EFFECT OF BROADBAND SERVICES ON CUSTOMERS (A SURVEY OF BROADBAND SERVICE PROVIDERS IN GHANA)

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HAYFORD MENSAH TETTEH



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# EFFECT OF BROADBAND SERVICES ON CUSTOMERS

# A SURVEY OF BROADBAND SERVICE PROVIDERS IN GHANA

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Centre for Graduate Studies

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2012

DECLARATION

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I hereby declare that this Master's Project is the result of my own work, except for quotations and summaries which have been duly acknowledged.

Signature:…….. Date:……



Signature:…… Date:……

Mr. George K. S. Akorfu

(Supervisor)

DEDICATION

This master's thesis is dedicated to my dear wife Rita Dansowaa Tetteh (Mrs) and my daughters Claire Adamki Tetteh, Claribel Dansowaa Tetteh and Clarine Mansah Tetteh for their encouragement and support during the course of my study.

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Finally, to all who contributed to this work, whether in kind words or constructive criticism, prayers or general support, I say thank you, and thank you! May the Good Lord never forget your good deeds toward me.

ABSTRACT

The research seeks to understand the adoption intentions of broadband internet users in Ghana considering factors such as stability, speed and cost on broadband internet in Ghana. Adoption for use was investigated based on some demographic factors. Combinations of qualitative and quantitative methods were used to gather data for the research. Finding from the research show that speed, stability and cost have no statistical significant relationship since some of the respondents choose their broadband service provider based on speed others also based their choice on stability or cost. Adoption intention was observed to vary with demographic factors such as educational levels, age, income and occupation of the respondents. Recommendations were made for policy and practices.

This is a replication study of such that has been done in other part of the world. It is good to replicate such studies so as to determine the peculiarities of factors and how they play our in specific culture and environment.

**Key words**: adoption intentions, broadband internet, stability, speed, cost

ABSTRAK

Kajian ini bertujuan untuk memahami niat penggunaan pengguna internet jalur lebar di Ghana mengingati faktor seperti kestabilan, kelajuan dan kos di internet jalur lebar di Ghana. Pakai untuk kegunaan disiasat berdasarkan beberapa faktor-faktor demografi. Gabungan kaedah kualitatif dan kuantitatif telah digunakan untuk mengumpul data untuk penyelidikan. Mencari daripada kajian ini menunjukkan bahawa kelajuan, kestabilan dan kos tidak mempunyai hubungan yang signifikan statistik sejak beberapa responden memilih pembekal perkhidmatan jalur lebar mereka berdasarkan kelajuan orang lain juga berdasarkan pilihan mereka terhadap kestabilan atau kos. Niat Angkat diperhatikan berbeza dengan faktor-faktor demografi seperti tahap pendidikan, umur, pendapatan dan pekerjaan daripada responden. Cadangan telah dibuat kepada dasar dan amalan.

Ini adalah satu kajian replikasi seperti yang telah dilakukan di bahagian lain di dunia. Ia adalah baik untuk meniru kajian itu bagi menentukan keunikan faktor dan bagaimana mereka bermain kami dalam budaya dan persekitaran tertentu.

**Kata kunci**: niat pakai, internet jalur lebar, kestabilan, kelajuan, kos

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# CHAPTER 1

# GENERAL INTRODUCTION AND SUMMARY

## 1.1. Background of the study

Over few past decades, the world has witnessed a tremendous advancement in science and technology, especially in the field of information and technologies; which has changed the way human being communicate, perform their duties as well as extension of boundaries that define an individual's or society's sphere of interaction (Moshi, & Mitimo, 2012). Moshi and Mitimo, (2012) indicate that IT has enables processing and storage of vast amount of information, telecommunication has allowed seamless exchange of information in real-time, and access of stored information within and across regional boundaries. The adoption and adoption of these ICT's in societies has proved to significantly create new and expand traditional economic and social opportunities in societies; though challenges persists as well (Kozma, 2008). Indeed, the wide spread of ICTs to different societies over time – has proved to be the fastest growing technology ever, that has been able to spread across societies, in the human history (ITU, 2009).

The importance of investment in telecommunications infrastructure is now widely agreed among development and economics scholars to be an essential strategy to unlock national economies potential through employment, new businesses creation, smoothening international trade, as well as boosting social services such as health, education, and government services (Moshi, & Mitimo, 2012).

Further, economies are likely to benefit from economic efficiencies gained from utilization of ICTs, all of these benefits sum into increased economic activities and enhanced social welfare of nations (Thompson, & Garbacs, 2011). Although the extent of economic growth resulting from investment in infrastructure and the uptake of telecommunications services is still debatable, there is a general consensus on its positive casual effect in economic growth (Waverman, 2005).

According to World Bank (2010), penetration of advanced telecommunication services (internet and broadband) is expected to spur higher economic growth compared to basic voice telecom services.

According to Moshi and Mitimo (2012), since 2009, Africa has witnessed completion of numerous inter- and intra- national fiber network projects that provide massive new data connectivity between Africa and the world, connecting from the South Africa, across other countries to major international fiber networks in Europe, Middle East and Asia. Prior to that, the region had to rely on unreliable satellite connectivity which was characterized by low capacity unable to meet demand, and restricting penetration of internet and broadband services to the masses. Together with that, there is ongoing deployment of 3G and 4G mobile networks to boost broadband penetration through wireless connection which is able to facilitate final data connection to mobile devices.

Based on the success experienced in deployment of mobile voice telecommunication, there is great expectation of positive benefits that will result from the now available data networks and affordable data services. Research has shown service industries such as trade, banking and finance, health and education are likely to benefit more from broadband penetration; however, most African countries receive limited economic contribution from such industries since their economies are heavily dependent of primary commodities; with high percentage of informal economy (Moshi, & Mitimo, 2012).

To reap the benefits of broadband connectivity, countries need to design policies that encourage the integration of broadband in their economic initiatives and activities in a way that provides merit broader economic benefit to the economy.

Telecommunication companies in Ghana provide broadband services to their customers. Some provide the broadband service through both fixed line and mobile services, others only provide the broadband service through mobile means. Customers' choice depends on factors such as fixed telephone lines at their locality, reliability, cost and speed. This research is designed to investigate which of the factors influence customer's choice of the broadband service provider they choose. Also whether the use of broadband has any positive effect on the customer.

## 1.2. Research field and subject area

This research thesis is done in the field of Broadband services and focused in the area of customers.

### 1.3. Objective of the research

#### 1.3.1. General objective

The general objective of this research is to add to the body of knowledge and to find out whether the use of broadband has any positive effect on the users' life style.

#### 1.3.2. Specific objectives

The specific objectives of this research are outlined below;

- To examine the relationship between customers satisfaction of broadband services with price factors of the network companies in Ghana.
- To determine the stability of broadband services among service providers in Ghana.
- To determine the speed of broadband service among the service providers in Ghana
- To determine customer satisfaction level with the broadband service providers.
- To study the demographic factors such as age, sex, occupation, education level and income level of broadband users in Ghana.
- To determine the percentage of people using broadband services and effect on their lives.
- To determine how broadband services have affected users life style.

### 1.4. Research Problem Statement

Broadband technology has become the choice of many countries to connect their citizens onto the Internet since it provides a convenient and faster way of accessing the internet (GIT, 2012). Many countries are now adopting and adapting the use of broadband to increase the efficiency of their work output (Sawyer et al, 2003). Since the use of broadband has contributed to economic growth and increase in productivity in developed countries and some developing countries, it is an ideal idea for country like Ghana to extend the access of broadband to greater percentage of its citizens and to make broadband cost affordable to its citizens.

Many customers are subscribing to both fixed and mobile broadband services so that they can ubiquitously work anywhere. Broadband subscribers expert value for money paid for broadband service, hence the aim of this research is to find out whether customers get value for broadband service paid for and are satisfy with the service.



### 1.5. Research Questions

The researcher will critically focus on the following questions within the scope of the research.

RQ1. What are people's perceptions about broadband services in Ghana in relation to price factor, stability and speed?

RQ2. Has broadband services changed the life style of the citizens in Ghana?

RQ3. What percentages of the population are using broadband service in their daily activities in Ghana?

RQ4. How do demographic characteristics of the individuals affect the choice of broadband service provider?

RQ5. How many people have PC/mobile devices with broadband internet and using the broadband internet in their daily activities?

### 1.6. Background and Justification of the Study

Information, Communication and Technology (ICT) is vital for every country's development and is viewed as important for production of goods and services. The benefit of ICT is undeniable as it has been applied in various fields for the purpose of service improvement. It is a fact that resources can be managed efficiently and effectively with the ICT (Suradi, Mustafa, Ismail, Shahabuddin & Norkisme, 2008).

The business dictionary defines efficiency as the comparison of what is actually produced or performed with what can be achieved with the same consumption of resource (money, time, labour etc.).

Junoh and Yaacob (2011) indicated that the world of telecommunication has changed rapidly as we enter the era of convergence between broadband internet, wireless network and the content sector. According to OECD (2002), broadband is considered as a key to enhance competitiveness if an economy and sustaining economic growth. Many countries are now encouraging the extension of broadband to citizens. They are of the view that the use of this technology will contribute to economic and social development by enhancing productivity and introducing new services (Lee, 2005).

Broadband is considered to be a technology that offers end-users fast and always-on access to new services, applications, and content with real life style and productivity benefits (Sawyer et al, 2003). International organisations such as Organisation for Economic Co-operation and Development (OECD) regard broadband as being a vital means of enhancing competitiveness in an economy and for sustaining economic growth (BSG, 2001, 2004). According to BSG (2004), there are a number of ways in which a nations' economy and its citizen's lives can be positively impacted through the adoption and utilisation of broadband.

"--- Society that adopt, adapt, and absorb the benefits of broadband enabled ICT, services and applications quickly and deeply will achieve significant benefits in terms of productivity, innovation, growth and quality of life as well as significant competitive advantage over societies that don't ---" (BSG, 2004).

The European Scrutiny Committee (ESC, 2006) also emphasises the significance of broadband in aiding the development of nations by maintaining that countries must set up efforts to encourage take-up of broadband services and stimulate further deployment, in particular in the less developed areas of the economy (ESC, 200).

Mobile broadband or high-speed access to the Internet and other data services over mobile networks is already changing the way people across the globe access the Internet (Global Information Technology report, 2012). According to Global Information Technology report (2012), mobile broadband promise to drive stronger economic growth than mobile telephony alone and to fundamentally change the way in which people live, learn, work, and collaborate.

### 1.7. Significance of the Study

The research is significant in diverse ways. To the policy makers, the findings and results will provide invaluable insight and more reliable guide to monitoring the broadband services of telecommunication companies in Ghana.

To the citizens, the findings and the result will assist them in choosing the broadband service provider which will provide a service with a lower cost of subscription.

To the broadband service providers, this research will serve as a wake-up call to help them know their strength and weakness in the competitive market.



### 1.8. Limitations and Delimitations of the Study

#### 1.8.1. Limitation of the research

Due to time constraint and cost, the research sampling will not cover all the 10 regions in Ghana. The target population will be in the Central Region, Western Region, Greater Accra Region, Ashanti Region, Eastern Region, and Volta Region. Moreover, not all the cities within the covered regions will be sampled for the research.

#### 1.8.2. Delimitation of the Study

The research will not look at the profit made by the broadband users or the broadband service providers. This is a gap in the research which needs to be investigated.

### 1.9. Research methodology

The entire research will be conducted based on random sampling technique of broadband users in Ghana by using a questionnaire survey. Sampling of broadband user will be done across the country so as to represent a fair view of the population. The questionnaire will consist of a closed-ended and a Likert scale questions.

The dependent variable for this research will be the customers' preference of broadband services in Ghana and the independent variable will be cost, speed, stability and reliability.

Prior to the dissemination of the final questionnaire, a pilot study will be conducted in order to determine the response rate and learn of any discrepancies with the questions, which will include determining whether the format of the questionnaire and the questions will be suitable. For the pilot study, the test questionnaire will be distributed to a small sample drawn from only one region in Ghana.

### 1.10. Theoretical framework

Customer's choice or preference of broadband service provider is dependable on factors such as stability, speed, availability, cost/price, and monthly income. Other sub-variables such as age, gender, and type of employment will also influence customers' choice.

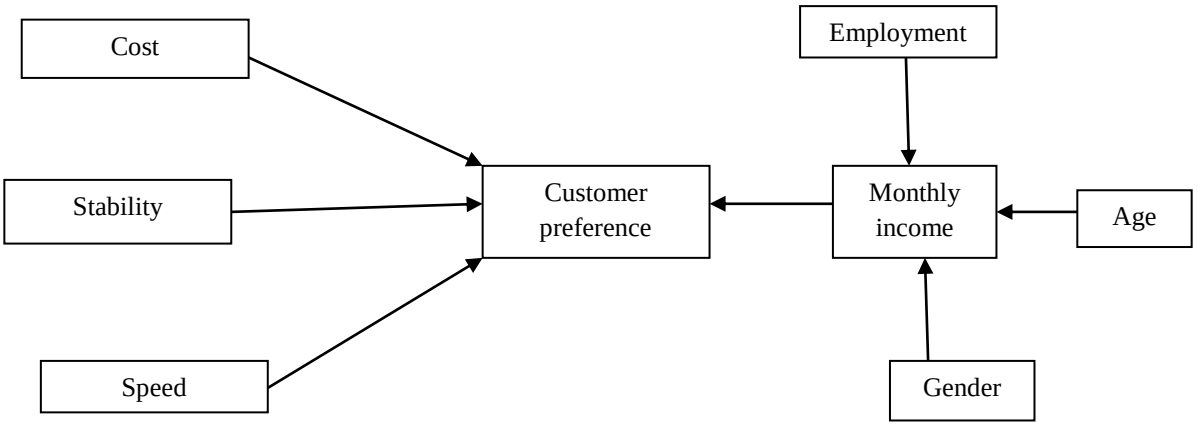


Figure 1.1: Adoption of Broadband internet by customers
Source: Davis et al., (1989), modified by author

**1.11. Summary**

Broadband service usage in Ghana is in the increase but yet only few people are subscribing to this service. This research aims at looking at the effect of broadband on users activities. Has broadband services improve the way users work? Has it increase productivity? Are people paying too much for the services? What age group and sex type mostly use the service? Are users satisfied with their service providers? These are some the few issues the research sought to investigate. The findings of the research will enable users to identify which broadband service provider gives the best services they are looking for and in no dought choose a service provider of their choice.



**1.12. Definition of Terms.**

**Broadband**

A class of communication channel capable of supporting a wide range of frequencies, typically from audio up to video frequencies or a telecommunication in which a wide band of frequencies is available to transmit information.

**Bandwidth**

The amount of data that can be carried from one point to another in a given time period (usually a second) or it is the width of the range (or band) of frequencies that an electronic signal uses on a given transmission medium.

**Mobile Broadband**

Data transmission delivered by the cellular carriers to cellphones, laptops and PCs. Speed are typically less than fixed broadband services such as DSL, cables, satellite and FiOS

**Fixed Broadband**

High-speed data transmission to home and business using technologies such as T1, cable, DSL and FiOS

**Service provider**

An organisation that provides some kind of communications service, storage service or processing service or any combination of the three. Example are a local or long distance telephone company, Internet service Provider (ISP), Application service provider (ASP) and Storage service provider (SSP).

**1.13. Outline of the Thesis**

The second chapter reviews the related literature of the thesis. Chapter three will look at the methodology and chapter four will be the data analysis and result. The last chapter, thus chapter five will be the discussion, conclusion and recommendation.

# CHAPTER 2

## REVIEW OF LITERATURE

### 2.1 International fibre optic cables are revolutionising Africa's Internet and broadband sector

According to Lange (2010, 2011), large parts of Africa gained access to international fibre bandwidth for the first time via submarine cables in 2009 and 2010. In other parts of the continent, additional fibre systems have brought competition to a previously monopolised market. More cables are expected to go online in 2011 and 2012. This has led to massive investments into terrestrial fibre backbone infrastructure to take the new bandwidth to population centres in the interior and across borders into landlocked countries (Lange, 2011).

According to Lange (2010, 2011), Africa's Internet and broadband sector is set to benefit the most from these developments. Wholesale prices for Internet bandwidth have come down by as much as 90% from previous levels based on satellite access, and the cost savings are slowly being passed on to the retail level as well. Broadband is rapidly replacing dial-up as the preferred access method, and this process is already virtually completed in the continent's more developed markets (Lange, 2011).Lange (2010, 2011) indicates that most African countries now have commercial DSL services, but their growth is limited by the poor geographical reach of the fixed-line networks.

Improvements in Internet access have therefore been mostly confined to the capital cities so far. However, the rapid spread of mobile data and third-generation and fourth-generation (3G & 4G) broadband services is changing this, with the mobile networks bringing Internet access to many areas outside of the main cities for the first time (Lange, 2010, 2011).

Many fixed-line incumbents have reacted by rolling out fixed-wireless access networks to expand their geographical reach. The technology of choice has been CDMA-2000 which supports broadband data rates with an upgrade to EV-DO standard. WiMAX technology, however, offers higher data rates and has gained ground in Africa with well over 100 networks already in operation. And also traditional copper fixed lines and DSL have seen a renaissance in some markets on the back of an increasing demand for broadband access.

### 2.2 Broadband penetration

According to Moshi and Mitimo (2012) and Lange (2010,2011), the availability of broadband infrastructure plays the most fundamental role in the race towards the subscription and the use of broadband services. Africa regions have made progress in terms of penetration of basic telecommunication service, the region still lags behind in broadband access infrastructure and usage of internet and broadband services (Moshi & Mitomo, 2012). Moshi and Mitomo (2012) indicated that in the year 2009, Africa consisted of 15% of the global population, it accounted for only 0.2% of international Internet bandwidth and only 9.6% of the population used Internet in 2010, most of them were in the North Africa countries and South Africa. The table 2.1 shows the countries and their internet bandwidth and use.

