n = \frac{N}{1 + N(e)^2}$$

Where, n = sample size required, N = the study population and e = Level of precision/allowable error /sampling error (0.05) at 0.95(95%) confidence level (t) of 0.05(5%) unit variance (p). To calculate the sample size at 95% confidence level and 5% margin error;

Using the above statistical formula, the sample size of study was determined as follows.

$$n = \frac{4797}{1 + 4797(0.05)^2} = 369$$

3.5.3 Sampling Technique

The main intention of this research was to investigate factors that affect fixed broadband service demand in Bahirdar grand shop. The researcher wants to generalize results about grand shop broadband demand factors of the population by analyzing the data of representative samples. To do this the researcher wanted to take the samples by dividing the customers in to two groups which is new subscriber and terminated customers of the shop. The intention behind the subgroups are the researcher believe that gathering the data from the new customer affects the demand positively and the terminated customers affect negatively.so the researcher employed stratified random sampling method divide the population into subgroups (strata) based on the type of customers and then simple random sampling method will implement to select representatives from each subgroup within the population that represent the sample.

3.6 Method of Data Analysis

After collecting the questionnaires that were distributed, the data was properly organized and prepared for Codification. Following this, the coded data was feed in to a software program that has been employed to analyze and present the data.

The descriptive statistical results were presented by tables, frequency distributions and percentages, mean and standard deviation to analyze the demographic characteristics of respondents and to identify factors affecting fixed broadband service demand in Bahirdar grand shop. Pearson's correlation coefficient analysis was also conducted to test the proposed hypothesis whether there are significant relationships between the independent variables and the dependent variable

Linear regression analysis also employed to investigate the relationship between independent and dependent variables. Whereas, multiple regression analysis was used to examine the effect of independent variables.

Regression functions

The equation of multiple regressions on this study was generally built around two sets of variables, namely dependent, and independent variables. The basic objective of using regression equation is

to make the researcher more effective at describing, understanding, predicting, and controlling the stated variables. Accordingly, the regression model has been presented as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 - \beta_3 X_3 + \beta_4 X_4 + \epsilon_{it}$$

Where: -

Y = the dependent variable (fixed broadband demand),

B₀= the intercept term-constant which is equal to the mean if all slope coefficients are 0,

B_i = (B₁, B₂, B₃, B₄, and B₅) are constant regression coefficients representing the condition of the independent variables to the dependent variables.

X_i = (X₁, X₂, X₃ and X₄,) are the independent variables which means;

X₁ = covid19

X₂= internet speed

X₃= price

X₄= after sales support

ε - (Extraneous) Error term.

3.6 Measurement of variables

3.7.1 Measurement of Independent Variables

In this study there are five independent variables specifically, covid19, internet speed, price/tariff reduction, and after sales support. Each of these variables measured between two to five questions which tailored with the fixed broadband demand context. Hence, a total of 17 questions were constructed. Responses to these questions were measured by a five-point Likert scale. For example, “1” denoted as strongly disagree, “2” denoted as disagree, “3” denoted as neutral, “4” as agree, and “5” as strongly agree.

3.7.2 Measurement of Dependent Variable

A total of 17 questions were developed to measure the respondent’s intention towards the factors affecting fixed broadband demand. A five-point Likert scale were applied to measure the responses, ranging from scale “1” as strongly disagree to scale “5” as strongly agree.

3.8 Pre-Testing Procedures (Validity and Reliability test)

Before administering the questionnaires, the research instruments were pre-tested by the researcher to ascertain the suitability of the tool before carrying out the research. A pretest is meant to test for clarity and understanding of questions to test if the questions will yield as expected. As indicated by Mugenda and Mugenda (2003) a pre-test ought to go from 1-10%. Therefore, to assess the reliability and validity of the questionnaires, a pre-testing of the instrument was conducted 10% of this study work.

3.8.1 Validity

According to Kothari (2004), validity indicates the degree to which an instrument measures what it is supposed to measure, that is the extent to which differences found with measuring instruments reflects true differences among those being tested to enhance validity of the study. In this regard, a pilot study was undertaken on 10% of the sample population to show both construct validity and content validity. For construct validity, the questionnaire was divided into several sections to ensure that each section assessed information for a specific objective. The questionnaire was subjected to thorough examination by two randomly selected operational managers which uses fixed broadband service to ensure content validity. They were asked to evaluate and comment the statements in the questionnaire for relevance and whether they were clear and meaningful. Based on the findings of the pre-test, the researcher tried to rephrase some questions that are not clear without affecting the basic context of the instrument and also it was confirmed that the questionnaires that pass the pre- test become effective to meet the objective of the study and enhance content validity before distributing to the respondents.

3.8.2 Reliability

As of Bhattacharjee (2012) reliability is the degree to which the measure of a construct is consistent or dependable. In order to make sure that the questionnaires are reliable and internally consistent, the Cronbach alpha is used as a coefficient of internal consistency and computed for each variable with multi item scales.

The questionnaire was subjected to overall reliability analysis of internal consistency. Internal consistency measures the correlations between different items on the same test (or the same

subscale on a larger test) and whether several items that propose to measure the same general construct produce similar scores. Mallery (2009) provides the following rules of thumb: >0.9 – Excellent, >0.8 – Good, >0.7 – Acceptable, >0.6 – Questionable, >0.5 – Poor and <0.5 – Unacceptable. Therefore, to estimate the reliability of the questionnaires in this study work, a pilot test of 19 questionnaires were randomly distributed to ethiotelecom fixed broadband users and Cronbach Alpha was computed through spss software program. Table 3.3 shows both the total and the pilot sample test result of reliability in the questionnaire.