Table 2. 1 Countries and their Bandwidth and Use

| Countries | International bandwidth 2009 | % of the world 2009 | Internet user 2010 |
|---|---|---|---|
| Africa | 38,535.0 | 0.2 | 9.6 |
| America | 4,889,491.0 | 20.7 | 55.0 |
| Arab State | 324,5755.3 | 1.4 | 24.9 |
| Asia-Pasic | 2,504,479.1 | 10.6 | 21.9 |
| Europe | 15,676,560.0 | 66.4 | 65.0 |
| CIS | 176,167.0 | 0.7 | 46.0 |

Source: Moshi and Mitomo (2012) adopted from ITU, 2010

Gillwald (2012) indicated that poor penetration of broadband in Africa can mainly be attributed to lack of access infrastructure; hence internet connectivity and broadband remain to be lagging behind other countries

in the world. Out of the total sample studied by Gillwald (2012), 87.3% from South Africa indicated that they have mobile devices with a prepaid SIM card, 97.4% from Ghana had mobile device with prepaid SIM card. The table 2.2 shows some of the response from other countries in Africa.

Table 2. 2 Countries and respondents with mobile device with prepaid SIM card

| Countries | % of mobile device with prepaid SIM card |
|---|---|
| South Africa | 87.3 |
| Namibia | 91.8 |
| Ghana | 97.4 |
| Uganda | 98.0 |
| Tanzania | 99.5 |
| Cameroon | 99.0 |
| Rwanda | 9.01 |
| Ethiopia | 98.4 |

Source: Gillwald, (2012)

Gillwald (2012) indicated some of the sample studied had internet enabled on their mobile devices but not all of them use their devices for browsing. The table 2.3 show the percentage of the sample that have internet enabled on the mobile device and those who use their mobile devices for browsing.

Table 2. 3 Internet enable mobile device for browsing

| Country | % of internet enable | % for browsing |
|---|---|---|
| South Africa | 48.6 | 26.0 |
| Namibia | 30.7 | 23.8 |
| Ghana | 28.5 | 13.4 |
| Tanzania | 19.2 | 5.2 |
| Uganda | 14.9 | 7.7 |
| Cameroon | 14.9 | 8.1 |
| Rwanda | 19.1 | 14.9 |
| Ethiopia | 6.5 | 5.1 |

Source: Gillwald, 2012



**2.3 Demographic use**

Rainie (2010) conducted a demographic research on Internet and broadband users and found that in the United State alone, as at 2009, 74% of male use Internet daily which is comparable to 74% female who also use the Internet daily. The research indicated that 93% adult between the age 18-29 use the Internet, 81% between the age 30-49, 70% are between the age 50-64 and 38% above 65 years.

A recent research by Pew Internet Research Center indicated that 53% of all American adults aged 65 and older use the Internet or email,76% of the Internet users age 50-64, 86% of the Internet users age 30-49, and 87% of the Internet users age 18-29 (Zickuhr & Madden, 2012). This result shows a significant increase in Internet use. The research also indicated that 97% of the sample aged 18-29, have access to Internet , 75% have broadband at home, 91% aged 30-49 have access to Internet and 77% have broadband at home, 77% aged 50-64 have access to Internet and 62% have broadband at home, and 53% aged 65 and above access to Internet and 39% have broadband at home (Zickuhr & Madden, 2012).

Gilwald (2012) indicates that in Africa, the use of the internet is progressing gradually. In 2007 15% of South Africans aged 15 years and above use the internet, 8.8% Namibians have access to internet, and 5.6% Ghanaians have access to internet. In 2011, the percentage of internet use has doubled for most of the Africa countries. South Africa increases its' internet usage to 32.5%, while Namibia and Ghana also has an increase internet usage 0f 15.9% and 12.7% respectively (Gillwald, 2012). Table 2.4 shows internet usage by countries from 2007 to 2011.

Table 2. 4 Internet Usage by Countries 2007 and 2011

| Country | 2007 | 2011 |
|---|---|---|
| South Africa | 15.0% | 32.5% |
| Namibia | 8.8% | 15.9% |
| Ghana | 5.6% | 12.7% |
| Uganda | 2.4% | 7.9% |

Table 2. 5 continued

| | | |
|---|---|---|
| Tanzania | **2.2%** | **3.5%** |
| Cameroon | 13.0% | 14.1% |
| Rwanda | 2.2% | 6.0% |
| Ethiopia | 0.7% | 2.7% |

Source: Gillwald, 2012

Suradi, Mustafa, Ismail, Shahabuddin, Ali and Norkisme (2008) indicated in their research in "Measuring broadband service quality: Engeering students perspective", that out of 273 respondents 61.9% were male and 38.1% were females. These are active users of broadband in their daily activities. This indicates that male dominate in the use of internet (broadband) compare to females (Suradi et al, 2008).

**2.4 Ownership of gadget**

According to Zickuhr and Madden (2012), the type of electronic gadget (cell phone, desktop, laptop, E-reader, tablet) owned by the different age groups differ in the United State of America. The age group 18-29 own greater percentage of cell phones followed by age group 30-49. The table 2.5 shows ownership and the type of electronic gadget.

Table 2. 6 Ownership and Type of Electronic Gadget

| **Ages** | **Electronic gadget** | | | | |
|---|---|---|---|---|---|
| | Cell phones | Desktops | Laptops | E – readers | tablet |
| 18-29 | 95% | 51% | 75% | 18% | 20% |
| 30-49 | 94% | 66% | 69% | 23% | 26% |
| 50-64 | 87% | 63% | 57% | 16% | 14% |
| 65 + | 69% | 48% | 32% | 11% | 8% |

Source: Zickuhr and Madden, 2012, Pew Internet & American life Project, PewResearchCenter.

From the findings, majority of the people (95%) aged 18-29 are using cell phone with internet activated on it (Zickuhr & Madden, 2012).

In Africa the number of people who have mobile devices and desktop/laptop computers is low as compared to the world statistics although there has been a significant increase in the number of mobile devices and desktop/laptop users from 2007 to 2011 (Gilward, 2012). Gilwald (2012) indicates that in 2007, South Africa had 62.1% using mobile devices (including mobile phones, smart phones etc) and 86% in 2011. Ghana had 59.8% mobile device users in 2007 and 59.5% in 2011. There was a declined in the number of mobile device users in Ghana in 2011 due to high cost of maintaining them (cost of buy credit to recharge devices). Gilwald (2012) also indicates that in South Africa 26.8% use desktop or laptops in 2011, 13% use desktop or laptop in Namibia and 10% in desktop or laptop in Ghana. Data on users of mobile devices and desktop/ laptop users in some of the Africa countries in provided in table 2.6.

Table 2. 7 Users of Mobile Devices and Desktops/Laptops

| **Country** | **Mobile Device** | | **Desktop / laptop** |
|---|---|---|---|
| | 2007 | 2011 | 2011 |
| South Africa | 62% | 86% | 26.8% |
| Namibia | 49.3% | 56.1% | 13.0% |
| Ghana | 59.8% | 59.5% | 10.0% |
| Uganda | 27.0% | 46.7% | 4.8% |
| Tanzania | 21.5 | 35.8% | 1.9% |
| Cameroon | 36.5% | 44.5% | 15.1% |
| Rwanda | 9.9% | 24.4% | 3.5% |
| Ethiopia | 3.2% | 18.3 | 2.0 |

Source: Gillwald, 2012

**2.5 Internet use in the World**

According to the Internet World Statistics (2011), analysis based on world regions indicates that internet usage by regions has a wide gap that needs to be filled. The report shows that Asia constitute 44.8% of internet use, Europe 22.1%, North America 12.0%, Lat./Caribbean 10.4%, Africa 6.2%, Middle East 3.4% and

Oceania/Australia 1.1% (Internet World Stats. 2011). Table 2.7 shows the World Internet Usage and Population Statistics.

Table 2. 8 World Internet Usage and population Statistics

| World Region | Population | Internet users 2000 | Internet users 2011 | Penetration %population | Growth 2000-2011 | Users %of tablet |
|---|---|---|---|---|---|---|
| Africa | 1,037,524,058 | 4,514,400 | 139,875,242 | 13.5 | 2,988.4% | 6.2 |
| Asia | 3,879,740,877 | 114,304,000 | 1,016,799,076 | 26.2 | 789.6% | 44.8 |
| Europe | 816,426,346 | 105,096,093 | 500,723,686 | 61.3 | 376.4% | 22.1 |
| Middle East | 216,258,843 | 3,284,800 | 77,020,995 | 35.6 | 2,244.8% | 3.4 |
| North America | 347,394,870 | 108,096,800 | 273,067,546 | 78.6 | 152.6% | 12.0 |
| Latin America/ Caribbean | 597,283,165 | 18,068,919 | 235,819,740 | 39.5 | 1,205.1% | 10.4 |
| Oceania/ Australia | 35,426,995 | 7,620,480 | 23,927,457 | 67.5 | 214.0% | 1.1 |
| World Total | 6,930,055,154 | 360,985,492 | 2,267,233,742 | 32.7 | 528.1% | 100 |

Source: Internetworldstats.com/stats.htm

From table 2.7 North America is the leading internet user (78.6%) in the world followed by Oceania/Australia (67.5%). Europe has 61.3% of its population using the internet with Africa being the least (13.5%) although the growth rate from 2000-2011 is 2,988.4% which is the highest on table 2.7 ( Internet World Stats, 2011). According to the statistics, the world average usage of the internet is 32.7%.

**2.6 Internet Usage Statistics for Africa**

As at 2011, Africa has 13.5% of its population using the internet with the rest of the world making up 36.1% of internet use (Internet World Statistics, 2011). According to the report, most Africa countries have very low internet usage. The top internet countries in Africa are listed in table 2.8

Table 2. 9 The Top Africa Countries with high Internet Usaege in Millions

| **Country** | **Millions of users** |
|---|---|
| Nigeria | 45.0 |
| Egypt | 21.7 |
| Morocco | 15.7 |
| Kenya | 10.5 |
| South Africa | 6.8 |
| Tanzania | 4.9 |
| Algeria | 4.7 |
| Uganda | 4.2 |
| Sudan | 4.2 |
| Tunisia | 3.9 |

Source: Internet world Statistics; www.internetworldstats.com/stats1.htm

Ghana is not listed in the group because the number of users per million is far below average. Table 2.9 shows the internet users population and statistics for Africa.

Table 2. 10 Internet Users population and Statistics for Africa

| Africa country | Population | Internet users 2000 | Internet users 2011 | Penetration %population | Users % Africa |
|---|---|---|---|---|---|
| Algeria | 34,994,937 | 50,000 | 4,700,000 | 13.4 | 3.4 |
| Cape Verde | 516,100 | 8,000 | 148,800 | 28.8 | 0.1 |
| Egypt | 82,079,636 | 450,000 | 21,291,776 | 26.4 | 15.5 |
| Kenya | 41,070,934 | 200,000 | 10,492,785 | 25.5 | 7.5 |
| Morocco | 31,968,361 | 100,000 | 15,656,192 | 49.0 | 11.2 |
| Nigeria | 155,215,573 | 200,000 | 45,039,711 | 29.0 | 32.2 |
| South Africa | 49,004,031 | 2,400,000 | 6,800,000 | 13.9 | 4.9 |
| Ghana | 24,791,073 | 30,000 | 2,085,501 | 8.4 | 1.5 |

Source: internet World Stats, 2011

From table 2.9 shows that some Africa countries have significant growth in internet penetration and users percentage in Africa. Ghana is among the countries whose internet use and penetration is low, although there is a significant increase from 50,000 users to 4,700,000 from 2000 to 2011.

**2.7 Broadband Speed**

Broadband speeds vary greatly depending on technology, location, applications and other factors. It also varies from country to country and also depends on the service provider. Because of this, it may be more helpful to focus on "acceptable broadband" speeds, which are the speeds necessary to meet the particular demands of any given market segment, such as schools, homes, businesses or medical centres (Intel World 2010, CWA 2009).

According to Intel World (2010), in emerging markets, Intel recommends that countries ensure that most citizens can achieve download speeds during peak hours of at least 1 to 3 megabits per second (Mbps). Although this is currently an acceptable minimum, by 2012, developing countries should aim for much higher speeds of 3 to 6 Mbps, and up to 15 Mbps soon after 2012.

Broadband networks can be accessed through a variety of wired and wireless services, each of which offers unique advantages in speed, reliability and affordability. Wired, or fixed, broadband services (ADSL, cable etc.) tend to be faster than wireless alternatives, but often cannot reach geographically remote areas. Wireless broadband networks, which can be accessed via cell phones, satellite, WiMAX and Wi-Fi signals, provide advantages in mobility and convenience.

According to Intel World (2010), users can access broadband services through a range of equipment, including desktop computers, notebooks, netbooks, tablets, cell phones and smartphones. The access speeds for these devices vary greatly, with download speeds as low as 200 Kbps for wireless, entry-level 3G cell-phone services. Other wireless broadband options such as WiMAX can deliver higher speeds, less latency, and in many cases, lower costs (Intel World 2010).

According to latest statistics from Ookla's NetIndex (2012), Ghana has been ranked with the fastest broadband Internet speed in Africa. Ookla is the global leader in broadband testing and web-based network diagnostic applications. Based on millions of recent test results from Speedtest.net, the NetIndex compares and ranks consumer download speeds around the globe. From the results, Ghana currently has download speeds of up to 5.14 Mbps, ranking it 1st in Africa and 73rd in the world. The country is closely followed by Kenya with 4.94 Mbps, Angola with 4.53 Mbps, Rwanda with 3.28 Mbps and Zimbabwe with 2.98 Mbps in that particular order.

Other African countries with the fastest broadband speed include South Africa with 2.98 Mbps, ranked 6th in Africa and 105th in the world; Libya with 2.94 Mbps, ranked 7th in Africa; Morocco with 2.77 Mbps, ranked 8th; Nigeria with 2.30 Mbps, ranked 9th in Africa and 129th in the world; and Tunisia ranked 10th with 2.12 Mbps.

The table 2.10 provides full details about the top 10 African countries with the fastest broadband speed.

Table 2. 11 Africa Top 10 faster Broadband Speed Countries (March 2012)

| Africa Rank | Country | Broadband speed(s) | World Rank |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 | Ghana | 5.14Mbps | 73 |
| 2 | Kenya | 4.94Mbps | 75 |
| 3 | Angola | 4.53Mbps | 80 |
| 4 | Rwanda | 3.28Mbps | 97 |
| 5 | Zimbabwe | 2.98Mbps | 104 |
| 6 | South Africa | 2.98Mbps | 105 |
| 7 | Libya | 2.94Mbps | 107 |
| 8 | Morocco | 2.77Mbps | 109 |
| 9 | Nigeria | 2.30Mbps | 129 |
| 10 | Tunisia | 2.12Mbps | 135 |

Source: Netindex by Ookla (2012). Data as at March 12, 2012

The highest household download index in the world is Hong Kong with download speed of 42.72Mbps, followed by Lithuania (33.67Mbps). Table 2.11 shows the top ten in the world.

Table 2. 12 World Top 10 Faster broadband Speed Countries (August 2012)

| Country | Household download index Mbps |
|---|---|
| Hong Kong | 42.74 |
| Lithuania | 33.67 |
| South Korea | 33.19 |
| Luxembourg | 32.08 |
| Singapore | 30.89 |
| Latvia | 28.91 |
| Taiwan | 28.80 |
| Japan | 28.35 |
| Netherland | 27.40 |
| Sweden | 26.15 |



Source: Netindex by Ookla (2012). Data as at August 04, 2012.

According to Ookla NetIndex (2012), as at August 04, 2012, the last ten countries with the least broadband speed in the world are Belize with household download index of 1.33Mbps, Pakistan (1.31Mbps), Mauritius (1.30Mbps), Syrian Arab Republic (1.25Mbps), Bhutan (1.25Mbps), Bolivia (1.21Mbps), Zambia (1.10Mbps), Bangladesh (1.10Mbps), Sudan (1.04Mbps) and Algeria (0.97Mbps) (Ookla, 2012). The Ookla Net Index report changes from time to time due to technology change and infrastructure in the world region.

### 2.8 Affordability of Broadband

#### 2.8.1 Affordability: Making the Expensive Affordable to the Next Wave of Users

According to Thomas (2012), recent studies published by ITU reveal that broadband penetration is directly related to its cost, relative to an average family income, as well as to the availability of products and services that accommodate the general population's purchasing ability. Thomas (2012) indicates that as the annual cost of broadband drops below 3 percent of a family's annual income, its use begins to increase dramatically. For developed countries, this relative cost has already been achieved, but for Africa countries, the cost of broadband remains higher than the average annual family income and thus it remains entirely out of reach (Thomas, 2012).

Extending the penetration of broadband to reach the next billion users becomes more complex because the ability of people in developing countries to afford more advanced technology and communications lessens

dramatically (Zickuhr & Smith, 2012; Thomas, 2012). Thomas (2012) indicates that there are approximately 5 billion people worldwide who remain without broadband access, the third billion represents those poised or preparing to achieve an income level capable of technology consumption.

Affordable broadband programs are starting to emerge in countries such as Sri Lanka and India, with service providers offering connectivity solutions starting as low as US$2 per month (Thomas, 2012). This level of affordability is making it possible for people to step up their learning, skills preparation, and service delivery levels by opening up their access to a larger quantity of Internet services and PC applications (Horrigan, 2009; Thomas, 2012). Horrigan (2009) indicates that Internet access services, coupled with computing devices that can range from entry-level netbooks to higher-performing laptops, are having a positive impact in these communities while providing choice. Many of the offerings are linked to financing options that further reduce the entry barriers to lower-income Internet entrants (Horrigan, 2009).

**2.8.2 Reason for Not Using Broadband**

Despite the benefits of broadband internet services, many people both in the developed and developing countries still do not see why they should use the internet. A survey by Zickuhr and Smith (2012) in the U.S. A. indicates that majority of adult did not use the internet and many non-users felt that the internet was a "dangerous thing"- 54% believed this, especially seniors and those with less than high school education. According to Zickuhr and Smith (2012), some 39% said that the internet is too expensive (particularly young adult under 30, and those with less than high school education), and 36% expressed concerned that the internet "is confusing and hard to use", especially those with high school education or less. A more recent research by Zickuhr and Smith (2012) indicates that among the non-internet users, almost half (48%) say the main reason they don't go online is because they don't think the internet is relevant to them – often saying they don't want to use the internet and don't need to use it to get the information they want or conduct the communication they want (Smith, 2010). According to Zickuhr and Smith (2012) about one in five (21%) mention price related reason, and a similar number cite usability issues (such as not knowing how to go online or being physically unable to). Only 6% say that a lack of access or availability is the main reason they don't go online (Zickuhr and Smith, 2012; Smith, 2010).

In May 2010, 21% of American adults age 18+ did not use the internet. (This number is 22% as of August 2011.) When asked the main reason they do not go online (in their own words), the factors they cited are listed in table 2.12 below.



Table 2. 13 The main reason users don't use the Internet

| Main reason | % offline adults |
|---|---|
| Just not interested | 31 |
| Don't have a computer | 12 |
| Too expensive | 10 |
| Too difficult | 9 |
| It's a waste of time | 7 |
| Don't have access | 6 |
| Don't have time to learn | 6 |
| Too old to learn | 4 |
| Don't want/need it | 4 |
| Just don't know how | 2 |
| Physically unable | 2 |
| Worried about viruses/spyware/spam | 1 |
| Other | 6 |

Source: Pew Research Center's Internet & American Life Project, April 29-May 30, 2010 Tracking Survey. http://pewinternet.org/Reports/2010/Home-Broadband-2010.aspx.

Table 2. 14 Reasons for Not using the Internet by Countries

| Reasons for not using the Internet | South Africa | Namibia | Uganda | Tanzania | Ghana | Cameroon | Rwanda | Ethiopia |
|---|---|---|---|---|---|---|---|---|
| Not interest/ not useful | 42% | 59.1% | 57.9% | 57.9% | 64.5% | 64.3% | 43.1% | 2.1% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| I don't know how to use it | 76.5% | 88.1% | 89.4% | 95.6% | 94.2% | 90.8% | 77.9% | 10.1% |
| No computer/ internet connection | 86.4% | 90.7% | 83.4 | 96.2% | 85.1% | 84.2% | 72.5% | 9.6% |
| Too expensive | 60% | 78.4% | 77.3% | 84.7% | 71.2% | 56.1% | 74.1% | 5.0% |

Source: Gillwald (2012).

Information published by SouthAfrica.info (2010) show that the number of South Africans accessing the internet via broadband have grown by more than 50%. According to Gillwald (2012), majority of the non-internet users (86.4%) in South Africa indicate that they have no computers or internet connection while less than this (76.5%) indicate they don't know how to use it. In Namibia, 90.7% of the non-internet users indicate that they have computer or internet connection while 88.1% say they don't know how to use it. Uganda however, has a high number of the non-internet users (89.4%) indicating that they don't know how to use it.

**2.9 The Status and importance of broadband**

Kim, Kelly and Raja (2010) indicate that countries around the world are looking to spur the growth of broadband access and use as the next stage in the development of telecommunications networks and services. Using a variety of networks and devices—from mobile handsets to desktop computers—broadband offers high-speed data transmission, enables multimedia communication, improves access to information, and supports high-quality Internet connectivity (Kim, Kelly and Raja, 2010). According to Kim, Kelly and Raja (2010), by exploiting wireless technology for high-speed Internet connections, broadband can cement gains from the significant global expansion in access to telecommunications provided by mobile phones.

**2.10 The Status of Broadband Connectivity worldwide**

According to Kim, Kelly and Raja (2010), globally, more than 1 billion broadband subscriptions exist. In September 2009, there were more than 465 million wireline broadband subscriptions (nearly three times the number in December 2004) and more than 575 million wireless high-speed data subscriptions (almost 20 times as many as in December 2004) (Kim, Kelly & Raja, 2010). According to Kim et al (2010) by 2013, the number of broadband subscriptions (both wireline and wireless) is expected to exceed 3 billion as today's narrowband networks are upgraded to broadband (Pyramid Research Group 2008, 16). Some countries, such as Singapore, already have a combined fixed and mobile broadband penetration rate in excess of 100 per 100 inhabitants (Kim, Kelly & Raja, 2010).

But broadband is spread unevenly worldwide. For example, European Union (EU) and North American countries together contain about half of global subscribers, while South Asia and Sub-Saharan Africa contain less than 3 percent (Kim et al 2010). Table 2.14 shows the global broadband subscription.

Table 2. 15 Broadband Subscriptions: Wirelines and Wireless, September 2009

| Region | Broadband subscribers (million) | Market penetration (per 100 inhabitant |
|---|---|---|
| East Asia and Pacific | 381.4 | 17.8 |
| Eastern Europe and Central Asia | 49.2 | 12.4 |
| European Union | 294.1 | 60.5 |
| Latin America and the Caribbean | 52.4 | 9.2 |
| Table 2. 16 continued | | |
| Middle East and north Africa | 27.8 | 7.6 |
| North America | 210.9 | 62.5 |
| South Asia | 9.1 | 0.6 |
| Sub-Saharan Africa | 15.6 | 1.9 |
| World | 1,040.5 | 15.6 |

Source: Kim et al, (2010)

**2.11 Definitions and Theoretical Framework**

**2.11.1 Definitions**

One of the most important things to clarify at this stage is the meaning of the "effect of broadband". There are many definitions given to the term "effect" but the most suitable one given in Dictionary.com is the power to produce results. This suggests that effect involves the use of new innovation, its usage and subsequent impact of usage. Therefore, the proposed theoretical framework has included constructs relevant to "effect", usage and its impact on consumers.

Before proceeding further, a term frequented within this work is 'broadband' and a short explanation of it is warranted. The umbrella term of broadband technology embraces a variety of high-speed access technologies including ADSL (Asymmetric Digital Subscriber Line), cable modems, satellite, and Wi-Fi (Wireless Fixed) Networks (Sawyer, et al 2003). The term broadband has no established definition. It varies from country to country (Firth and Kelly, 2001) and evolves over time as the underlying transmission and routing technologies continuously advancement: yesterday's broadband is today's 'narrowband'. Given the variations in defining 'broadband', for the purpose of this research I follow the technology neutral definition suggested by the Broadband Stakeholder Group (BSG, 2001) that defines broadband as "always on access, at work, at home or on the move provided by range of fixed line, wireless and satellite technologies to progressively higher bandwidths capable of supporting genuinely new and innovative interactive content, applications and services and the delivery of enhanced public services' (BSG, 2001). This definition is technology neutral; that is, it has less to do with the technical speed, and focuses on functionality, that is, more to do with what a user can do with broadband (Sawyer, et al, 2003).

An additional focus of this research is that of the consumers, and at this point the differentiating factor between the terms of consumers and users is provided. According to Rice (1997) 'consumers' are those who pay for services and goods; whilst, 'users' are individuals who are affected by or who affect the product or services. In other words, users are those who use the products and services but do not pay for it (Rice 1997). For example, a child can be categorised as a user since he/she uses broadband for online gaming and to undertake homework; however, the child does not pay for the service. In contrast, the parents are consumers since they pay for the service.

**2.11.2 Technology Acceptance Model**

Several researches have been made on identifying the conditions and factors influencing the integration technology into business (Legris, Ingham & Collerette, 2003). Many of these innovation acceptance researches have made use of the Technology Acceptance Model (TAM), which aimed to explain information systems (IS) adoption (Plouffe, Hulland & Vandenbosch 2001). TAM proposes that attitude towards using a system is controlled by two external variables, namely perceived usefulness and perceived ease of use. Attitude towards using a system directly affects the behavioral intention to use the system, which then determines the actual system use. (Davis et al., 1989).

Perceived Usefulness is defined to be "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational concept" while Perceived Ease of Use is described as "the degree to which the prospective user expects the target system to be free of effort" (Davis et al., 1989). Various researches have utilized TAM to study the acceptance of different Internet-based technologies such as World Wide Web (www) by Agarwal and Prasad (1997), web-based learning by Gong & Yu (2004), online consumer behaviour by Koufaris (2002), and User acceptance enablers by Venkate, Speier, & Morris (2002).

**2.11.3 Network Externalities**

Another important factor affecting the adoption of telecommunication innovations is the network externalities. Network effect theory described the network effect as the change in the benefit obtained from a good or service, when the number of the other users changes (Liebowitz & Margolis, 1994). Gruber and Verboven (2001) explained network externalities as "a system is subject to network externalities if consumers value a system more the more users adopt it". Katz and Shapiro (1985) have distinguished three sources of positive externalities; direct network externalities implies the direct physical effects of the number of the users on the quality of the product or service while indirect network externalities is driven by interdependencies between complementary goods. Third source for the positive externalities is described as the quality and the availability of the post-purchase service increases as the size of the network becomes larger. Schoder (2000) stated that telecommunication services like sending and receiving messages, online chat services, video calls, online multi-player games, etc lead to direct network effects.

**2.11.4 Model of Adoption of Technology in Households (MATH).**

The model of the Adoption of Technology in the household was applied to investigate PC adoption in the American households. According to this model, technology adoption in the household is determined by a number of factors. These include the attitudinal belief structures such as utilitarian outcomes, hedonic outcomes and social outcomes; normative belief structures such as the influence of friends, family and secondary information sources; and a control belief structure that consists of three barriers namely knowledge, difficulty of use, and cost (Venkatesh & Brown, 2001).

The majority of constructs included in this model are also useful to study broadband adoption (Dwivedi and Choudrie, 2004; Choudrie and Dwivedi, 2004). However, constructs from this model do not provide insights to the phenomenon of diffusion; they only shed light upon the adoption part of it. Furthermore, this model was constructed to study PC use; therefore a detailed factor needs to be adjusted for broadband. Therefore, the researcher considered the majority of MATH constructs as attitudinal belief dimensions.

The researcher considering the three models mentioned above, thus TAM, Network Externalities and MATH, and their derived benefits (quality of product or service, availability of service, knowledge, difficult of use and cost) developed the framework diagram as shown in figure 1. According to Baran (2009), customer's choice or preference of broadband service provider is depended on factors such as stability, speed, availability, cost/price, and monthly income which constitute the external factors that determine the perceived usefulness and perceived ease of use as introduced in TAM (Davis et al., 1989), quality of product or service as in Network Externalities (Schoder, 2000) and difficult of use and cost as in MATH (Venkatesh & Brown, 2001). Other sub-variables such as age, gender, and type of employment will also influence customers' choice and use.

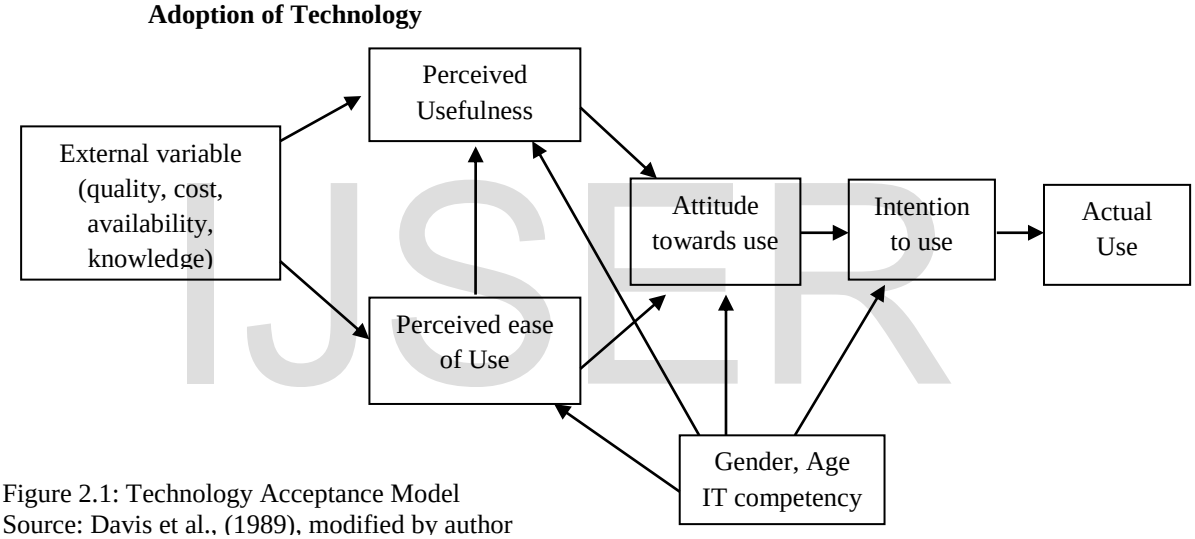


Figure 2.1: Technology Acceptance Model
Source: Davis et al., (1989), modified by author

**2.11.4 Service Quality**

In broadband services, an annual fee contract, monthly fee or 'pay as you go' onetime fee is paid for by the consumers and during this period, if the provided service is not satisfactory, then consumers will discontinue the broadband subscription. Alternatively, if consumers had a choice of providers, then they might move to others. Therefore, it is important to understand if consumers are satisfied with their current providers and their provided services or not. Hence, the underlying hypothesis is:

**H1:** The greater the perceived service quality from current broadband subscription, the more likely that a consumer will continue to subscribe it.

**2.11.5 Cost**

The South Korean government's vision recognized an affordable monthly cost of broadband for the middle-income household as one of the most important factor that led to the high rates of adoption of broadband use (Lee and Choudrie, 2002). However, a previous exploratory study on broadband adoption in the UK suggests that the high monthly cost is a major barrier that is inhibiting the adoption of broadband in the household (Dwivedi et al, 2003 c). Therefore, it is expected that if perceived cost is high, then adoption will be slow. Hence, the hypothesis is:

**H2:** The greater the perceived monthly cost of broadband access, the less likely that it will be adopted.

**2.11.6 Requisite Knowledge**

The level of knowledge about an innovation, its risks and benefits affect the adoption rate of broadband (Rogers, 1995). The greater the awareness of the benefits of the innovation amongst the consumers and users,

the more likely the innovation gets adopted. Lee and Choudrie's (2002) research suggests that in South Korea the consumers knew what the potentials of broadband were. The consumers were aware of the benefits of faster Internet access, which was essential to satisfy their needs. It is assumed that the adoption of broadband requires a clear message of its usages and benefits amongst the total segments of society. Also, if consumers are not aware of what the benefits of adopting a particular innovation are, then it is expected that they are more likely to reject the decision to make a purchase due to the lack of the perceived needs.
Therefore, the underlying hypotheses are:
**H3:** The lack of knowledge on broadband, its availability and benefits inhibit broadband adoption.

**2.11.7 Skills of Using PC and Internet**

Since the use of broadband also requires using a PC and/or mobile devices and the Internet, the ease or difficulty of use and requisite knowledge of a PC and/or mobile device and Internet use are expected to have an impact of broadband adoption. Therefore, it is expected that household users with basic PC/mobile device and Internet skills are more likely to adopt the broadband. Hence, the hypothesis is:
**H4:** The lesser the skill toward using the PC/mobile device and Internet, the less likely that broadband will be adopted.

**2.11.8 Demographic Characteristics**

After exploring a vast literature, Rogers (1995, p.269) have deduced several generalizations about the adopter characteristics affecting innovativeness. Socioeconomic status, personality values and communication behavior are the headings under which Rogers has placed the related deductions. Under the heading socioeconomic status, the generalization he has arrived at regarding the characteristic 'age' is stated below:
"Earlier adopters are not different from later adopters in age"
Relationship between age and innovativeness is generalized as insignificant however there are some studies showing that early adopters are younger and some others showing that they are older as well.
Another generalization Rogers arrived at is related with the education levels of the individuals, stated as: (Rogers, 1995, p.269)
"Earlier adopters have more years of formal education than later adopters."
According to Rogers, previous literature has shown that education levels of the individuals are effective on their adoption intentions for innovations.

Another demographic characteristic that is under focus in this research study is the city size. City size and distance are identified to be two essential factors that explain the spatial diffusion of innovations (Murayama et al, 2000, p19). City size is found to be influential in innovation adoptions; larger cities tend to encourage both innovation and its diffusion. The flow of information is rapid in large cities owing to the higher population density that promotes human contacts. Another reason can be stated as more concentrated educational activities taking place in large cities (Bairoch, 1991, p336). Hence city size is also considered as an effective demographic factor and included in this research study.
Occupation and gender are other demographic control variables that are examined in the research paper. The significance of the influence of these variables on adoption intentions is inquired.

To sum up, demographics control part in this research study is seeking for whether there exists a relationship between the characteristics gender, age, education levels, city of residence and occupation of the participants and adoption intentions for broadband technologies.
Therefore, the following hypotheses are generated:
**H5:** Age of the individuals has an influence on the adoption intentions of broadband use.
**H6:** Gender of the individuals has an influence on the adoption intentions of broadband use.
**H7:** Education level of the individual has an influence on the adoption intentions of broadband use**.**
**H8:** Occupation of the individual has an influence on the adoption intentions of broadband use.