Table 3.1: Cronbach Alpha Coefficient for each Variable

ITEMS	Cronbach Alpha	
	10% Pilot Sample	Total Sample
Covid19	0.876	0.779
Internet speed	0.793	0.835
Price	0.757	0.732
After sales support	0.808	0.802
Fixed broadband demand	0.810	0.799

Source: SPSS output

All the items in the case of total sample except internet speed and price have Cronbach Alpha values of greater than 70% it shows that the reliability of the questionnaire. As indicated on the above the Cronbach Alpha is covid 19, after sales service and fixed broadband demand greater than 0.8 which is relatively high and showing a relatively strong internal consistency among the measurement items. And also the cronbach alpha value of internet speed and price were 0.793 and 0.757 respectively also acceptable.

3.9 Ethical Considerations

There are certain ethical protocols that have been followed by the researcher. The first is soliciting explicit consent from the respondents. This ensures that their participation to the study is not out of their own volition. The researcher also ensured that the respondents were aware of the objectives of the research and their contribution to its completion. One other ethical measure exercised by researcher is treating the respondents with respect and courtesy (Leary, 2004). This was done so that the respondents were at ease and more likely to give honest responses to the questionnaire.

There were also ethical measures that have been followed in the data analysis. To ensure the integrity of data, the researcher checked the accuracy of encoding of the survey responses. This was carried out to ensure that the statistics generated from the study are truthful and verifiable (Leary, 2004).

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

4.1. Introduction

This chapter presented the results of data analysis and findings compiled from the field. It was divided into three main sections. The first section compacted with background information of the respondents. The second section analyzed and discussed the relationship between the various variables in the study. The third section analyzed the basic assumptions that the independent variables (covid19, internet speed, price, and after sales support) impact on the dependent variable i.e. fixed broadband demand in case of Bahirdar grand shop, in Bahir Dar city. A multiple regression modeling approach was also proposed as an effective for studying the relationships. The result of this multiple regression model was analyzed and discussed in this chapter.

The statistical analysis of this study was performed through SPSS software (Version 23) and the results of the study were showed in descriptive and inference section. In descriptive section table, chart and statistics and in inference section, the result of multiple liner regression was analyzed.

4.2. Response Rate

This chapter presented analysis and findings of the study based on the interpretation of the data collected. The researcher received three hundred fifty (350) responses from a total of three hundred sixty-nine (369) questionnaires which were distributed physically and represented 95% of response rate, thus enabling meaningful data analysis.

This study was executed to accomplish the targeted aims. The representation of the study's outcomes and discoveries according to the polls managed to the chosen respondents. The sampling frame in this study was 350 customers who actively use fixed broadband and terminated the service.

Table 4.1: Respondents' Demographic profile

Variable	category	frequency	percentage (%)
Gender	male	204	58.3
	female	146	41.7
	total	350	100
Age(years)	18-30	130	37.1
	31-40	93	26.6
	41-56	79	22.6
	Above 56	48	13.7
	Total	350	100
Marital status	single	117	33.4
	Married	161	46
	Widowed	43	12.3
	Divorced	29	8.3
	Total	350	100
Level of education	Primary	58	16.6
	Secondary	58	16.6
	Diploma	39	11.1
	Degree	73	20.9
	Masters	101	28.9
	Above masters	21	6
	Total	350	100
Customer status	active	266	76
	Deactivate	84	24
	Total	350	100

Source: Primary Data (2021)

4.3. Descriptive Analysis

This descriptive analysis is used to look at the data collected and to describe the data captured through the questionnaire. It was used to describe the demographic factors for more clarification. Descriptive analysis is mainly important to make some general observations about the data gathered for general or demographic questions.

4.3.1. Demographic Information of the Respondents

This section shows the demographic details of the respondents. The respondents were asked to indicate their gender, age, education level, marital status and current customer status related to usage of fixed broadband. The results are shown in the above table 4.1.

The above table 4.1 indicates that from 350 sample respondents, 204 (58.3%) were male while the remaining 146 (41.7%) were female respondents. This indicates that majority of the fixed broadband subscriber were male. The other classification of respondent is that based on their age level, 130 (37.1%) of them were aged 18 to 30 years, 93(26.6%) were aged 31 to 40 years and 79 (22.6%) were found between 41 to 56 years and 48(13.7%) of respondents were aged above 56 years. This indicates that the majority of the fixed broadband subscriber of Bahirdar grand shop were young and middle aged. From this analysis, we infer that number of young and productive age group were highly sensitive to subscribe and use fixed broadband. As far as the marital status of customers is concerned in the table 4.1, 161(46%) were married, 117 (33.4%) were single status, 43(12.3%) were widowed and 29(8.3%) were divorced status. From this data we infer that the married respondents had high rate of demand to subscribe fixed broadband. Because fixed broadband is fixed at a specific location of customer's home and able to access with their family.

In addition to the above descriptions, respondents were asked to indicate their education level that currently enroll or they were terminated privasioly. 101 (28.9%) were follow and completed their master's degree, 73 (20.9%) were degree holder or follower, 58(16.6%) were primary and secondary level of education separately, 39(11.1%) were diploma and 21 (6%) were above masters' level. This implies that well educated customers were better awareness and usage experience compared to low education level customers.so large number of fixed broadband subscriber in Bahir Dar grand shop were well educated customer. Lastly, respondents were

classified based on their current usage status, 266 (76%) were currently use fixed broadband actively and 84 (24%) were currently terminated the service. This implies many of the respondents have a demand for fixed broadband. But there were some respondents unsubscribe the service due to different factors.

4.3.2.Descriptive Statistics (Mean and Standard Deviation)

Descriptive statistics (Mean and Standard deviations) of the respondent scores were computed. Analysis has been done through comparing this mean and standard deviation among respondents. The reason for using descriptive statistics is to compute the different factors that affect fixed broadband demand in case of Bahir Dar grand shop, Bahir Dar by using Mean and standard deviation values. In the table 4.2 the respondent’s perception on fixed broadband demand

Table 4.2 shows the mean value depicting the overall fixed broadband demand. As far as these descriptive statistics is concerned, fixed broadband demand in Bahirdar grand shop is highly satisfactory level with the mean of 4.09 and also standard deviation value of 0.959 indicates that there is moderate variability in fixed broad band service demand on a 5 point Likert scale.

Table 4.2: Descriptive statistics (Mean and Standard Deviation)

Variables	No. of Items	N	Mean	Standard Deviation
Covid19	2	350	4.03	0.944
Internet speed	3	350	4.08	1.009
Price	5	350	3.88	0.917
Aftersales support	5	350	3.80	0.961
Fixed broadband demand	2	350	4.09	0.959

Source: Primary Data (2021) n =350

The above table 4.2 also shows that the mean and standard deviation of each independent variables. As far as the mean values are concerned, covid19 (4.03), internet speed (4.08), price (3.88), and aftersales support (3.80) have relatively major roles on fixed broadband demand. This shows that all explanatory variables play a fundamental role on fixed broadband service demand.

As shown in Table 4.2, among all the explanatory variables cited as influencing that affects fixed broad band service demand, internet speed impact was highest.

4.4. Inferential Analysis

In this section, correlational analysis between fixed broadband demand and its determinants which affect the dependent variable and the regression analysis including multi- collinearity as well as normality tests were presented.

4.4.1. Correlation Analysis

This section tested the relationships between the different dependent and independent variable(s) in order to get an answer to the research questions. In order to know to what extent there is a relationship between the different variables, the correlation coefficient was examined. This coefficient is a measure which indicates the strength and direction of a linear relationship between two random variables. It can vary from -1 (perfect negative correlation) through 0 (no correlation) to +1(perfect positive correlation) and is also known as the Pearson Correlation Coefficient (R-value). In other words, if the correlation coefficient value is close to either -1.0 or 1.0, it means that there is a strong negative or a strong positive relationship between the two variables. Generally, the strengths of the correlations were determined on the basis of the standard illustrated under table 4.3.

Since all variables are interval, the relationship between the independent variables i.e. covid19, internet speed, price, aftersales support and the dependent variable i.e. fixed broadband was investigated using Pearson product–moment correlation coefficient. The results of correlation analysis in the table 4.3 shown below that all the independent variables were positively and significantly correlated with the dependent variable i.e. fixed broadband demand at 99 percent confidence level ($P < 0.01$). The highest correlation is signified by internet speed ($r = 0.710$), followed by covid19 ($r = 0.691$), aftersales support ($r = 0.564$) and price ($r = 0.498$).

Table 4.3: Pearson Correlation analysis between the dependent & explanatory variables

Determinants	Fixed broadband demand	
	Pearson Correlation	Sig. (2-tailed)
Covid19	0.691	.000**
Internet speed	0.710	.000**
Price	0.498	.000**
Aftersales support	0.564	.000**

**Correlation is significant at the 0.01 level (2-tailed)

Based on the Pearson correlation test shown in the table 4.3, internet speed is positively, highly and significantly correlated with fixed broadband demand. The correlation coefficient between internet speed and fixed broadband demand is the second of all correlation results of independent variables which is ($r=0.710$). This means if the telecom operators improve the speed of internet and provide high quality and consistence speed of internet in order to capture fixed broadband subscribers and to create long last users. Therefore, the internet speed has a greater power to affect the dependent variable i.e., fixed broadband demand of Bahirdar grand shop.

The second explanatory variable which is integrated with fixed broadband demand is covid19. Derived from the Pearson correlation test shown in the above table 4.3, covid19 and fixed broadband demand have positive and significant correlation coefficient which is ($r=0.691$) significant at the 0.01 level. This means due to covid19 pandemic the usual face to face interaction of personal and organizational activity of a society restricted and most activities are performed in online ways as a result the demand of fixed broadband in Bahirdar grand shop highly increased during covid19.

The third factor that is included in factors affecting fixed broadband demand is aftersales support. As far as the table 4.3 is concerned, it has positive and significant relationship with the dependent variable. In addition to this, the correlation coefficient between aftersales support and the dependent variable, fixed broadband demand which is ($r=0.564$). This shows that aftersales support is an influencing factor of fixed broadband. This implies need to improve aftersales service support

and proper follow up after selling of the service to attract potential customers, to create loyal customers and finally to build high demand for fixed broadband service.

Price is another element among the independent variables that is taken into account to affect fixed broadband demand. The correlation coefficient between price and the dependent variable is ($r=0.498$). This means customers are influenced by subscription and usage price to demand and access fixed broadband. Price is one of the important marketing tools used to create long term relationship with customers in service provider organizations and considered as one of the organizational resource commitments that serves as an input into fixed broadband service provider and is intended to enhance firm's ability to successfully build and maintain a maximum profit portfolio for relationships with customer.