## 2.12 Methodological and Other Issues

Previous and current research which studied broadband adoption employed the survey methodology by using semi-structured interviews and questionnaire methods to collect primary data. The two approaches complement one another in that the weakness in one approach is complement by strength of the other. However, most of them used only questionnaire surveys. The following examples of previous researchs that used only questionnaire include Jones, McCarthy, halawi and Mujtaba (2010), Dwivedi, Lal and Williams (2009), Choudrie and Dwivedi (2004), Suradi, Mustafa, Ismail, Shahabuddin, Ali and Norkisme (2008), Venkatesh and Morris (2000) and Baran (2009). Other researchers for example Kripanont (2006) used interview together with questionnaire.

The questionnaires designed by most researchers were pre-tested by distributing few about 20-30 questionnaire to respondent. Pre-testing helped to eliminate problem with wordings or measurement of ambiguities (Kripanont, 2006), because the questionnaire wording subsequently influence accuracy.

Various statistical analysis techniques were employed in the analysed data collected for the study. Descriptive statistics such as mean, frequency distribution were used by most researchers to analyze their data. Other statistical tools employed included internal consistency reliability testing by using 'Conbach's alpha', Composite reliability, average variance, Correlation and so on. These statistical tools were used to enable the researcher explain the characteristic behavior of the sampled population.

# CHAPTER 3

# METHODOLOGY

## 3.1 Theoretical framework

The nature of this research is to cover a large population to learn how many people use broadband internet services at home, work place, or any other place. How many people use mobile broadband internet service and how many use fixed broadband internet? Moreover the researcher sought to find out the reason(s) for choosing a particular broadband internet service provider and how much they spend on broadband internet connectivity per month. The researcher is also interested to know the effect of broadband internet on customers. For these reasons quantitative research method remained the option for the researcher since it is an information sought type of research.

Many scholars have defined quantitative research in many ways. According to Chris (2011), quantitative research generates numerical data or data that can be converted into numbers for a statistical review. Quantitative data is most often collected in the form of a questionnaire of survey. The research process typically involves the development of questions as well as scale that are used to measure feelings, satisfaction and other important factors on a numerical level (Chris, 2011).

According to Cohen (1980), quantitative research is defined as social research that employs empirical methods and empirical statements. Cohen (1980), states that an empirical statement is defined as a descriptive statement about what "is" the case in the "real world" rather than what "ought" to be the case. Typically, empirical statements are expressed in numerical terms. Another factor in quantitative research is that empirical evaluations are applied. Empirical evaluations are defined as a form that seeks to determine the degree to which a specific program or policy empirically fulfils or does not fulfil a particular standard or norm (Cohen, 1980).

Moreover, Creswell (1994) has given a very concise definition of quantitative research as a type of research that is explaining phenomena by collecting numerical data that are analyzed using mathematically based methods (in particular statistics). Qualitative studies are more subjective, text-based and used for studies requiring in-depth information on a few cases but quantitative approach to research are more objective, number-based and has more breadth of information across a large number of cases though less in-depth (Neumann, 2006; Bair, 2011 ).

Saunders, Lewis & Thornhill (2007) refer to descriptive research as the continuation of exploratory research. Saunders, Lewis & Thornhill (2007) explained that in order to obtain information concerning the current state of a phenomenon, descriptive research is used to describe the conditions that now exist in a situation. Descriptive research can be quantitative or qualitative. According to Neumann (2006), descriptive research involves not only gathering data to describe categories of information such as gender but also reducing the data to manageable form. Whatever attitude variables, subjective variables and perceived behavioural control variables that influence people's intention to adopt the use of broadband already exist, and the researcher only needs to obtain data from the cases being studied to inform others of such phenomenon.

According to Hakim (2000), sample surveys have become one of the most common methods to collect data for social research (Hakim, 2000). Sample surveys are widely used for collecting information on various social and economic issues. Sample surveys can be utilized under the conditions when maximum accuracy and reliability is required with limited budget, the units show significant variation, total number of population is impossible or too costly to analyze, scope of the analysis is wide and population not completely known, and time, money and other resources are scarce (Singh & Chaudhary, 1986, p.3).

Regarding this research thesis, the conditions for applying sample surveys fit quite well, with limited resources in terms of time, money, other resources and the requirement for accuracy and reliability and the impossibility for analyzing the whole population of Ghana which is more than 20 millions.

The possible methods of gathering data in sample surveys are viewed as interviews, which can be face-to-face or through telephones, questionnaires and time diaries. Considering the time, money and distance limitations, it is impossible to make deeper interviews one by one in quite a large sample, and time diaries are not applicable in this study. Hence, the way for getting information of the sample will be through questionnaires which are designed to get the personal perceptions about broadband internet connection in Ghana. Sample surveys can be designed to analyze the causal relationships, the reasons behind the social patterns, which is actually what this study is seeking for (Hakim, 2000).

The study is analyzing the causal relationships, factors affecting consumer behaviors, and their perceptions regarding innovations, in this case - broadband technology. Sample surveys are very beneficial to develop an understanding of a population with low costs, by analyzing a representative sample. Also sample surveys are less time-consuming because of the reduced number of the population that is under investigation.

Other than these, the benefits of using surveys may be followed by the transparency of the research, which makes the work visible to other parties and gives opportunity for the replications in different times and different locations (Hakim, 2000). There are also some drawbacks using sample surveys for gathering data, giving rise to biases in the results, which can be analyzed as follows: (Weisberg, Krosnick & Bowen, 1996, p.65) *'Noncoverage errors'* may be described as the omission of some of the relevant population, which may occur as a result of cost and distance from people within the population. Regarding this study, since the surveys are conducted through questionnaires, non-coverage errors are expected to be faced due to the exclusion of the individuals that are far from data collection point.

*'The response rate'* is a common problem the surveyors face, resulting from individuals refusing to take part in the surveys, because they can be busy or unwilling to answer the questions, or simply do not trust the surveyor. Regarding this study, the focus was on individuals, inquiring their perceptions about broadband technology through the questionnaires. However the possible response rate can be quite low because broadband technology concept is quite new in Ghana. People may not have heard of broadband technology, which may make them lose their interest to take part in the research.

In order to include the unaware participants in the survey, an introductory paragraph about broadband technology and services was included at the beginning of the questionnaire, which will inform the unaware people about broadband internet connectivity. This way, it was possible to get the viewpoints of people who have not heard of broadband internet technology but interested in purchasing the technology after they are informed. Even if they are not interested in buying such technologies, still their perceptions are critical and should be included as well, so that the reasons lying behind their unwillingness to purchase the broadband services can be analyzed.

### 3.2 Sampling

Sampling, which is an important step in conducting surveys, is the selection of a subgroup from a population. In order to make generalizations in the end of the research, it is crucial for the samples to be representative for the whole population.

Sampling design process is described to start with the definition of the target population (Malhotra & Birks 2000). In this research work, the target population was identified as the population of Ghana, in the pursuit of their use of broadband internet connection.

Next step was the decision of the sampling technique which was used in this research.

Regarding the sampling technique in this research, random sampling technique was applied, which is a probability sampling technique. In a simple sampling technique, a population is identified and subgroup is drawn from the population. The individuals within the population have an equal chance of being included.

A simple random sampling technique is meant to be an unbiased representation of a population or a group. Hence to avoid biasness, the researcher sought to simple random technique. Another important benefit of simple random sampling is that it allows researchers to use statistical methods to analyze sample results. For example, given a simple random sample, researchers can use statistical methods to define a confidence interval around a sample mean. Statistical analysis is not appropriate when non-random sampling methods are used. To allow the researcher to apply statistical analysis to the data collected, simple random sampling became the choice.

### 3.3 Instrumentation

Fowler (2002) suggested that a prerequisite for determining a sample size should be the analysis plan. This research is a part of a larger study on broadband usage in household and some organizations in Ghana. Analysis of the entire study required performing principal component analysis (PCA), regression analysis, t-test and chi-square test. Stevens (1996) suggested that in order to perform the statistical analysis mentioned above with firmness, the sample size should be above 300. Therefore, keeping statistical analysis plan in mind it was decided that the total sample size should be large enough to obtain a minimum of 300 responses. Therefore the total sample size was determined by using a pilot response rate as basis of final survey.

**Total sample size**= [Total responses required*100] / Pilot response rate= 300*100/80= 375

As illustrated above an overall sample size of 375 was required in order to obtain 300 responses. Due to undelivered and partially completed responses, the sample size was increased further from 375 to 400. This was done to compensate for any shortfalls in the 300 responses that may occur. So, a total sample size of 375 was considered suitable for this research. The final questionnaires were sent through colleagues to different part of the country (regions that were covered by the researcher).

**3.4 Data collection procedure**

Prior to dissemination of the final questionnaire, a pilot study was conducted to: determine the response rate and learn of any discrepancies within the questions, which included determining whether the format of the questionnaire and questions were suitable.

The pilot questionnaire was distributed to respondents in only one region. These respondents were randomly sampled and a total 100 questionnaires were distributed in August 2012. The researcher was able to retrieve a total of 80 replies from the respondents within the specified time communicated to the respondents. The majority of the respondents reported that the questionnaire was easily understandable and required about 10 minutes for completion. The majority of the respondents validated the content of the questionnaires, although minor changes to the final design of the questionnaire were undertaken based upon the received feedback and a final questionnaire was developed. Since there were no major changes required to incorporate in questionnaire, responses received from pilot study also included in the final analysis (Fowler 2002).

In order to collect random data for the target population, a self-administered questionnaire was considered to be the most appropriate primary survey instrument in this research. The following is the reasoning used for selecting self-administered questionnaires in comparison to other data collection tools:

- it addressed the issue of reliability of information by reducing and eliminating differences in the way by which the questions are asked (Cornford & Smithson 1996)
- relatively low costs of administration
- can be accomplished with minimal facilities
- it provides access to widely dispersed samples
- respondents have time to give thoughtful answers
- help asking questions with long or complex response categories; asking similar repeated questions
- and also the respondents do not have to share answers with interviewers (Fowler 2002).

In all, the questionnaire used in this research was made of three sections, section A, Section B and Section C. Section A contains 6 multiple choice questions addressing the demographics. Section B contains 12 multiple choice question addressing the type of Internet connection respondents possess at home, frequency of Internet access, how much they spend for broadband internet connection, reason for not using broadband internet connection (fixed or mobile broadband), the broadband internet service provider they subscribing from, their subscription plan, time spent online and the type of device they use for broadband internet connection (Anderson & Tracy 2001, Vitalari et al. 1985). Closed multiple-choice questions were used in the questionnaire in order to obtain a high response rate. This is due to instances where respondents preferred to answer closed questions within the non-interactive, self-administered questionnaires (Fowler 2002). The last section of the test instrument (section C) contains 23 likert scale items. The respondents are to express their opinion choosing from a range of options Strongly Agree, Agree, Disagree and Strongly Disagree.

**3.5 Framework of data analysis**

The collated data was analysed using SPSS. This allowed the calculation of the response frequencies, percentages and chi-square values to analyse the variables determined by this research. Since variables included within this research were nominal in nature, the chi-square test was considered to be most appropriate (Brace et al. 2003) when testing for the statistical significance of the differences between the users and non-user of broadband. In other to avoid complex statistical analysis, the Likert scale items were group into two. Strongly Disagree and Agree were put together as Agree and Disagree and Strongly Disagree were also put together as Disagree.

Table 3.1 Summary of Analytical Framework

| Objective | Questions | Hypothesis | Source of Data | Type of Data | Technique of Analysis |
|---|---|---|---|---|---|
| To examine the relationship between customers satisfaction of broadband services with price factors of the network companies in Ghana. | What are people's perceptions about broadband services in Ghana? | H2. The greater the perceived monthly cost of broadband access, the less likely that it will be adopted. | Primary Questionnaire | Ordinal Nominal | Frequency Percentage correlation |
| To determine the stability of broadband services among service providers in Ghana. | What are people's perceptions about broadband services in Ghana? | H1: The greater the perceived service quality from current broadband subscription, the more likely that a consumer will continue to subscribe it. | Primary Questionnaire | Nominal | Frequency Percentage crosstab |
| To determine the speed of broadband service among the service providers in Ghana | What are people's perceptions about broadband services in Ghana? | H1: The greater the perceived service quality from current broadband subscription, the more likely that a consumer will continue to subscribe it. | Primary Questionnaire | Nominal/ ordinal | Frequency Percentage Crosstab |
| To determine customer satisfaction level with the broadband service provider | What are people's perceptions about broadband services in Ghana? | H2. The greater the perceived monthly cost of broadband access, the less likely that it will be adopted. | Primary Questionnaire | Nominal | Frequency Percentage crosstab |

Table 3.1 continued

| | | | | | |
|---|---|---|---|---|---|
| To study the demographic factors such as age, sex, occupation, education level and income level of broadband users in Ghana | How do demographic characteristics of the individuals affect the choice of broadband service provider? | H5: Age of the individuals has an influence on the adoption intentions of broadband use.<br>H6: Gender of the individuals has an influence on the adoption intentions of broadband use.<br>H7: Education level of the individual has an influence on the adoption intentions of broadband use.<br>H8: Occupation of the individual has an influence on the adoption intentions of broadband use. | Primary Questionnaire | Scale Nominal | Percentage Frequency Correlation crosstab |
| To determine the percentage of people using broadband services and effect on their lives. | RQ 3.What percentage of the population is using broadband service in their daily activities in Ghana?<br>RQ5. How many people have PC/mobile devices? | **H3:** The lack of knowledge on broadband, its availability and benefits inhibit broadband adoption.<br>**H4:** The lesser the skill toward using the PC/mobile device and Internet, the less likely that broadband will be adopted. | Primary Questionnaire | Nominal | Percentage Crosstab |
| To determine how broadband services have affected users life style. | Has broadband services changed the life style of the citizens in Ghana? | | Primary Questionnaire | Nominal | Frequency Percentage |

# CHAPTER 4

## DATA ANALYSIS AND RESULT

### 4.1 Introduction

In this chapter the analysis of the data of the research as well as the findings are presented. To make the analysis easier to understand the likert scale items were group into two main groups. Strongly agree and agree were put together as agree and disagree and strongly disagree were also put together as disagree. Detailed tables are presented in appendix B. Missing system in tables means that the respondents did not answer those questions since they were not applicable to their situation. This is further explained in the discussion section in this chapter.

### 4.2 Descriptive statistics

The survey provided data on several demographics variable including gender, age, education level, monthly income, occupation and the region where the respondents lives.

### 4.2.1 Demographic profile of respondents

From table 4.1 the analysis of the data showed that out the 318 respondents, 53.5% (170) of the respondents were males and 46.5% (148) were females.

Table 4. 1 GENDER

| | Frequency | Percent |
|---|---|---|
| Male | 170 | 53.5 |
| Female | 148 | 46.5 |
| Total | 318 | 100.0 |

Source: Author



Most of the respondents were young adult aged between 18 to 29 years (48.1%) and middle aged adult between 30 to 49 years (46.5%). The respondents from 50 years and above accounted for only 5.1% of the respondents. Table 4.2 shows the age distribution of the respondents.

Table 4. 2 AGE

| | Frequency | Percent |
|---|---|---|
| 18 to 29 years | 153 | 48.1 |
| 30 to 49 years | 148 | 46.5 |
| 50 to 64 years | 16 | 5.1 |
| 65 + years | 1 | 0.3 |
| Total | 318 | 100.0 |

Source: Author

#### 4.2.1.1 Gender verses broadband internet use

Within the gender groups, table 4.3 shows that 50.6% males and 54.1% females indicated that they use broadband internet at home. However 49.4% males and 45.9% females also indicated that they do not use broadband internet at home. To find out whether respondents use broadband internet in their work, the result of the analysis from table 4.3 indicated that within the gender groups, 44.7% males and 44.6% females indicated

they use broadband internet at work, whiles 55.3% males and 55.4% females also indicated that they do not use broadband internet at work (table 4.3).

Table 4. 3 Gender verses broadband use

| | | | Do you use broadband internet at home? | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| What is your gender? | Male | Count | 86 | 84 | 170 |
| | | % within What is your gender? | 50.6% | 49.4% | 100.0% |
| | | % of Total | 27.0% | 26.4% | 53.5% |
| | Female | Count | 80 | 68 | 148 |
| | | % within What is your gender? | 54.1% | 45.9% | 100.0% |
| | | % of Total | 25.2% | 21.4% | 46.5% |
| Total | | Count | 166 | 152 | 318 |
| | | % within What is your gender? | 52.2% | 47.8% | 100.0% |
| | | % of Total | 52.2% | 47.8% | 100.0% |
| | | | Do you use broadband internet at work? | | Total |
| | | | Yes | No | |
| What is your gender? | Male | Count | 76 | 94 | 170 |
| | | % within What is your gender? | 44.7% | 55.3% | 100.0% |
| | | % of Total | 23.9% | 29.6% | 53.5% |
| | Female | Count | 66 | 82 | 148 |
| | | % within What is your gender? | 44.6% | 55.4% | 100.0% |
| | | % of Total | 20.8% | 25.8% | 46.5% |
| Total | | Count | 142 | 176 | 318 |
| | | % within What is your gender? | 44.7% | 55.3% | 100.0% |

Source: Author

Looking at the educational background of the respondents, table 4.4 indicates that 3.5%(11) of respondents have completed middle school or junior high school, 14.8%(47) have completed secondary school or senior high school, 6.3%(20) have completed training college and 75.4%(240) have completed tertiary institution.

Table 4. 4 Education

| | Frequency | Percent |
|---|---|---|
| Primary school (including JSS/JHS) | 11 | 3.5 |
| Secondary school (including SSS/SHS) | 47 | 14.8 |
| Training college | 20 | 6.3 |
| Tertiary (including poly and University) | 240 | 75.4 |
| Total | 318 | 100.0 |

Source: Author

The analysis also indicates that majority of the respondents, 42.5% earn between GH¢500 to GH¢1,000 per month 18.6% earning below GH¢500. Also 24.8% of the respondent earn a monthly income between GH¢1,100 to 1,499 while 3.8% earn between GH¢1,500 to GH¢1,999 with 2.8% earning between GH¢2,000 to GH¢2,499. Only 1.3% of the respondents earn GH¢2,500 and above. Table 4.5 shows the income of the respondents. Some of the respondents did not indicate their monthly income, a reason they did not disclosed to the researcher.

Table 4. 5 INCOME

| | | Frequency | Percent |
|---|---|---|---|
| | Below GH¢500 | 59 | 18.6 |
| | GH¢ 500 to GH¢ 1,000 | 135 | 42.5 |
| | GH¢ 1,100 to GH¢ 1,499 | 79 | 24.8 |
| | GH¢ 1,500 to GH¢ 1,999 | 12 | 3.8 |
| | GH¢ 2,000 to GH¢ 2,499 | 9 | 2.8 |
| | GH¢ 2,500 + | 4 | 1.3 |
| | Total | 298 | 93.8 |
| Missing | System | 20 | 6.2 |
| Total | | 318 | 100.0 |

Source: Author

Table 4.6 indicates that 21.1%(67) of the respondents are working in a banking and other financial institutions, 62.3%(198) are working in education institutions, 8.2%(26) are engineers, 8.2%(26) are traders and 0.3%(1) is with medical/pharmaceutical/nursing profession.

Table 4. 6 OCCUPATION

| | Frequency | Percent |
|---|---|---|
| Banking and Financing | 67 | 21.1 |
| Education | 198 | 62.3 |
| Engineering | 26 | 8.2 |
| Trader | 26 | 8.2 |
| Medical/Pharm/Nursse | 1 | 0.2 |
| Total | 318 | 100.0 |

Source: Author

Table 4.7 also shows the number of respondents from each region of Ghana. From table 4.7 18.9% were from the Central region, 17.0% from Western region, 15.4% from Ashanti region, 15.6% from Greater

Accra region, Brong Ahafo region accounted for 16.4% and Eastern region 16.7%. Details of males and females respondents from each region are shown in fig. 4.1.

Table 4. 7 REGIONS OF RESPONDENTS

| | Frequency | Percent |
|---|---|---|
| Central | 60 | 18.9 |
| Western | 54 | 17.0 |
| Ashanti | 49 | 15.4 |
| Greater Accra | 50 | 15.6 |
| Brong Ahafo | 52 | 16.4 |
| Eastern | 53 | 16.7 |
| Total | 318 | 100.0 |

Source: Author

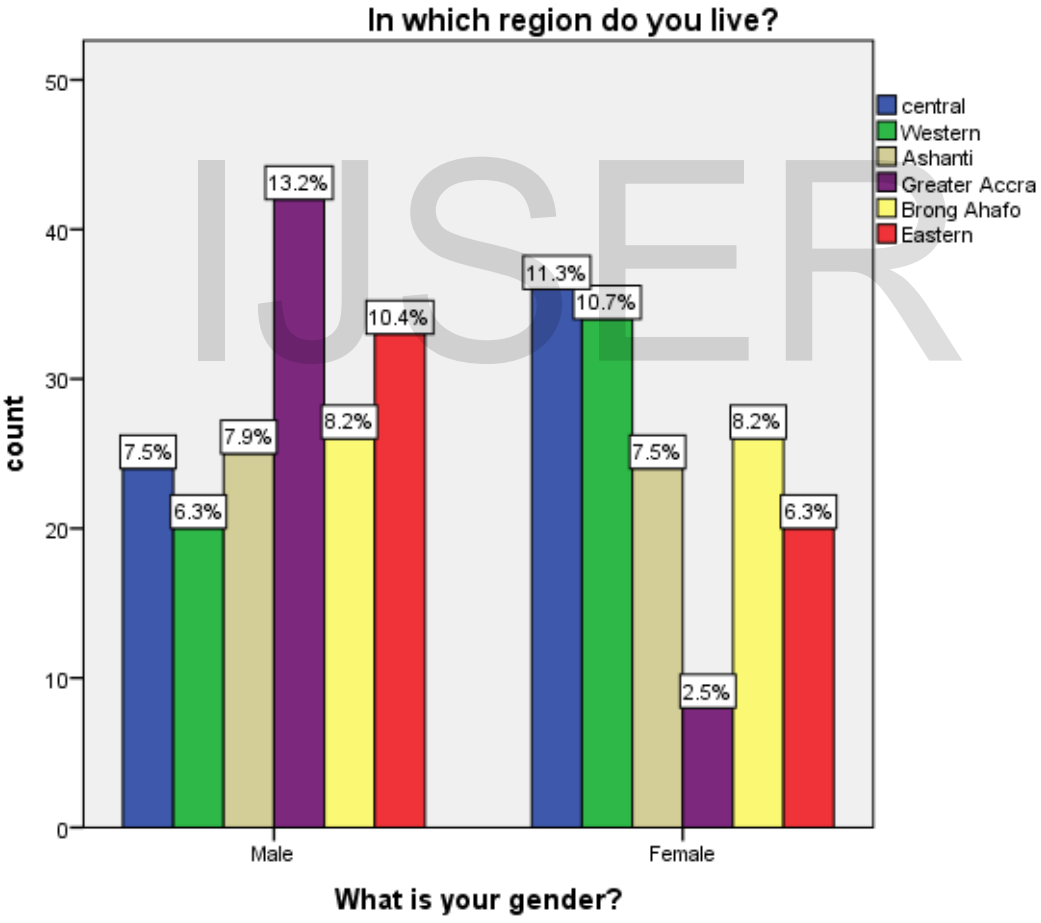


**Figure 4. 1 MALES AND FEMALES FROM EACH REGION**

**4.2.2 Computer Use**

In an attempt to find out how many of the respondents use computer at home and work place, 82.7% of the respondents indicated that they use computer at home while 17.3% indicated otherwise. Table 4.8 shows the result the numbers of respondents who use computer at home and those who do not have computer at home.

Table 4. 8 Computer use at home

| | Frequency | Percent |
|---|---|---|
| Yes | 263 | 82.7 |
| No | 55 | 17.3 |
| Total | 318 | 100.0 |

Source: Author

In a follow up question to know if respondents also use computer at workplace, 56.6% of the respondents indicated that they use computers at work while 43.4% said they never use computers at work. Table 4.9 shows the result.

Table 4. 9 computer use at workplace

| | Frequency | Percent |
|---|---|---|
| Yes | 180 | 56.6 |
| No | 138 | 43.4 |
| Total | 318 | 100.0 |

Source: Author

The researcher also wanted to know if respondents have mobile devices ( including iPad, iphone, SmartPhone, tablet PC etc.) with broadband internet activated on it, table 4.10 shows that 78.9% responded that they have mobile device with internet connection activated on it which they use for checking their mail and searching for information. 21.1% indicated they don't have such devices.



Table 4. 10 Mobile device with internet connection

| | Frequency | Percent |
|---|---|---|
| Yes | 251 | 78.9 |
| No | 67 | 21.1 |
| Total | 318 | 100.0 |

Source: Author

**4.2.3 Use of Broadband Internet**

To find out if the respondents have broadband internet access at home and workplace, 52.2% indicated that they have broadband internet at home (table 4.11) while 47.8% answered no to the question. 44.7% of the respondents also indicated that they have access to broadband internet at workplace while 55.3% answered "No" to the question (table 4.12)

Table 4. 11 broadband internet at home

| | Frequency | Percent |
|---|---|---|
| Yes | 166 | 52.2 |
| No | 152 | 47.8 |
| Total | 318 | 100.0 |

Source: Author

Table 4. 12 broadband internet at work

| | Frequency | Percent |
|---|---|---|
| Yes | 142 | 44.7 |
| No | 176 | 55.3 |
| Total | 318 | 100.0 |

Source: Author

**4.2.4 Reason for not using broadband internet**

From table 4.13, greater percentages of the respondents do not use broadband internet at home and workplace. In finding the reason why a large percentage of respondents do not use broadband internet, 6.0% indicated that they do not have PC / mobile device at home or work while 16.7% also think that the broadband internet is too expensive and they cannot afford it. Another set respondents, 5.3% also indicated that they are not interested in the use broadband internet or broadband internet is not useful to them. Others (5.7%) also indicated that they don't know how to use broadband internet, 14.8% indicated that there are no telephone cable or wireless signal near them. The missing in table means that respondents did not answer this question because they use broadband internet. Table 4.13 show the results the reasons respondents gave for not using broadband internet.

Table 4. 13 Reason for not using broadband

| | | Frequency | Percent |
|---|---|---|---|
| | Do not have PC/mobile device at home or work | 19 | 6.0 |
| | It is too expensive | 53 | 16.7 |
| | Not interested/ Not useful | 17 | 5.3 |
| | I don't know how to use it | 18 | 5.7 |
| | No telephone cable or wireless signal near me | 47 | 14.8 |
| | Total | 154 | 48.4 |
| Missing | System | 164 | 51.6 |
| Total | | 318 | 100.0 |

Source: Author

**4.2.5 Broadband Connection Type**

Some broadband internet service providers use fixed telephone line while others also use wireless mobile MODEM. The researcher wanted to find out whether the respondents know the type of broadband connection they are using, found that out of the 318 respondents, 15.1% (48) of the respondents indicated that they use fixed line broadband connection and 70.8% (225) of the respondents indicated that they use wireless mobile MODEM connection. Only 1.3% (4) indicated they use both fixed line and wireless MODEM connections and 12.8% (41) also indicated that they not know. Table 4.14 shows the respondents result.

Table 4. 14 broadband connection type

| | Frequency | Percentage |
|---|---|---|
| Fixed line internet broadband | 48 | 15.1 |
| Wireless (MODEM) internet broadband | 225 | 70.8 |
| Both fixed line and MODEM | 4 | 1.3 |
| Do not know | 41 | 12.8 |
| Total | 318 | 100.0 |

Source: Author

**4.2.6 Subscription Plan**

Table 4.15 shows the subscription plan of the respondents. From the table most of the respondents 43.7% (139) and 43.1% (137) have chosen monthly plan and Pay As You Go plan respectively. Only 3.1% (10) respondents indicated that they pay yearly for the broadband services. Another group of respondents, 10.1% also indicated that although they use broadband internet they are responsible for paying for the service, hence indicated they do not know the subscription plan.

Table 4. 15 subscription plan

| | Frequency | Percent |
|---|---|---|
| Yearly | 10 | 3.1 |
| Monthly | 139 | 43.7 |
| Pay As You Go | 137 | 43.1 |
| Do not know | 32 | 10.1 |
| Total | 318 | 100.0 |



Source: Author

**4.2.7 Cost of Broadband to respondents**

Majority of the respondents have a monthly subscription plan and pay between GH¢ 10 to GH¢ 50 per month. This accounted for 27% (86) of the respondents with 4.4% (14) pay between GH¢ 60 to GH¢ 100 per month and 1.3% (4) paying GH¢ 160 and above per month. From table 4.15, it could be noticed that some of the respondents also use 'Pay As You go' plan. 9.1% (29) pay between GH¢ 6 to GH¢ 10 while others 7.9% (25) of the respondents pay between GH¢ 1 to GH¢ 5 and 6.3% (20) pay GH¢ 11 to GH¢ 30. Only few of the respondents pay their broadband service yearly. Thus 0.6% (2) pay between GH¢100 to GH¢200 a year and 0.6%(2) also pay GH¢ 600 plus a year for broadband use. However 42.8% (136) of the respondents could not estimate how much the pay for broadband use. Table 4.16 show how much respondents pay for broadband use in Ghana.

Table 4. 16 payment of broadband by respondents

| | Frequency | Percent |
|---|---|---|
| GH¢ 10 to 50 per month | 86 | 27.0 |
| GH¢ 60 to 100 per month | 14 | 4.4 |
| GH¢ 160 + per month | 4 | 1.3 |
| GH¢ 1 to 5 Pay As you Go | 25 | 7.9 |

Table 4.16 continued

| | | |
|---|---|---|
| GH¢ 6 to 10 Pay As You Go | 29 | 9.1 |
| GH¢ 11 to 30 Pay As You Go | 20 | 6.3 |
| GH¢ 100 to 200 a year | 2 | 0.6 |
| GH¢ 600 + per year | 2 | 0.6 |
| Do not know | 136 | 42.8 |
| Total | 318 | 100.0 |

Source: Author

**4.2.8 Broadband service providers**

As a concern by the researcher to find out respondent choice of service provider, it was found that greater percent of the respondents, 28.9% (92) use MTN, followed by 19.2% (61) also using Vodafone and 11% (35) also use Glo. Airtel, Expresso and Tigo accounted for 9.4% (30), 9.7% (31) and 4.1% (13) respectively. Also some of the respondents use more than one service provider. From table 4.16, 0.9% (3) of the respondents indicated the use of Vodafone and MTN, 0.9% (3) also use MTN and Tigo, 1.3% (4) use Vodafone and Expresso, 0.9% (3) use MTN and Airtel, 1.3%(4) use MTN and Glo, 03.% (1) uses MTN and Expresso,0.9% (3) use Airtel and Expresso. Some of the respondents were also using three or more service provider. Moreover, some respondents were found to be using all the service providers. From the analysis, 0.3% (1) was found using MTN, Airtel and Glo, 0.3% (1) of the respondents also uses Vodafone, MTN and Glo and another 0.3% (1) was found using Vodafon, MTN, Airtel and Glo. Only 0.6% (2) were found using all the service providers. Table 4.17 shows the results of the respondent's choice of service providers.

Table 4. 17 respondents and Broadband service providers

| | Frequency | Percent |
|---|---|---|
| Vodafone | 61 | 19.2 |
| MTN | 92 | 28.9 |
| Airtel | 30 | 9.4 |
| Expresso | 31 | 9.7 |
| Tigo | 13 | 4.1 |
| Glo | 35 | 11.0 |
| Vodafone and MTN | 3 | 0.9 |
| MTN and Tigo | 3 | 0.9 |
| MTN, Airtel and Glo | 1 | 0.3 |
| Vodafone and Expresso | 4 | 1.3 |
| All the networks | 2 | 0.6 |
| MTN and Airtel | 3 | 0.9 |
| Vodafone, MTN and Glo | 1 | 0.3 |
| MTN and Glo | 4 | 1.3 |
| MTN and Expresso | 1 | 0.3 |

Table 4.17 continued

| | | | |
|---|---|---|---|
| | Vodafon, MTN, Airtel and Glo | 1 | 0.3 |
| | Airtel and Expresso | 3 | 0.9 |
| | Total | 288 | 90.6 |
| | Did not choose any service provider | 30 | 9.4 |
| Total | | 318 | 100.0 |

Source: Author

**4.2.9 Frequency of broadband usage**

When respondents were asked how even they use the broadband internet, 60.8% (193) indicated that they use their broadband internet daily, while 6.0% also indicated they use it weekly with 5.3% (17) indicating that they use it monthly. However, 18.2% (58) and 9.7% (31) indicated that they use it once a while and when it becomes necessary respectively. Table 4.18 shows the summary by the respondents.

Table 4. 18 frequency of broadband use by respondents

| | | Frequency | Percent |
|---|---|---|---|
| | Daily | 193 | 60.8 |
| | Weekly | 19 | 6.0 |
| | Monthly | 17 | 5.3 |
| | Once a while | 58 | 18.2 |
| | As it becomes necessary | 31 | 9.7 |
| | Total | 318 | 100.0 |

Source: Author



**4.2.10 Device ownership**

The result presented in table 4.19 shows that 64.3% (206) of the respondents have personal computer with which they use their broadband internet, 1.6% (5) have iPad with broadband enabled on it, 2.2% (7) have iPhone with broadband internet enabled, 2.8% (9) have tablet PCs with broadband internet enabled and 15.4% (49) also have SmartPhone with broadband enabled. It was also found that respondents with personal PCs also have mobile devices with broadband enabled on them. From table 4.18, 1.9% (6) respondents have personal computer and Smartphone, 0.6% (2) have personal computers and iPhone, 0.6% (2) have personal computers and iPad and 0.3% (1) has SmartPhone and iPhone. Only 0.3% (1) indicated he/she has personal computer, tablet PC and SmartPhone. As many as 9.4% (30) indicated they use their friends device to use the internet.

Table 4. 19 Device ownership

| | | Frequency | Percent |
|---|---|---|---|
| | My personal computer | 206 | 64.8 |
| | My iPad | 5 | 1.6 |
| | My iPhone | 7 | 2.2 |

Table 4.19 continued

| | | | |
|---|---|---|---|
| | My tablet PC | 9 | 2.8 |
| | My smartPhone | 49 | 15.4 |
| | My personal computer and my SmartPhone | 6 | 1.9 |
| | My personal computer and my iPhone | 2 | 0.6 |
| | My personal computer and my iPad | 2 | 0.6 |
| | My personal computer, my tablet PC and my smartPhone | 1 | 0.3 |
| | My iPhone and my smartPhone | 1 | 0.3 |
| | On a friends device | 30 | 9.4 |
| Total | | 318 | 100.0 |

Source: Author

From the table 4.20, 34.4% of the respondents aged between 18 to 29 have PCs with broadband internet connectivity, 33.3% aged between 30 to 49 years also have PCs with broadband internet connection. Only 3.8% aged 50 years and above have PCs with broadband internet connection. With mobile devices, 1.4%, 0.7%, 1.4% and 9.4% of the respondents aged 18 to 29 years own iPad, iPhone, table PCs and SmartPhones respectively, 0.3%, 1.0%, 1.0% and 7.6% aged 30 to 49 years own iPad, IPhone, tablet PCs and SmartPhones respectively and no respondents above 50 years owns an iPad but 0.7% and 0.3% own iPhone and tablet PCs.