4.5. Linear and Multiple Regression Analysis

In this section, regression analysis was used to examine the effect of independent variables (covid19, internet speed, price and aftersales support) impact on the dependent variable i.e. fixed broadband demand in Bahirdar grand shop located in Bahir Dar city.

4.5.1. Assumptions of Regression Analysis

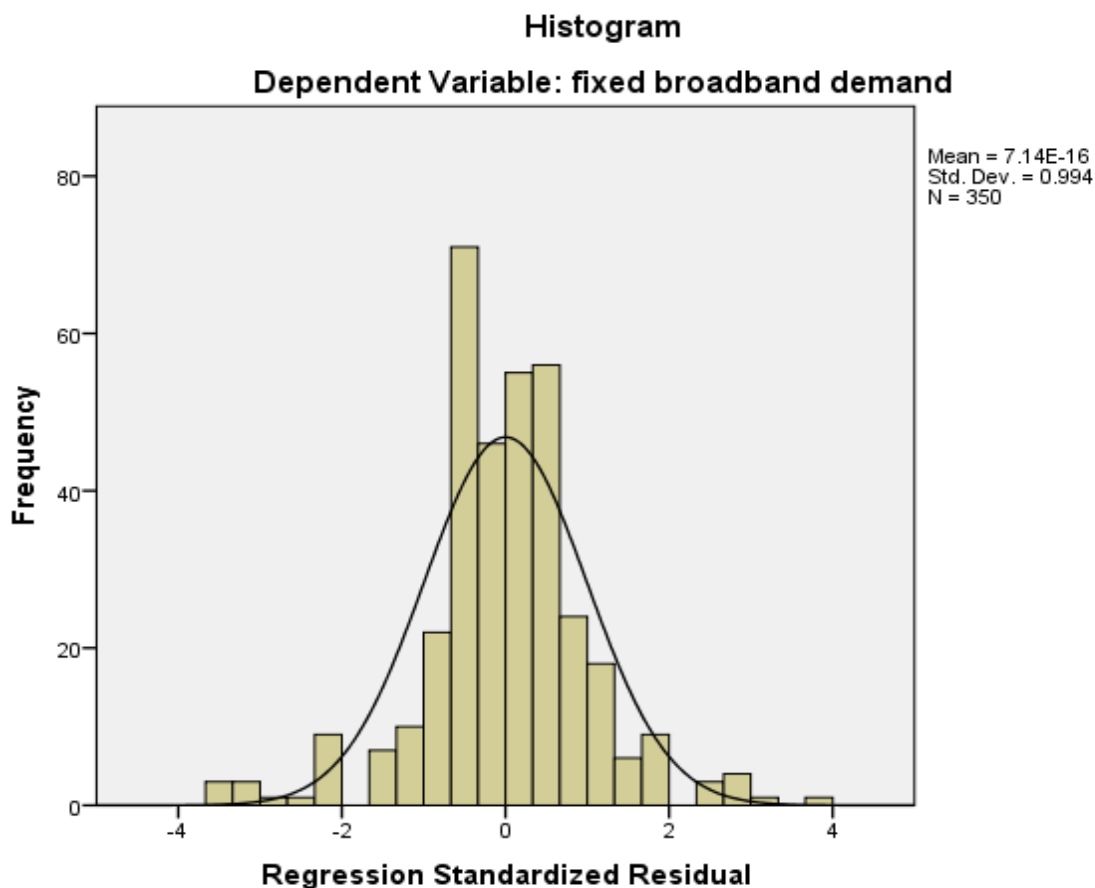
Before going further in to the data through SPSS procedures, the first issue is test the assumption of classical linear regression model (CLRM). This section provides test for the classical linear regression model (CLRM) assumptions such as normality, linearity, heteroscedasticity, and multicollinearity tests. The linearity of the parameter is assumed since the model applies linear ordinary least square (OLS). The objective of the model is to predict the strength and direction of association among the dependent and independent variables. Thus, in order to maintain the validity and robustness of the regression result of the research in CLRM, it is better to satisfy basic assumption CLRM assumptions. As noted by (Brooks, 2008), when these assumptions are satisfied, it is considered as all available information is used in the model. However, if these assumptions are violated, there will be data that left out of the model. Accordingly, before applying the model for testing the significance of the slopes and analyzing the regressed result, normality, linearity, multicollinearity and heteroscedasticity tests were made for identifying misspecification of data if any so as to fulfill the research quality.

4.5.1.1. Normality Test

One assumption of classical linear regression model (CLRM) is the normal distribution of the residual part of the model. As noted by Gujarati (2004), OLS estimators are BLUE regardless of whether the u_i are normally distributed or not. If the disturbances (u_i) are independently and identically distributed with zero mean and constant variance and if the explanatory variables are constant in repeated samples, the OLS coefficient estimators are asymptotically normally distributed with means equal to the corresponding β^2 's.

However, as per the central limit theorem, if the disturbances are not normally distributed, the OLS estimators are still normally distributed approximately if there are large-sample data. As per the classical linear regression model (CLRM) assumption, the error term should be normally distributed or expected value of the error terms should be zero ($E(u_t) = 0$).