Table 4. 20 Device with broadband internet



| | | | My personal computer | My iPad | My iPhone | My tablet PC | My smartPhone |
|---|---|---|---|---|---|---|---|
| What is your Age? | 18 to 29 years | Count | $99_a$ | $4_a$ | $2_a$ | $4_a$ | $27_a$ |
| | | % within What is your Age? | 71.2% | 2.9% | 1.4% | 2.9% | 19.4% |
| | | % of Total | 34.4% | 1.4% | 0.7% | 1.4% | 9.4% |
| | 30 to 49 years | Count | $96_a$ | $1_a$ | $3_a$ | $3_a$ | $22_a$ |
| | | % within What is your Age? | 71.6% | 0.7% | 2.2% | 2.2% | 16.4% |
| | | % of Total | 33.3% | 0.3% | 1.0% | 1.0% | 7.6% |
| | 50 to 64 years | Count | $11_{a, b}$ | $0_{a, b, c, d}$ | $2_{c, d}$ | $1_{b, d}$ | $0_a$ |
| | | % within What is your Age? | 78.6% | 0.0% | 14.3% | 7.1% | 0.0% |
| | | % of Total | 3.8% | 0.0% | 0.7% | 0.3% | 0.0% |

Table 4.20 continued

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 65 + years | Count | $0_a$ | $0_{a, b}$ | $0_{a, b}$ | $1_b$ | $0_a$ |
| | | % within What is your Age? | 0.0% | 0.0% | 0.0% | 100.0% | 0.0% |
| | | % of Total | 0.0% | 0.0% | 0.0% | 0.3% | 0.0% |
| Total | | Count | 206 | 5 | 7 | 9 | 49 |
| | | % within What is your Age? | 71.5% | 1.7% | 2.4% | 3.1% | 17.0% |
| | | % of Total | 71.5% | 1.7% | 2.4% | 3.1% | 17.0% |

*Each subscript letter denotes a subset of I use internet broadband on... categories whose column proportions do not differ significantly from each other at the .05 level.

Source: Author

**4.2.11 Stable broadband internet provider**

The result shown in table 4.21 is a mixed reaction from respondents since some of the respondents use more than one different broadband internet provider. From the table out 208 respondents who use Vodafone broadband internet 36.5% (116) agreed that Vodafone broadband internet is more stable followed by Airtel 32.4% (103) out of 195 respondents. Glo is the next with 32.1% (102) out of 103 respondents who indicated that Glo is stable. MTN is the service provider with least number of respondents 4.7% (15) out of 225 respondents agreeing that it is stable. Tigo has 172 respondents using it with 16.0% (51) agreeing it is stable and Express has 189 respondents with 27.7% (88) indicating it is stable.

Table 4. 21 Stability

| Service provider | | Frequency | Percent | Total freq. (agree + disagree) |
|---|---|---|---|---|
| Vodafone | Agree | 116 | 36.5 | 208 |
| | Disagree | 92 | 28.9 | |
| | Do not use | 110 | 24.2 | |
| MTN | Agree | 15 | 4.7 | 225 |
| | Disagree | 208 | 65.4 | |
| | Do not use | 99 | 31.1 | |
| Tigo | Agree | 51 | 16.0 | 172 |
| | Disagree | 121 | 38.1 | |
| | Do not use | 146 | 45.9 | |
| Expresso | Agree | 88 | 27.7 | 189 |
| | Disagree | 101 | 31.8 | |
| | Do not use | 129 | 40.6 | |

Table 4.21 continued

| | | | | |
|---|---|---|---|---|
| Airtel | Agree | 103 | 32.4 | 195 |
| | Disagree | 92 | 28.9 | |
| | Do not use | 123 | 38.7 | |
| Glo | Agree | 102 | 32.1 | 172 |
| | Disagree | 70 | 22.0 | |
| | Do not use | 146 | 45.9 | |

Source: Author

**4.2.12. Which is faster?**

From table 4.22, respondents indicated that MTN is the fastest broadband internet among the other broadband networks. It should be noted here that some of the respondents use more than one broadband network and can make comparison among the networks. Thus out of the 208 respondents 48.4% (122) agreed that MTN broadband network is faster than all the other broadband networks. Vodafone had 248 respondents with 38.3% (122) also indicating that Vodafone network is fast. Thus among broadband internet services in Ghana, MTN has the fastest speed. Other broadband internet providers like Tigo, Expresso, Airtel and Glo have low speed compared with MTN and Vodafone. Though the speed for these networks is not bad as indicated in table 4.20 from table 4.20, Airtel has 34.3% (109) out of 190 respondents indicating that its broadband internet connection is fast with Glo having 32.7% (104) out of 181 respondents indicating that it is the fastest. Expresso and Tigo have the least percentage, 29.2% (93) out of 194 Expresso users and 19.2% (64) out of 173 Tigo users respectively.

From table 4.22, greater number of respondents (34.2%) disagree that Tigo broadband is faster, 31.7% also disagree that Expresso broadband is faster, 27.0% disagree that MTN Broadband is faster, 25.4% disagree that Airtel broadband is fast, 24.2% disagree that Glo broadband is fast and 22.0% disagreeing that Vodafone broadband is fast.



Table 4. 22 faster network

| Service provider | | Frequency | Percent | Total freq. (agree + disagree) |
|---|---|---|---|---|
| Vodafone | Agree | 122 | 38.3 | 248 |
| | Disagree | 70 | 22.0 | |
| | Do not use | 126 | 39.6 | |
| MTN | Agree | 122 | 48.4 | 208 |
| | Disagree | 86 | 27.0 | |
| | Do not use | 110 | 34.6 | |
| Tigo | Agree | 64 | 19.2 | 173 |
| | Disagree | 109 | 34.2 | |
| | Do not use | 148 | 46.5 | |
| Expresso | Agree | 93 | 29.2 | 194 |
| | Disagree | 101 | 31.7 | |
| | Do not use | 124 | 3.9 | |
| Airtel | Agree | 109 | 34.3 | 190 |
| | Disagree | 81 | 25.4 | |
| | Do not use | 128 | 40.3 | |

Table 4.22 continued

| | | | | |
|---|---|---|---|---|
| | Agree | 104 | 32.7 | 181 |
| Glo | Disagree | 77 | 24.2 | |
| | Do not use | 137 | 43.1 | |

Source: Author

**4.2.13 Cost of using broadband internet**

In an attempt by the researcher to find out which of the broadband internet is expensive, responses from the respondents indicate that MTN broadband internet is expensive than the others. From table 4.23, 37.7% (120) out of 217 respondents who use MTN broadband internet agree that MTN broadband is expensive while 30.5% (97) disagree. Respondents of other broadband internet providers also gave their view about the cost of using their broadband internet. 30.5% (97) of Vodafone broadband users indicated that it expensive while 30.9% (98) disagree. Tigo broadband users who agreed that it expensive accounted for 20.8% (66) out of 177 user and 34.9% (111) disagreed. Also Expresso user who agreed that Expresso broadband internet is expensive accounted for 21.4% (68) of 192 users and 38.0% (124) disagreed. Airtel and Glo users who agreed that broadband internet is expensive accounted for 19.8% (63) and 18.2% (58) out of 184 and 176 respectively while 38.0% (121) and 18.2% (37.1) disagreed respectively.

Table 4. 23 cost of broadband internet

| Service provider | | Frequency | Percent | Total freq. (agree + disagree) |
|---|---|---|---|---|
| | Agree | 97 | 30.5 | 195 |
| Vodafone | Disagree | 98 | 30.9 | |
| | Do not use | 123 | 38.7 | |
| | Agree | 120 | 37.7 | 217 |
| MTN | Disagree | 97 | 30.5 | |
| | Do not use | 101 | 31.8 | |
| | Agree | 66 | 20.8 | 177 |
| Tigo | Disagree | 111 | 34.9 | |
| | Do not use | 141 | 44.3 | |
| | Agree | 68 | 21.4 | 192 |
| Expresso | Disagree | 124 | 38.0 | |
| | Do not use | 126 | 39.6 | |
| | Agree | 63 | 19.8 | 184 |
| Airtel | Disagree | 121 | 38.0 | |
| | Do not use | 134 | 42.1 | |
| | Agree | 58 | 18.2 | 176 |
| Glo | Disagree | 118 | 37.1 | |
| | Do not use | 142 | 44.7 | |

Source: Author

**4.2.14 Impact of broadband internet**

To find out whether broadband internet has impacted positively or negatively on people, 67.9% (216) of the respondents indicated that broadband internet has impacted positively on their lives and 12.6% (40) of the respondents disagree that broadband internet has change their lives positively. About 19.5% (62) of the respondents could not decide whether there has been any significant change in their lives. Table 4.24 shows the results.

Table 4. 24 Impact of broadband

| | Frequency | Percent |
|---|---|---|
| Agree | 216 | 67.9 |
| Disagree | 40 | 12.6 |
| Do not know | 62 | 19.5 |
| Total | 318 | 100.0 |

Source: Author

**4.2.15 Easy of information access**

When respondents were asked to assess how difficult it is to access information for their daily activity, 82.1% (261) agreed that they can have access to information easily with the introduction of broadband internet while 4.1% (13) also indicated the access to information is difficult. However 13.8% (44) of the respondents could not tell if they can access information with difficulty or with ease. Table 4.25 shows the result.

Table 4. 25 Easy of information access



| | Frequency | Percent |
|---|---|---|
| Agree | 261 | 82.1 |
| Disagree | 13 | 4.1 |
| Do not know | 44 | 13.8 |
| Total | 318 | 100.0 |

Source: Author

**4.2.16 Perception of work output**

The perception of respondents about the efficiency of work output with the introduction of broadband internet overwhelming. From table 4.26, 79.6% (253) out of 318 respondents agreed that work output has increased tremendously. Only 11% (35) respondents disagreed to this accession. Also 9.4% (30) of the respondents were not able to decide whether there has been any improvement in work output.

Table 4. 26 Work output increased

| | Frequency | Percent |
|---|---|---|
| Agree | 253 | 79.6 |
| Disagree | 35 | 11.0 |
| Do not know | 30 | 9.4 |
| Total | 318 | 100.0 |

Source: Author

In other to confirm the perception of the respondents as in table 4.27, the researcher put a negative question "broadband has made people lazy at work", and 50.6% (161) of the respondents disagreed to that while 26.8% (85) also agreed that some people have become lazy because of broadband internet. Table 4.27 which shows the results also shows that 22.6% (72) were not sure, partially disagree and partially agree.

Table 4. 27 broadband has made people lazy

| | Frequency | Percent |
|---|---|---|
| Agree | 85 | 26.8 |
| Disagree | 161 | 50.6 |
| Not sure | 72 | 22.6 |
| Total | 318 | 100.0 |

Source: Author

**4.2.17 Computer / internet skills**

The response in table 4.25, table 4.26 and table 4.27 could be influenced by the knowledge and skills in computers and internet. The result shown in table 4.28 may be a mix of responses from the respondents. Some may have basic skills in computers but do not know how to use the internet. From table 4.28, 77.44% (246) indicated that they have basic skills in computers and internet and 22.6% (72) also indicated that they don't have basic skills in computers or internet. Some of the respondents 53.8% (171) indicated they are expert in computers / internet while 46.2% (147) also indicated that they are not expert but either have basic skill or no computer skills.

Table 4. 28 Computer / Internet skills



| | | Frequency | Percent |
|---|---|---|---|
| Basic skills | Agree | 246 | 77.4 |
| | Disagree | 72 | 22.6 |
| | Total | 318 | 100.0 |
| Expert | Agree | 171 | 53.8 |
| | Disagree | 147 | 46.2 |
| | Total | 318 | 100 |

Source: Author

**4.3 Analysis of Hypothesis**

**4.3.1. H1: The greater the perceived service quality from current broadband subscription, the more likely that a consumer will continue to subscribe it.**

The researcher was looking at the quality of service in terms of stability and speed of broadband services providers give to customers. In an attempt to research respondent's satisfaction and the number of respondents who use the service, table 4.29 shows that majority (36.5%) of the respondents indicated Vodafone broadband was more stable followed by Airtel (32.4%) and Glo (32.1%). MTN was marked as the broadband with less stability (15%). Expresso and Tigo had 24.7% and 16.0% of the respondents indicating their stability respectively.

In terms of speed the same number of respondents (38.3%) indicated that Vodafone and MTN are faster while 34.3%, 29.2%, 24.2% and 19.2% of the respondents also indicated that Airtel, Expresso, Glo, and Tigo have fast broadband internet respectively. To relate the quality as perceived by the researcher to the number of subscribers, 28.9% of the respondents use MTN broadband, 19.2% use Vodafone broadband and 11.0% use Glo broadband internet. Low percent of the respondents, thus 9.5%, 9.4% and 4.1% of the respondents use Expresso, Airtel and Tigo broadband internet respectively.

Table 4. 29 Quality of Service verses subscribers

| | Stability | | Speed | | Use | |
|---|---|---|---|---|---|---|
| | Frequency | Percent | Frequency | Percent | Frequency | Percent |
| Vodafone | 116 | 36.5 | 122 | 38.3 | 61 | 19.2 |
| MTN | 15 | 4.7 | 122 | 38.3 | 92 | 28.9 |
| Tigo | 51 | 16.0 | 64 | 19.2 | 13 | 4.1 |
| Expresso | 88 | 24.7 | 93 | 29.2 | 31 | 9.5 |
| Airtel | 103 | 32.4 | 109 | 34.3 | 30 | 9.4 |
| Glo | 102 | 32.1 | 77 | 24.2 | 35 | 11.0 |

Source: Author

**4.3.2. H2: The greater the perceived monthly cost of broadband access, the less likely that it will be adopted**

The adoption of broadband internet is depended on how much an individual pay for using broadband. To find out whether the accession is true, a crosstabulation of how much the respondents pay for using broadband internet verses the use of broadband (table 4.30) indicates that within do you use broadband internet at home, the respondents who indicated yes, 51.6% indicated that they pay between GH¢10 to Gh¢ 50 per month, 8.1% pay between GH¢ 60 to Gh¢ 100 per month, and 0.8% pay GH¢ 160 or more per month. However some of the respondents use Pay As You Go plan and yearly plan. Among those who use Pay As You Go plan, 13.7% pay between GH¢ 1 to GH¢ 5, 12.1% pay between GH¢ 6 to GH¢ 10 and 11.3% pay between pay between GH¢ 11 to GH¢ 30. For those who pay yearly, 0.8% indicated that they pay between GH¢ 100 to GH¢ 200 and 1.6% also indicated that they pay GH¢ 600 or more.

From table 4.30, 31.9% of the respondents indicated that they do not use broadband at home due to the cost involved while 68.1% of the respondents also indicated that they use broadband internet at home irrespective of the cost.

Table 4. 30 Cost verses broadband adoption

**Do you use broadband internet at home? * How much do pay for your broadband? Crosstabulation**

| | | | How much do pay for your broadband? | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | GH¢ 10 to 50 per month | GH¢ 60 to 100 per month | Gh ¢ 160 + | GH¢ 1 to 5 Pay As you Go | GH¢ 6 to 10 Pay As You Go | GH¢ 11 to 30 Pay As You Go | GH ¢ 100 to 200 a year | GH¢ 600 + per year | |
| Do you use broadband internet at home? | Yes | Count | $64_a$ | $10_{a, b}$ | $1_b$ | $17_{a, b}$ | $15_b$ | $14_{a, b}$ | $1_{a, b}$ | $2_{a, b}$ | 124 |
| | | % within Do you use broadband internet at home? | 51.6% | 8.1% | 0.8% | 13.7% | 12.1% | 11.3% | 0.8% | 1.6% | 100.0% |
| | | % of Total | 35.2% | 5.5% | 0.5% | 9.3% | 8.2% | 7.7% | 0.5% | 1.1% | 68.1% |
| | No | Count | $22_a$ | $4_{a, b}$ | $3_b$ | $8_{a, b}$ | $14_b$ | $6_{a, b}$ | $1_{a, b}$ | $0_{a, b}$ | 58 |
| | | % within Do you use broadband internet at home? | 37.9% | 6.9% | 5.2% | 13.8% | 24.1% | 10.3% | 1.7% | 0.0% | 100.0% |
| | | % of Total | 12.1% | 2.2% | 1.6% | 4.4% | 7.7% | 3.3% | 0.5% | 0.0% | 31.9% |
| Total | | Count | 86 | 14 | 4 | 25 | 29 | 20 | 2 | 2 | 182 |
| | | % within Do you use broadband internet at home? | 47.3% | 7.7% | 2.2% | 13.7% | 15.9% | 11.0% | 1.1% | 1.1% | 100.0% |
| | | % of Total | 47.3% | 7.7% | 2.2% | 13.7% | 15.9% | 11.0% | 1.1% | 1.1% | 100.0% |

Each subscript letter denotes a subset of How much do you pay for your broadband? categories whose column proportions do not differ significantly from each other at the .05 level.

Source: Author

**4.3.3 H:3 The lack of knowledge on broadband, its availability and benefits inhibit broadband adoption.**

An analysis to determine whether knowledge about broadband and its benefit has an influence on adoption of broadband, showed from table 4.31 that respondents who indicated they have knowledge and knows the benefit of broadband, within do you use broadband internet at home and work, 127(49.6%) and 109(42.6%) indicated that they use broadband internet at home and work respectively while 89(34.8%) and 107(41.8%) indicated they do not use broadband internet either at home or work respectively.