Figure 4. 1: Frequency Distribution of standardized Residual



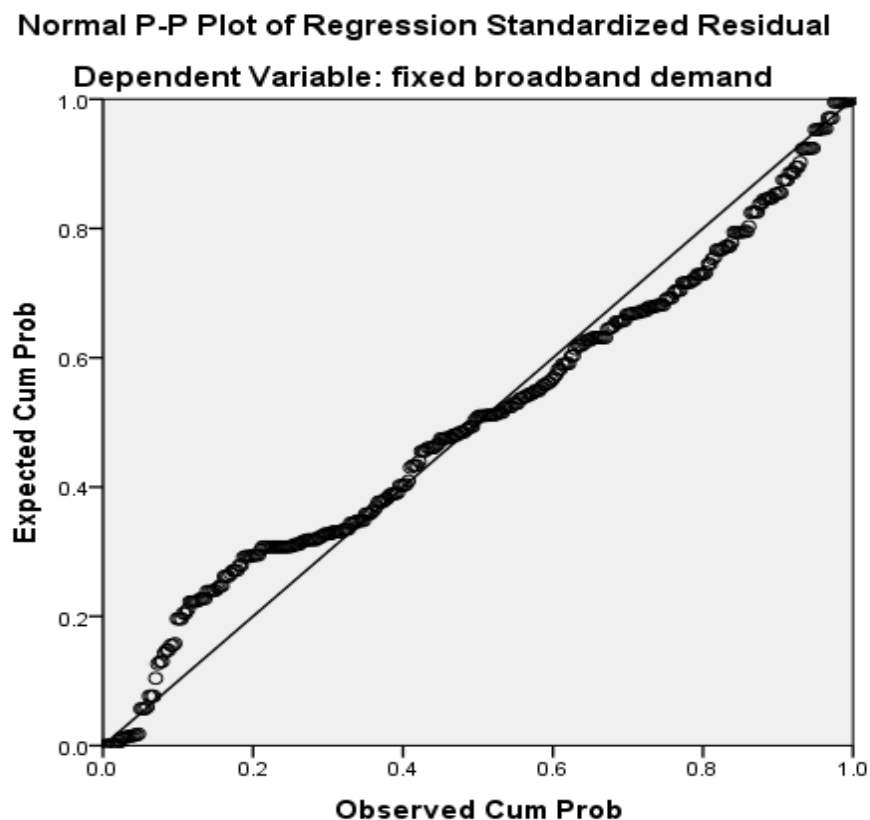
Source: SPSS output

Normality is used to describe a symmetrical, bell-shaped curve, which has the greatest frequency of scores around in the middle combined with smaller frequencies towards the extremes (Pallant, 2005). The dependent variable in this case is fixed broadband demand. Thus, since the sample size for this study is large enough, it is approximately considered as normally distributed. This implies that residuals are asymptotically normal in this study.

4.5.1.2. Linearity Test

Linearity refers to the degree to which the change in the dependent variable is related to the change in the independent variable. To determine whether the relationship between the dependent variable fixed broadband demand and the independent variables X1 (covid19), X2 (internet speed), X3 (price), and X4 (aftersales support) is linear; plots of the regression residuals through SPSS software had been used.

Figure 4. 2: Normal point plot of standardized residual



Source: SPSS output

In the figure 4.2 shown above is the probability plot of the standardized figure which seems that the assumption is acceptable for these data. This scatter plot shows that there exists a linear correlation between dependent variable and independent ones. Therefore, this result suggests the relationship which is the researcher trying to predict is linear.

4.5.1.3. Multicollinearity Test

This assumption is concerned with the relationship exist between explanatory variables. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect collinearity, and it cannot be estimated by OLS Brooks (2008). Multicollinearity condition exists where there is high, but not perfect, correlation between two or more explanatory variables (Cameron and Trivedi, 2009), (Wooldridge, 2006). According to (Churchill et.al, 2005), when there is multicollinearity, the amount of information about the effect of explanatory variables on dependent variables decreases. As a result, many of the explanatory variables could be judged as not related to the dependent variables when in fact they are. This assumption does allow the independent variables to be correlated; they just cannot be perfectly correlated. If the researcher did not allow for any correlation among the independent variables, then multiple regressions would not be very useful for analysis.

The diagnostics variance inflation factor (VIF) and tolerance are used to test multicollinearity of the independent variables. Multicollinearity is present when the VIF for at least one of the independent variable is large. According to the rule of thumb, if VIF of a variable exceeds 10 or tolerance of 0.1 or less, the variable is said to be highly collinear (Murray et. al, 2012). Multicollinearity is not a problem in the regression model as none of the independent variables has a VIF value of greater than 10 & tolerance values are less than 0.1. Therefore, the Collinearity statistics were computed to provide the tolerance and variance inflation factor (VIF) scores for each of the five variables and these scores were provided in Table 4.4.

Table 4.4: Collinearity Statistics

Variables	Collinearity Statistics	
	Tolerance	VIF
Covid19	0.751	1.331
Internet speed	0.355	2.815
Price	0.285	3.514
Aftersales support	0.354	2.827
Mean of Tolerance & VIF	0.436	2.621

Source: SPSS output

Based on the results indicated in the above table 4.4, there is no Multicollinearity problem in this study; this is due to the fact that the mean of $1/VIF$ & VIF of explanatory variables is 0.44 and 2.621 respectively which is much lower than the threshold of 10. The tolerance and VIF for each variable also very low, this indicates that the explanatory variables included in the model were not correlated with each other.

Generally, VIF greater than 10 and $1/VIF$ is less than 0.10 indicates the presence of multicollinearity. However, in this study the result shows that, no multicollinearity problem since VIF less than 10 and $1/VIF$ is greater than 0.1. Thus, the explanatory variables which have been incorporated in this study are the basic influential factor of fixed broadband in Bahirdar grand shop in Bahir Dar city. This of course enhanced the reliability of regression analysis.

4.5.2. Regression Analysis

The regression analysis was conducted using the hierarchical regression method. It was conducted to investigate the influence of independent variables on the dependent variable and identify the relative significant influence; i.e., independent variables (covid19, internet speed, price, and aftersales support) to the dependent variable; i.e. fixed broadband demand. Therefore, the overall regression model and its ANOVA were summarized as follows in this study work:

4.5.2.1. Model Summary

Table 4.5 depicts the results of multiple regressions of four explanatory variables i.e., covid19, internet speed, price and aftersales support. The result shows that the model tested is significant ($p < 0.01$).

As far as the next table 4.5 is concerned, the R square (R^2) 0.679 indicates that 67.9 percent of the variance in fixed broadband demand is attributed to the four independent variables entered into the regression and the remaining 32.1 percent of the variance in fixed broadband demand may be explained by other factors which are not included in the model. Therefore, the proposed independent variables (covid19, internet speed, price, and aftersales support) are moderate explanatory variables of fixed broadband demand in Bahirdar grand shop located in Bahirdar city.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.824 ^a	.679	.675	.54691

a. Predictors: (Constant), After sales support, covid 19 pandemic, speed of internet, price of fixed broadband

b. Dependent Variable: fixed broadband demand **n=350**

Source: SPSS output

4.5.2.2. ANOVA (Analysis of Variance)

It shows the collective influence of independent variables (covid19, internet speed, price and aftersales support) on the dependent variable which is fixed broadband demand.

Table 4.5: ANOVA (Analysis of Variance)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	218.004	4	54.501	182.210	.000 ^b
	Residual	103.193	345	.299		
	Total	321.197	349			

a. Dependent Variable: fixed broadband demand

b. Predictors: (Constant), After sales support, covid 19 pandemic, speed of internet, price of fixed broadband

n=350

Source: SPSS output

The above table 4.6 shows that the group of independent variables collectively predicted the dependent variable at a statistically significant level ($F= 182.210$, $p<0.01$). From the ANOVA test in table 4.6 shows that the significant value 0.01 is greater than the calculated sig. value 0.000. It reflects that there was a statistically significant correlation between dependent and independent variables at 1% significant level. Which means the explanatory variables have a great impact to fixed broadband demand in Bahirdar grand shop located in Bahir Dar City. But it does not mean that all these determinants have equally significant correlation with the dependent variable. The results of multiple linear regression analysis signal that there is a variation in explanatory variables on dependent variable. Beside the F statistics (182.210) which is used to measure the overall test of significance of the model was presented and the null hypothesis can be clearly rejected since the p-value is 0.000 which is sufficiently low, the model is well fitted at one percent level of significance.

4.5.2.3. Regression Coefficient Analysis of the Model

Coefficient analysis shows the relationship between dependent variable and independent variables. According to sig. value of X₁ (covid19), X₂ (internet speed), X₃ (price) and X₄ (aftersales support) are statistically significant at one percent significant level in agreement with the hypothesis. This means the independent variables have a great contribution to the dependent variable.

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.324	.157		2.062	.040
	covid 19 panadimic	.441	.036	.434	12.340	.000
	speed of internet	.465	.049	.489	9.549	.000
	price of fixed broadband	-.174	.060	-.166	-2.908	.004
	After sales support	.202	.051	.203	3.950	.000

a. Dependent Variable: fixed broadband demand

a. Dependent Variable: fixed broadband demand

n=350

Source: SPSS output

From the above findings, the researcher developed the following regression model

Based on Unstandardized Coefficients

$$\text{FBBD} = 0.324 + 0.441X_1 + 0.465X_2 - 0.174X_3 + 0.202X_4$$

Based on standardized Coefficients

$$\text{FBBD} = 0.434X_1 + 0.489X_2 - 0.166X_3 + 0.203X_4$$

Std. Error (0.157) (0.036) (0.049) (0.060) (0.051)

T-Values (2.062) * (12.340) * (9.549) * (-2.908) * (3.950)

R-Square (R^2) =0.679, F=182.21

*= Significant at 99% level

Where, FBBD=Fixed broadband demand

X_1 = covid19

X_2 =internet speed

X_3 =price

X_4 =aftersales support

Here, a one-unit increase in X_1 (covid19) has a 0.434-unit increment in fixed broadband demand at Bahirdar grand shop. A one-unit increase in X_2 (internet speed) has a 0.489 unit fixed broadband demand at Bahirdar grand shop. A one-unit decrease in X_3 (price) has a 0.166-unit increment in fixed broadband demand at Bahirdar grand shop. A one-unit increase in X_4 (aftersales support) has a 0.203-unit increment in fixed broadband demand at Bahirdar grand shop.

All the above mentioned explanatory variables except price have a positive relationship with the dependent variable. Meaning that any incremental in these variables leads to increase the customer demand of subscribing and using fixed broadband demand.so these finding provide the independent variable covid19, internet speed, price and aftersales support significantly influential factor for the dependent variable fixed broadband service demand in Bahir Dar grand shop.

4.6. Discussions on Regression Results

The preceding sections presented the overall results of the study. Thus, this section discusses in detail analyses of the results for each explanatory variables and their importance in determining factors affecting fixed broadband demand in accordance with the above regression result. In

addition, the discussion analyses the statistical findings of the study in relation to the previous empirical evidences.

4.6.1. Covid19 and fixed broadband demand

Hypothesis 1: covid19 has positive and significant effect on fixed broadband demand.