However those who indicated that they do not have much knowledge and know less about the benefit of broadband internet, within do you use broadband internet at home? 20(7.8%) indicated that they use broadband at home while 20(7.8%) also indicated they do not use broadband at home and within do you use broadband internet at work? 22(8.6%) indicated they use broadband internet at work while 18.0(7.0%) also indicated that they do not use broadband internet at work.

In all both respondents with much knowledge in broadband and its benefit and use broadband internet at home and work constituted 54.3%(278) of the respondents while those with less knowledge in broadband and its benefit and do not use broadband internet at home and work also constituted 45.7%(234) of the respondents.

Table 4. 31 Knowledge/Benefit of broadband verses use of broadband internet at home and work? Crosstabulation

| | | | Do you use broadband internet at home? | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| Knowledge/Benefit of broadband | Agree | Count | 127 | 89 | 216 |
| | | % within Do you use broadband internet at home? | 49.6% | 34.8% | 84.4% |
| | Disagree | Count | 20 | 20 | 40 |
| | | % within Do you use broadband internet at home? | 7.8% | 7.8% | 15.6% |
| Total | | Count | 147 | 109 | 256 |
| | | % within Do you use broadband internet at home? | 100.0% | 100.0% | 100.0% |
| | | % of Total | 57.4% | 42.6% | 100.0% |

| | | | Do you use broadband internet at work? | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| Knowledge/Benefit of broadband | Agree | Count | 109 | 107 | 216 |
| | | % within Do you use broadband internet at work? | 42.6% | 41.8% | 84.4% |
| | Disagree | Count | 22 | 18 | 40 |

Table 4.31 continued

| | | | | |
|---|---|---|---|---|
| | % within Do you use broadband internet at work? | 8.6% | 7.0% | 15.6% |
| | Count | 131 | 125 | 256 |
| Total | % within Do you use broadband internet at work? | 100.0% | 100.0% | 100.0% |
| | % of Total | 51.2% | 48.8% | 100.0% |

Source: Author

**4.3.4. H4: The lesser the skill toward using the PC/mobile device and internet, the less likely that broadband will be adopted**

It is likely that individuals who have lesser skill in computers are less likely to adopt and use broadband internet for their activities. The result from table 4.32 shows that those who agreed that they have basic skills in computers, within do you use broadband internet at home?, 137(49.4%) of the respondents indicated they use broadband internet at home while 109(39.3%) also indicated they do not use broadband internet at home. Those who indicated they do not have basic skills in computers, within do you use broadband internet at home, 14(5.1%) of the respondents indicated that while 17(6.1%) also indicated that they do not use broadband internet at home.

Table 4.32 also shows the result of the respondents who use broadband internet at work. Within do you use broadband internet at work?, 88(35.3%) of the respondents indicated that they use broadband internet at work and 83(33.4%) of the respondents also indicated that they do not use broadband internet at work. Among these respondents, those who indicated that they do not have skill in computers and internet, within do use broadband internet at work?, 38(15.3%) indicated they use broadband internet at work while 40(16.0%) also indicated they do not use broadband internet at work. In summary 151(54.5%) and 126(50.6%) of the respondents who agreed and disagreed that they have skills in computers and internet use broadband internet at home and work respectively and 126(45.5%) and 123(49.4%) also indicated they do not use broadband at home and work respectively.



Table 4. 32 Basic computer/Internet skills verses broadband use

**I have basic computer/internet skills * Do you use broadband internet at home? Crosstabulation**

| | | | Do you use broadband internet at home? | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| I have basic computer/ internet skills | Agree | Count | 137 | 109 | 246 |
| | | % within Do you use broadband internet at home? | 49.4 % | 39.3% | 88.8% |
| | Disagree | Count | 14 | 17 | 31 |
| | | % within Do you use broadband internet at home? | 5.1% | 6.1% | 11.2% |
| Total | | Count | 151 | 126 | 277 |

Table 4.32 continued

| | | | | | |
|---|---|---|---|---|---|
| | | % within Do you use broadband internet at home? | 100.0% | 100.0% | 100.0% |
| | | % of Total | 54.5% | 45.5% | 100.0% |
| | | | Do you use broadband internet at work? | | Total |
| | | | Yes | No | |
| I have basic computer/ internet skills | Agree | Count | 88 | 83 | 165 |
| | | % within Do you use broadband internet at work? | 35.3% | 33.4% | 68.7% |
| | Disagree | Count | 38 | 40 | 78 |
| | | % within Do you use broadband internet at work? | 15.3% | 16.0% | 31.3% |
| Total | | Count | 126 | 123 | 249 |
| | | % within Do you use broadband internet at work? | 100% | 100% | 100% |
| | | % of Total | 50.6% | 49.4% | 100% |

Source: Author



**4.3.5. H5: Age of the individual has an influence on the adoption intentions of broadband use**

The analysis of the age of the respondents and the adoption of broadband internet shows that as the individual advances in age, the adoption intention decreases. From table 4.33 and 4.32 when the researcher wanted to find out the age of the respondents and the use of broadband internet at home and at work, the young adult between 18 to 29 years (68) and middle aged adults between 30 to 49 years (86) form majority of the respondents who use broadband internet at home. The same age groups also have 68 and 65 respondents who use broadband internet at work. Only few respondents 50years (12) and above indicated that they use broadband at home. Similarly, almost the same number of respondents between 18 to 29 years (68) and between 30 to 49 years (65) indicated that they use broadband internet at work. From 50 years and above only 9 respondents indicated that they use broadband internet at work.

Table 4. 33

**Age verses broadband internet use at home**

| | | Do you use broadband internet at home? | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| What is your Age? | 18 to 29 years | 68 | 85 | 153 |

Table 4.33 continued

| | | | | |
|---|---|---|---|---|
| | 30 to 49 years | 86 | 62 | 148 |
| | 50 to 64 years | 12 | 4 | 16 |
| | 65 + years | 0 | 1 | 1 |
| Total | | 166 | 152 | 318 |

Table 4. 34

**Age verses use broadband internet at work**

| | | Do you use broadband internet at work? | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| What is your Age? | 18 to 29 years | 68 | 85 | 153 |
| | 30 to 49 years | 65 | 83 | 148 |
| | 50 to 64 years | 8 | 8 | 16 |
| | 65 + years | 1 | 0 | 1 |
| Total | | 142 | 176 | 318 |

Source: Author



**4.3.6. H6: gender of the individual has an influence on the adoption intentions of broadband use**

The researcher wanted to know whether gender has an influence on adoption and use of broadband, found out that (table 4.35) within the gender group 51.8% of males indicated that they use broadband at home compared to 48.2% within the female group who indicated that they use broadband at home. Also within the gender group 55.3% of males indicated they don't use broadband at home compared to 44.7% females within the gender group who do not use broadband at home.

Table 4. 35 Gender verses Broadband adoption and use at home

**What is your gender? * Do you use broadband internet at home? Crosstabulation**

| | | | Do you use broadband internet at home? | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| What is your gender? | Male | Count | 86 | 84 | 170 |
| | | % within What is your gender? | 50.6% | 49.4% | 100.0% |
| | | % within Do you use broadband internet at home? | 51.8% | 55.3% | 53.5% |
| | | % of Total | 27.0% | 26.4% | 53.5% |

Table 4. 36 continued

| | | | | | |
|---|---|---|---|---|---|
| | Female | Count | 80 | 68 | 148 |
| | | % within What is your gender? | 54.1% | 45.9% | 100.0% |
| | | % within Do you use broadband internet at home? | 48.2% | 44.7% | 46.5% |
| | | % of Total | 25.2% | 21.4% | 46.5% |
| Total | | Count | 166 | 152 | 318 |
| | | % within What is your gender? | 52.2% | 47.8% | 100.0% |
| | | % within Do you use broadband internet at home? | 100.0% | 100.0% | 100.0% |
| | | % of Total | 52.2% | 47.8% | 100.0% |

Source: Author

To find out the gender difference of adoption of broadband at work, within the gender group 53.5% males indicated that they use broadband internet at work compared to 46.5% females within the gender group who indicated that they use broadband internet at work. However within the gender group, 53.4% of males indicated that they don't use broadband internet at work compared to 46.6% females who indicated that they don't use internet broadband at work. Table 4.36 shows the result.

Table 4. 37 Gender verses broadband adaption at work

**What is your gender? * Do you use broadband internet at work? Crosstabulation**

| | | | Do you use broadband internet at work? | | Total |
|---|---|---|---|---|---|
| | | | Yes | No | |
| What is your gender? | Male | Count | 76 | 94 | 170 |
| | | % within What is your gender? | 44.7% | 55.3% | 100.0% |
| | | % within Do you use broadband intrnet at work? | 53.5% | 53.4% | 53.5% |
| | | % of Total | 23.9% | 29.6% | 53.5% |

Table 4.36 continued

| | | | | | |
|---|---|---|---|---|---|
| | Female | Count | 66 | 82 | 148 |
| | | % within What is your gender? | 44.6% | 55.4% | 100.0% |
| | | % within Do you use broadband internet at work? | 46.5% | 46.6% | 46.5% |
| | | % of Total | 20.8% | 25.8% | 46.5% |
| Total | | Count | 142 | 176 | 318 |
| | | % within What is your gender? | 44.7% | 55.3% | 100.0% |
| | | % within Do you use broadband internet at work? | 100.0% | 100.0% | 100.0% |
| | | % of Total | 44.7% | 55.3% | 100.0% |

Source: Author

**4.3.7. H7: Education level of the individual has influence on the adaption intentions of broadband use**

Testing whether the level of education has influence on adoption intentions of broadband use, table 4.37 show that 0.6% of the respondents who attended primary school indicated that they use broadband internet at home while 13.3% at having secondary education as their highest level also indicating that they use broadband at home, 9.6% of those who attended training college use broadband at home and 76.5% of those who attended tertiary education use broadband at home. However 6.6%, 16.4%, 2.6% and 74.3% primary, secondary, training college and tertiary respondents respectively indicated that they do not use broadband at home.



Table 4. 38 Educational level verses broadband internet use at home Crosstabulation

**Do you use broadband internet at home? * What is highest educational level? Crosstabulation**

| | | | What is highest educational level? | | | | |
|---|---|---|---|---|---|---|---|
| | | | Primary school including JSS/JHS | Secondary school including SSS/SHS | Training college | Tertiary including poly and University | Total |
| Do you use broadband internet at home? | Yes | Count | $1_a$ | $22_b$ | $16_c$ | $127_b$ | 166 |
| | | % within Do you use broadband internet at home? | 0.6% | 13.3% | 9.6% | 76.5% | 100.0% |
| | | % of Total | 0.3% | 6.9% | 5.0% | 39.9% | 52.2% |
| | No | Count | $10_a$ | $25_b$ | $4_c$ | $113_b$ | 152 |
| | | % within Do you use broadband internet at home? | 6.6% | 16.4% | 2.6% | 74.3% | 100.0% |
| | | % of Total | 3.1% | 7.9% | 1.3% | 35.5% | 47.8% |
| Total | | Count | 11 | 47 | 20 | 240 | 318 |

Table 4. 39 continued

| | | | | | | |
|---|---|---|---|---|---|---|
| | | % within Do you use broadband internet at home? | 3.5% | 14.8% | 6.3% | 75.5% | 100.0% |
| | | % of Total | 3.5% | 14.8% | 6.3% | 75.5% | 100.0% |

Each subscript letter denotes a subset of What is highest educational level? categories whose column proportions do not differ significantly from each other at the .05 level.

Source: Author

To determine whether the respondents also use broadband in their work, table 4.38 shows that 1.4% primary 12.0% secondary, 8.5% training college and 78.2% tertiary respondents indicated they use broadband internet in their work. Also 5.1% primary, 17.0% secondary, 4.5% training college and 73.3% tertiary educated respondents indicated that they do not use broadband internet in their work.

Table 4. 40 Education level verse broadband use at work Crosstabulation

| | | | What is highest educational level? | | | | |
|---|---|---|---|---|---|---|---|
| | | | Primary school including JSS/JHS | Secondary school including SSS/SHS | Training college | Tertiary including poly and University | Total |
| Do you use broadband internet at work? | Yes | Count | $2_a$ | $17_{a, b}$ | $12_b$ | $111_{a, b}$ | 142 |
| | | % within Do you use broadband internet at work? | 1.4% | 12.0% | 8.5% | 78.2% | 100.0% |
| | | % of Total | 0.6% | 5.3% | 3.8% | 34.9% | 44.7% |
| | No | Count | $9_a$ | $30_{a, b}$ | $8_b$ | $129_{a, b}$ | 176 |
| | | % within Do you use broadband internet at work? | 5.1% | 17.0% | 4.5% | 73.3% | 100.0% |
| | | % of Total | 2.8% | 9.4% | 2.5% | 40.6% | 55.3% |
| Total | | Count | 11 | 47 | 20 | 240 | 318 |
| | | % within Do you use broadband internet at work? | 3.5% | 14.8% | 6.3% | 75.5% | 100.0% |
| | | % of Total | 3.5% | 14.8% | 6.3% | 75.5% | 100.0% |

Each subscript letter denotes a subset of What is highest educational level? categories whose column proportions do not differ significantly from each other at the .05 level.

Source: Author



**4.3.8. H8: Occupation of the individual has an influence on the adaption intentions of broadband internet use**

To find out whether the type of occupation has an influence on the use broadband internet by individuals, from table 4.39, it is seen that out of 67 respondents who work at banking and financial institutions, 42 indicated that they use broadband at home while 25 also indicated that they don't have broadband at home. For those in the educational institutions, 106 out of 198 respondents indicated that they use broadband at home and 92 indicated that they don't have broadband at home. Engineering field had 26 respondents and 10 indicated that they use broadband at home while 16 do not. For the 26 trader's respondents, 7 indicated that they use broadband at home while 19 do not. Only one respondent was in the Medical/Pharm/Nurse field and indicated that he/she use broadband at home.

Table 4. 41 Occupation verses broadband internet use at home Crosstabulation

| | | Do you use broadband internet at home? | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| What is your occupation? | Banking and Financing | 42 | 25 | 67 |
| | Education | 106 | 92 | 198 |
| | Engineering | 10 | 16 | 26 |
| | trader | 7 | 19 | 26 |
| | Medical/Pharm/Nurse | 1 | 0 | 1 |
| Total | | 166 | 152 | 318 |

Source: Author

Most people have broadband internet but do not use it to do their daily work. In an attempt to find out how many people use broadband internet at work, table 4.40 shows that 46 respondents out the 67 from the banking and financial institutions indicated that they use broadband internet at work while 21 do not. The educational sector had 68 respondents out of 198 who use broadband at work while 130 do not. However among the 26 respondents from the engineering field 21 use broadband at work and 5 do not. Twenty six of the respondents who were traders had 6 who use broadband internet for their work and 20 do not. The only Medical/Pharm/Nurse respondent indicated he/she use broadband internet at work.



Table 4. 42 Occupation verses broadband internet use at work Crosstabulation

| | | Do you use broadband internet at work? | | Total |
|---|---|---|---|---|
| | | Yes | No | |
| What is your occupation? | Banking and Financing | 46 | 21 | 67 |
| | Education | 68 | 130 | 198 |
| | Engineering | 21 | 5 | 26 |
| | trader | 6 | 20 | 26 |
| | Medical/Pharm/Nurse | 1 | 0 | 1 |
| Total | | 142 | 176 | 318 |

Source: Author

**4.4 Correlation**

Table 4.41 shows the relationship between gender, age, education, monthly income, occupation and use of broadband internet at home and work. From table 4.41, there is a negative correlation between gender and broadband use at home. Meanwhile, there is a positive correlation between gender and broadband internet use at work. In both cases there is no statistically significant correlation between gender and use of broadband internet at home and work since $P>0.05$. Thus increase or decrease in gender do not significantly relate to increase or decrease of broadband use at home and work.

Age is negatively correlated to use of broadband both at home and work. However there is a statistically significant correlation between age and use of broadband internet at home since $P<0.05$ and not at work, $P>0.05$. Thus as individual advanced in age the adoption intention of broadband use decreases.

Table 4.41 also shows a negative correlation between educational level and the use of broadband at home and work. However there is a statistically significant correlation between educational level and the

adoption of broadband at home and work. Thus, the higher the educational level the more likelihood of the adoption of broadband internet both at home and work. Likewise the lower the educational level the less likelihood the adoption intention of broadband internet.
Monthly income is also negatively correlated to adoption of broadband at home and work.

Table 4. 43 Relationship between variables

| | | Do you use broadband internet at home? | Do you use broadband internet at work? |
|---|---|---|---|
| What is your gender? | Pearson Correlation | -.035 | .001 |
| | Sig. (2-tailed) | .539 | .984 |
| | N | 318 | 318 |
| What is your Age? | Pearson Correlation | -.151** | -.024 |
| | Sig. (2-tailed) | .007 | .671 |
| | N | 318 | 318 |
| What is highest educational level? | Pearson Correlation | -.100 | -.100 |
| | Sig. (2-tailed) | .076 | .076 |
| | N | 318 | 318 |
| What is your monthly Income? | Pearson Correlation | -.163** | -.105 |
| | Sig. (2-tailed) | .005 | .070 |
| | N | 298 | 298 |
| What is your occupation? | Pearson Correlation | .175** | .128* |
| | Sig. (2-tailed) | .002 | .023 |
| | N | 318 | 318 |
| | Sig. (2-tailed) | .000 | |
| | N | 318 | 318 |
| | Correlation is significant at the 0.01 level (2-tailed).** | | |
| | Correlation is significant at the 0.05 level (2-tailed).* | | |

Source: Author

The alpha coefficient for the 18 items is 0.802, suggesting that the items have high internal consistency. Table 4.5 shows the reliability test.