The finding of this study indicates that covid19 has a positive and significant effect on customers fixed broadband demand. This entails that for one unit change in covid19, keeping other things constant has resulted in 0.434 units change on the level of demands of fixed broadband.

4.6.2. Internet speed and fixed broadband demand

Hypothesis 2: internet speed has positive and significant effect on fixed broadband demand.

As per the result of the regression analysis above, table 4.7 indicated that statistically significant and positive effect of internet speed customer demand of fixed broadband. It implies that for one unit change in speed of broadband, keeping other things constant has resulted in 0.489 unit increments on the subscription demand of fixed broadband.

This result was consistent with the findings Sangwon Lee and Justin S. Brown conducted a research to find out broadband adoption factors between countries and found that higher level of broad band speed could be driver of global broadband demand.

4.6.3. Price and fixed broadband demand

Hypothesis 3: price has negative and significant effect on fixed broadband demand.

The coefficient sign of price has shown that, price has a negative and statistically significant level on demand of fixed broadband. It entails that for one unit change in price, keeping other things constant has resulted in 0.166 units change on the level of fixed broadband demand.

This result is consistent with the findings of Hernan G and Christian A. (2013); on price elasticity of demand for broadband: evidence from Latin America and Caribbean founds that broadband penetration was strongly and negatively correlated with price. This means that countries with low price have higher penetration or demand for broadband.

4.6.4. Aftersales service support and fixed broadband demand

Hypothesis 4: aftersales support has positive and significant impact on fixed broadband demand.

As per the result of the regression analysis above, table 4.7 indicated that statistically significant and positive effect of aftersales support to create demand for fixed broadband service. It implies that for one unit change in aftersales support, keeping other things constant has resulted in 0.203 units change on the level of fixed broadband demand. This positive and significant effect of aftersales support on fixed broadband demand indicates that the grand shop concerned staffs provide improved and better aftersales support for their customers it helps that continuous demand of usage for existing fixed broadband subscribers (reducing the number of unsubscribe or terminated fixed broadband) and attract to the new ones.

The findings also similar with International Journal of Scientific & Engineering Research (2018) the researcher found that Better after sales service given will lead to higher level of purchase decision.

4.7. Summary of Hypotheses Testing

In this study linear regression was used to test the research hypotheses. The table below shows the summarized results of the hypotheses tested.

Table 4.6: Summary of hypotheses tested

Hypotheses	Alternative Hypothesis	Beta (β)	Sig. Value (P)	Decision	Implication
H ₁	Covid19 has positive and significant effect on fixed broadband demand	0.434	P<0.01 .000<0.01	Alternative hypothesis accepted	Covid19 affects fixed broadband demand positively & significantly
H ₂	Internet speed has positive and significant effect fixed broadband demand.	0.489	P<0.01 .000<0.01	Alternative hypothesis accepted	Internet speed affects fixed broadband demand positively & significantly
H ₃	Price has negative and significant effect on fixed broadband demand.	0.166	P<0.01 .004<0.01	Alternative hypothesis accepted	price affects fixed broadband demand positively and significantly
H ₄	After sales support has positive and significant effect on fixed broadband demand	0.203	P<0.01 .000<0.01	Alternative hypothesis accepted	Aftersales support affects fixed broadband demand positively and significantly

Source: Own survey 2021

Generally, the null hypothesis for all variables were rejected and accepted the formulated alternative hypothesis at 99 % level of significance.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1. Introduction

In this chapter summary, conclusions of the research findings that have been analyzed and discussed in the previous chapter were briefly presented. Furthermore, based on the findings of the study possible recommendations were made.

5.2. Summary of Main Findings

The main objective of this study is to investigate factors that affecting fixed broadband service demand in case of Bahirdar grand shop located in Bahirdar city. In this study, quantitative research approach was implemented and simple random sampling technique was also employed. The target populations of the study were customer of newly subscribe fixed broadband and terminated the service during the year of 2020G.C.

In this study, both primary and secondary data were used as source of information. Based on the research objective, questionnaires were prepared and distributed to 369 respondents which is selected from a total population 4797 in Bahirdar grand shop. From the 369 survey forms, 350 were completed and returned. This is a 95% of response rate.

Regarding the reliability of the questionnaire, table 3.3 illustrates that all the quaternaries were reliable and acceptable with Cronbach's Alpha result of greater than 0.8 and only fixed broadband demand counts 0.7. With respect to the demographic information of the respondents, table 4.1 indicates majority of the respondents were males and in terms of marital status shows that married followed by single status. Another demographic information of respondent was age of respondent. In this case majority of respondents age were between 18 -30. This indicates large number of customers are youngest. Education level of respondent also included and the data shows majority of the respondents were academically well fitted that is 28.9% of respondents were master's holder or currently follow master's program. Finally, the customer status of the respondent shows that majority of respondents (76%) were currently use fixed broadband demand actively.

As the findings of this study indicated in table 4.2, the explanatory variables i.e covid19, internet speed, price and aftersales support plays fundamental role on customer demand of fixed broadband

As well the result of correlation analysis in table 4.3 shows that all the independent variables i.e. covid19, internet speed, price and aftersales support are positively and significantly correlated with the dependent variable i.e. fixed broadband demand at 99 percent confidence level ($P < 0.01$). The highest correlation is signified by internet speed ($r = 0.710$), followed by covid 19 ($r = 0.691$), aftersales support ($r = 0.564$) and price (0.498).

Furthermore, table 4.5 depicts the results of multiple regressions of the explanatory variables. The result shows that the model tested is significant at ($p < 0.01$). In this study, the R square 0.679 indicates that 67.9% of variance in fixed broadband demand attributed to the four independent variables entered into the regression. The remaining 32.1 percent of the variance in fixed broadband demand may attribute to other factors.

5.3. Conclusion

The objective of the study was to assess the influential factor of fixed broadband service demand in Bahirdar grand shop.

The study identified factors which influence fixed broadband demand i.e covid19, internet speed, price reduction and after sales support. The findings revealed that the factors identified as independent variable have great influence on the dependent variable which is fixed broadband demand. The global crises covid19 pandemic creates dramatically change on the habit of internet usage. This leads to large number of fixed broadband subscriber visits ethio shops to subscribe fixed broadband. The regression result also shows covid19 has positive and significant effect on the demand of fixed broadband.

The study concluded that internet speed also another influential factor that affects the customer demand of fixed broadband. Service quality of broadband measured by the speed which includes upload and download speed. And this variable significantly affects the dependent variable. Price and aftersales support also another variable included on the study and its influence on the dependent variable tested. The results show that both have significant effect on the demand of fixed broadband on Bahirdar grand shop.

5.4. Recommendations

As compared to global fixed broadband subscriber number of Fixed broadband user's growth in Ethiopia as well as in Bahirdar was at grassroots level. Due to this ethiotelecom has great number of potential customers that subscribe fixed broadband. But in order to change this potential customer to the actual customers it needs to more effort in different aspects. But for the time being based on the above results, the researcher recommended the following points:

- ❖ Ethio telecom should give greater emphasis to build long last relationship with fixed broadband service users, unless their demand of the service will be fail and becomes to terminate due to different factors,
- ❖ The company should also make to enhance the network quality and improve speed of internet, and also the government should support the company to update telecom infrastructure.
- ❖ Although ethio telecom makes mass price/tariff reduction on fixed broadband subscription and usage fee in last year it should continue on the future to make affordable for low income groups which counts majority of the society and to increase the customer demand on fixed broadband as well as company revenue from the service,
- ❖ The company should also take continuous follow up, preventive measure and fast after sales support service. Because the service is not used up rather it consumed always.
- ❖ Finally, on the future the monopoly power of the company becomes to an end with In a short time and strong competition will occur due to the entrance of new telecom operators. so it should be strongly focused on determinant factor of fixed broadband demand specifically and all other product/services and make efficient and effective decision making to be preferable and better telecom operator from the competitors.

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Appendix



Bahir Dar University

College of Business and Economics

Department of Marketing Management

Questionnaire

Dear respondents:

The researcher is Zewditu Misganaw, MA student in Bahir Dar University. This is a questionnaire designed to collect data on “**factors affecting fixed broadband service demand in Bahir Dar grand shop**” in a partial fulfillment of MA Degree in Marketing Management. Your genuine response is solely used for academic purpose and the data will be treated utmost confidentiality. Therefore, your kindly cooperation is appreciated in advance.

The questionnaire comprises of two parts:

- ✦ **Part-A:** Questionnaires related with Bio Data,
- ✦ **Part-B:** Questionnaires related with influential factor of fixed broadband service demand.

Instructions

- ◆ Read each statement carefully;
- ◆ No need of writing your name in this questionnaire;
- ◆ Please tick [√] where appropriate on the space provided;
- ◆ Multiple responses are not possible;
- ◆ Would you please check the questionnaire has **4** pages and fill all pages accordingly?

Part A: Questionnaires related with Bio-Data

Please indicate your Bio Data by ticking [] inside appropriate blank boxes.

1. Gender:

Male

Female

2. Age:

18-30

31-40 years

41-56 years

Above 56 years

3. Marital status

Single

Married

Widowed

Divorced

4. Level of education:

Doctorate Degree

Master's Degree

Bachelor Degree

Diploma

Others/ specify

5. Customer status

Active

Deactivate

Part B: Questionnaires related with Fixed Broadband Demand and Its Determinants

Kindly indicate the extent to which you agree or disagree with each of the following statements regarding the *fixed broadband demand*. Please indicate by ticking [√] on the space specifying options ranging from “Strongly agree” to “Strongly disagree” as indicated below.

SN	Measurement Items	Measurement Scales				
		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I	Covid 19					
1	Covid19 pandemic play a key role for fixed broadband service demand.					
2	High rate of fixed broadband usage in time of covid 19 stay at home principle					
II	Internet speed					
1	operator has faster access to download and upload files					
2	Always on access to internet					
3	I often access the actual bandwidth I subscribed for.					
III	Price					
1	Cost of subscription and installation fee has significantly high					
2	tariff reduction (price reduction) initiate to subscribe fixed broadband					
3	High usage charge (monthly fee) for the fixed broadband service.					
4	I am getting better service compared to the payment I made.					

5	Price of modem significantly affect broadband demand					
IV	After sales support					
1	When I face a problem, I can get sufficient information to solve it.					
2	do you think that ways of announcing the problem or fault is easy and fast?					
3	Installation process of the fixed broadband is completed within a maximum of one week.					
4	The number of days it takes to get the maintenance and location change is reasonable.					
5	The company request bill for only active connections.					
V	Fixed broadband demand					
1	Currently overall demand of fixed broadband increased					
2	Network expansion and access initiate the need of subscribing fixed broadband					

III. Please write on the below free space what you feel about the questions.

1. What is the reason to forced terminate the fixed broad band service?
2. Specify any other factors which affect your fixed broadband service demand?

Your participation and assistance is highly appreciated!