**4.5 Reliability Test on stability, speed and coast**

**Table: 4.42 Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| 0.802 | 0.791 | 18 |

Source: Author

# CHAPTER 5

# DISCUSSION, CONCLUSION AND RECOMMENDATION

This research sought to investigate whether the introduction of broadband internet in Ghana has any effect (positively or negatively) on users. It aimed at the adoption intention of users considering factors such as cost, speed and stability of broadband internet. The relationship between demographics (gender, age, educational level, occupation and income level) of users and the adoption intention of users was also considered as a factor that could influence broadband internet adoption. Out of 400 questionnaires distributed, 318 were collected and analysed with SPSS. Techniques that were employed for the data analysis include frequencies, percentage, crosetabulation and correlation.

The results of the analysis showed that majority of broadband users were male (53.5%) whiles females formed 46.5% of the respondents. Respondents between the ages 18 to 29 years (48.1%) were found to user broadband internet more than those between 30 to 49 years (46.5%). Respondents from 50 years and above formed about 5.3% of broadband internet users. It was also found that respondents who have higher education (75.5%) use broadband internet more than those whose educational background were low and those whose monthly salary was between 500 to 1,000 Ghana cedis were found to adopt to broadband internet most.

Among the respondents, those who work in educational institution (62.3%) were found to adopt broadband internet most than those in other professions.

There was no significant difference between the adoption of broadband internet in the regions studied. However in some regions females outnumbered males in broadband internet use while in other regions male outnumbered females.

Some of the reasons given by respondents for not using broadband internet included, 'it is too expensive (16.7%)', 'Not interested/ Not useful (5.3%)', 'I don't know how to use it (5.7%)'. Most of the respondents connect to broadband using wireless MODEM (70.8%). Only few (15.1%) connect using fixed line. Looking at the broadband internet provider with the highest subscribers, it was found that 28.9% of the respondents used MTN broadband internet and 19.2% used Vodafone broadband internet.

## 5.1 Discussion of findings

### 5.1.1. Demographic profile of respondents

The result of the analysis indicated that females dominated the use of broadband internet with a percentage of 50.6% compared to 54.1% females. This is similar to what is happening in other countries around the world. According to Rainie (2010), in the USA females are in parity with males in the broadband internet usage. Thus 74% of males and females in the USA have adopted broadband internet. Zickuhr and Smith (2012), reported a decline in females adoption of broadband internet. According to Zickuhr and Smith(2012), 65% of males use broadband compared to 59% females. However the result is different from studies by Crabbe et al. (2009), Ntsiful et al. (2010), Yamoah & Kyere-Duodo, (2011) and Suradi, Mustafa, Ismail, Shahabuddin, Ali and Norkisme (2008) that suggest that males dominate the Internet users in Ghana. Crabbe et al. (2009) reported 73% males and 27% females, Ntsiful et al. (2010) reported 71% males and 29% females whiles Yamoah & Kyere-Duodo, (2011) reported 66% males and 34% females internet users whiles Suradi, Mustafa, Ismail, Shahabuddin, Ali and Norkisme (2008) reported 61.9% male and 38.1% females internet users in Ghana. The statistics from this research compared to earlier researches ( Crabbe et al. 2009, Ntsiful et al. 2010, and Yamoah & Kyere-Duodo, 2011) suggest that females are reaching parity with males in broadband internet adoption. This is a clear indication that females understand the benefit of broadband internet and are embracing it use.

Statistics of the result also shows that as respondents advanced in age their interest in broadband use declines. Majority of the respondents aged between 18 to 29 years and 30 to 49 years were the people who have adopted broadband use both at home and work. Thus 68 out of the 318 respondents aged between 18 to 29 years use broadband internet at both home and work whiles 86 of the respondents between 30 to 39 years use broadband internet at home. 12 respondents between 50 to 64 years indicated that they use broadband at home while 65 years plus no respondent indicated the use of broadband. These results conform to statistics of other researches carried out in other parts of the world. Rainie (2010), Zickuhr & Smith (2012) and Zickuhr & Madden (2012) all reported similar results. According to Rainie (2010), in USA only 76% of the respondents aged between 18 to 29 years use broadband at home, 67% aged between 30 to 39 years use broadband at home, 56% aged between 50 to 64 years use broadband at home and 26% aged 65 years plus use broadband at home. Zickuhr & Smith (2012), indicated that 76% of the respondents between 18 to 29 years use broadband at home, 70% between 30 to 39 years use broadband at home, 60% between 50 to 64 years use broadband at home and 30% aged 65 years plus use broadband at home. Zickuhr & Madden (2012) also reported similar results. According to Zickuhr & Madden (2012), 75% US adults aged between 18 to 29 years use broadband at home whiles 77% between 30 to 39 years also use broadband internet at home. 62% and 39% of the respondents aged

between 50 to 64 years and 65 years plus respectively use broadband internet at home. The results of this research are also not too different from previous work done in Ghana by Yamoah & Kyere-Duodo (2011). According to Yamoah & Kyere-Duodo, (2011), 54.5% of the respondents aged between 20 to 39 years use broadband at home, 25.8% between 30 to 39 years use broadband at home, 10.3% between 40 to 49 years use broadband at home, 7.3% between 50 to 59 years use broadband internet at home and only 0.4% of the respondents above 59 years use broadband internet at home.

A careful study of the previous reports and this research shows that there is a decline in the use of broadband internet as age increases. It can be generalised that as individuals grow the desire to adopt broadband internet decreases. This may be due a lot of factors such decline in interest to use broadband, less information needed at old age, less income, cost of broadband and many more which is beyond the scope of this research.

With respect to educational background, respondents with tertiary education who have adopted broadband internet make up 76.5% of broadband internet users. This includes polytechnics and university graduate. However respondents who have completed training college and have adopted broadband internet form 9.6% of the respondents whiles SSS/SHS graduate forms 13.3%. JSS/JHS graduate form only 0.6% of broadband users. All these respondents indicated that they use broadband internet at home. Comparing this result to Yamoah & Kyere-Duodo, (2011), it rather the opposite. SHS graduates make up 88.4% of the respondents who have adopted broadband internet (Yamoah & Kyere-Duodo, 2011). This probably suggest that previously, respondents with higher academic qualification did not realised the importance of broadband early but currently they have come to realised how broadband internet can help them in the daily activities. This in the view of the researcher has attracted my higher graduate to adopt broadband internet. However the result is similar to that of Rainie (2010) and Zickuhr & Smith (2012). Zickuhr & Smith (2012) reported that in the US 85% of the respondents who with college degree and above have adopted broadband internet whiles 73% of those with some college degree also adopt broadband internet. 52% of the respondents with high school degree adopt broadband and 22% of the respondents with no high school degree have adopted broadband. It can be inferred that as individual go up the academic ladder, quest for information become so important. The result of the research also shows that must to the respondents who have higher educational background are working in educational institutions where more research work is important to enhance teaching and learning as well as discovering of new ideas. The result shows that 62.9% of respondents with higher education are working in educational institutions in Ghana. Only 25.8% are in the banking and finance institutions in Ghana.

In term of income, majority of the respondents (63.7%) earn between GH¢ 500 to GH¢ 1,999. Similar findings were reported by Yamoah & Kyere-Duodo, (2011). Yamoah & Kyere-Duodo, (2011) reported the 40.3% of their respondents who user Internet earn between GH¢ 1,000 and GH¢ 1,999. The researcher's findings compared to previous work show that those who have adopted broadband internet are middle class earners. They have seen the benefit of broadband internet and have adopted it to improve their working condition. The high income earners form about 7.9% of the total respondents. Many of these high income earners might have thought that they make big income and would not need broadband internet to improve upon their skill or change the way they work since their old way of doing things is earning them higher income. Respondents who earn below GH¢ 500, 18.6% of them use broadband internet. The reasons some of them gave was that it is too expensive to use broadband internet and their income cannot support the use of broadband. Rainie (2010), Zickuhr & Madden (2012) and Zickuhr & Smith (2012) indicated that rather, in the US those with higher income have adopted broadband internet than the middle and lower income earners. Zickuhr & Smith (2012) indicated that their respondents who earn above $75,000/year, 89% have adopted broadband internet and those who less than $30,000/years, 41% have adopted broadband internet.

Occupation was one of the key factors that could influence the adoption intention of respondents. The researcher found that most the respondents 62.3% work in educational institution in Ghana and 21.1% in banking and financial institutions in the country. This can be attributed to the volume of research work that goes on in the educational institutions in the country and the need to be current to ensure effective teaching and learning. Engineers and trader make up 8.2% each of the respondents and 0.3% in the medical field. The response in the medical field cannot be used to make a generalisation that those in medical field do not user broadband internet since only one respondent was captured in the sampling. A similar report was made by Yamoah & Kyere-Duodo, (2011), thus 78.2% of the respondents are in educational institution.

From the result of the analysis, it was found that majority of the respondents who own PCs with broadband internet connection aged between 18 to 49 years. Thus 34.4% of the respondents aged 18 to 29 years own PCs with broadband internet, and 33.3% aged 30 to 49 years also own PCs with broadband internet connection. The result shows that there is no significant difference between ownership of gadget age group 18 to 29 years and 30 to 49 years at 0.05 level. The numbers of respondents who own mobile devices are very few. It was found that 1.4%, 0.7%, 1.4% and 9.4% of the respondents aged 18 to 29 years own iPad, iPhone, table PCs and SmartPhones respectively, 0.3%, 1.0%, 1.0% and 7.6% aged 30 to 49 years own iPad, IPhone, tablet PCs and SmartPhones respectively and no respondents above 50 years owns an iPad but 0.7% and 0.3% own iPhone

and tablet PCs. This may be due to the cost of mobile devices compare to PCs. The age group 50 years above seem to less interest in the use PCs and mobile devices. The result obtained from the analysis conforms to previous report by Zickuhr & Madden (2012), Zickuhr & Smith (2012) and Gilwald (2012). Zickuhr & Madden (2012) reported that 51% of their respondents aged 18 to 29 years own PCs, 66% aged 30 to 49 years own PCs, 63% aged 50 to 64 years own PCs and 48% aged 65 years plus own PCs with broadband internet connection. This is similar to Zickuhr & Smith (2012). Gilwald (2012) also indicated that generally there is ownership of gadget with broadband internet is low in Africa but there is a gradual increase in gadget ownership in Africa from 2007 to 2011.

Looking at stability of broadband internet in Ghana, 36.5% of the respondents indicated that Vodafone broadband is most stable whiles others 32.4% also indicated Airtel broadband is more stable. Glo had 32.1% of the respondents indicating is more stable whiles 27.7% indicated that Expresso broadband is stable. Tigo and MTN had 16.0% and 4.7% of the respondents indicating that they are stable. Although MTN was rated the lowest in terms of stability, greater percent of the respondents indicated MTN broadband is faster than all the other broadband. When respondents were asked to rate the speed of broadband internet in Ghana, 48.4% indicated that MTN broadband is faster, 38.3% indicated Vodafone broadband is faster, 34.3% indicated Airtel is faster, 32.7% indicated Glo is faster, 29.2% and 19.2% indicated Expresso and Tigo respectively are faster. However 37% of the respondents indicated that MTN broadband is expensive than Vodafone broadband and the other networks, 30.5% thinks otherwise. They indicated that Vodafone broadband is expensive while 21.4% and 20.8% were also of the view that Expresso and Tigo broadband respectively are expensive. Thus Airtel and Glo were rated less expensive with only 19.8% of Airtel broadband user and 18.2% of Glo broadband user indicating that they are expensive. From the above results, although MTN broadband is less stable and expensive than the others because it's faster majority (28.9%) of the respondents subscribe to MTN broadband. This suggest that people are looking for how fast they can get information or work done irrespective of the cost that goes with it. Vodafone is more stable than and less expensive compare to MTN but due to less speed, only 19.2% of the respondents subscribe to it. This probably means that people are not too much interested in stability but speed. If the network is stable but slow, it's rather be costly if only part of a task is completed. According to Intel World (2010), one the factors that determines choice of broadband internet by consumers is speed. This is due to the fact that people want to provide faster service to the customers and get work done within the shortest allowable time period although stability is important factor as well.

The research also proved that respondents are happy with the introduction of broadband internet in Ghana. They are of the view that broadband internet has had positive impact on the way do their work. They claimed that broadband internet has increase work output, made easy to access information, send information and increase their daily income by hundred folds. They also added that they can service their client on the move, thus not only in the office but also out of the office because of the mobility nature of broadband internet. As many as 68% of the respondents are happy with the introduction of broadband internet.

Most of the respondents who do not use broadband internet gave several reasons for not using broadband internet. Some (6.1%) indicated that they do not have basic skills in computers and hence do not know how to use broadband internet. Other (16.7%) gave reasons that broadband is too expensive and their income cannot support it, 5.7% also indicated that they do not know how to use it, 6.0% said they do not have PC/mobile devices at home with 5.3% also indicating that they were not interested because broadband is not useful to them. This reasons given by non users of broadband confirm what other non broadband users around world say as reported by Zickur & Smith (2012), Zickuhr & Madden (2012) and Gillwald (2012). These indicated that their respondents gave the same reasons as above for not using broadband internet. This implies that there are people around the world who would want to use broadband internet but cost has become a barrier. It is believed that if the cost of broadband is lowered many more people will subscribe it use it (Gillwald, 2012).

**5.2 Conclusion and recommendations**

The findings of this research have significant implications for the research community. This study adds not only to the body of knowledge but also to inform the general public about the benefits one can derived from broadband internet and also to inform policy makers about the quality of service provided to customers. The adoption intention is influenced by factors such as speed, stability and cost of internet broadband; however there are also many others possible constructs that may have effect on customers' satisfaction level of internet broadband services in Ghana. Hence future research should enlarge the scope of study by examining the different factors that could bring effects to customers' satisfaction level of broadband services. The researcher is of the view that Ghanaian must be given education on the benefits of broadband internet whiles the quality of service is also being improved with lower price so that many more Ghanaians can adopt internet broadband. The result of the research also shows the most the broadband users are people who are working in educational institutions in Ghana who do a lot of research work. Only few people use it in their businesses. To ensure economic growth and stability in businesses, individuals and organisations should be encourage to adopt broadband service in their activities.

The study has its limitations such as the generalisations of the findings to the whole Ghanaian population since only 318 respondents were sampled for the study. Although the respondents were fairly selected across the selected regions in Ghana, not all towns and cities were involved and not all regions in Ghana were involved in the studies, hence the finding were insufficient to make a conclusion for the entire population of Ghana. Time and resources constraint are another limitation that I faced in this study. This study was conducted in a short time frame so insufficient sample size has limited the ability of researcher to analyze more findings from different perspectives. Therefore, future research of a similar nature should entail a longer data collection period, which subsequently will eliminate any variables that may have produced anomalies in the result. Also the questionnaire was newly constructed by the researcher and it never been tested before in the survey, the results may generate lower reliability level. Hence, the researcher suggests improvement and further enhancement of the instruments in future research. Further research could be expanded to other cities and regions that were not captured in this research and should be repeated at regular intervals to observe the impact of broadband internet on customers and also to monitor the quality and cost of broadband in Ghana.



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**APPENDICES**
**RESEARCH QUESTIONNAIRE**

**Note**: This instrument is designed to collect data for the purpose of the research only. All information provided remain confidential to the researcher only and would not be disclosed to any other person. Please be fair in providing the answers to the questions. Your name is not important for this research work and must not be provided. All other information is very important to the researcher and must be answered.

**SECTION A: Please circle the option that fit your opinion**

**Demography**

1. What is your gender?
    1. Male
    2. Female
2. What is your age?
    1. 18 to 29 years
    2. 30 to 49 years
    3. 50 to 64 years
    4. 65 + years
3. What is your highest educational level?
    1. Primary school (including JSS/JHS)
    2. Secondary school (including SSS/SHS)
    3. Training college
    4. Tertiary (including poly and university)
4. What is your monthly income?
    1. Below GH¢500.00
    2. GH¢ 500 to GH¢ 1,000
    3. GH¢ 1,100 to GH¢ 1,499
    4. GH¢ 1,500 to GH¢ 1,999
    5. GH¢ 2,000 to GH¢ 2,499
    6. GH¢ 2,500 +
5. What is your occupation?
    1. Banking and financing
    2. Education
    3. Engineering
    4. trader
6. In which region do you leave?
    1. Central
    2. Western
    3. Ashanti
    4. Volta
    5. Greater Accra
    6. Brong Ahafo
    7. Northern
    8. Upper West
    9. Upper East

**Section B: Please circle the option that best fit your opinion.**

7. Do you use computer at home?
    1. Yes
    2. No
8. Do you use computer at work?
    1. yes
    2. no
9. Do you have mobile device ( iPad, iPhone, SmartPhone, tablet PC etc) with internet connection?
    1. Yes
    2. No
10. Do you have broadband internet connection at home?
    1. Yes (skip question 12)
    2. No ( go to question 12)
11. Do you use broadband internet connection at work?
    1. Yes (skip question 12)

2. No ( go to question 12)

12. Give reasons for not using broadband internet.
    1. Do not have PC/mobile device at home or work
    2. It is too expensive
    3. Not interested/ not useful
    4. I don't know how to use it
    5. No telephone cable or wireless signal near me.
13. What type of broadband internet connection do you use?
    1. Fixed line internet broadband
    2. Wireless (MODEM) internet broadband
14. What is your subscription plan?
    1. Yearly
    2. Monthly
    3. Pay As You Go
15. How much do you pay for your broadband internet connectivity plan?
    1. GH¢..... per year
    2. GH¢..... per month
    3. GH¢..... per Pay As You Go
16. Which internet broadband service provider do you subscribe to?
    1. Vodafone
    2. MTN
    3. Airtel
    4. Expresso
    5. Tigo
    6. Glo
17. How often do you use your broadband?
    1. Daily
    2. Weekly
    3. Monthly
    4. Once a while
18. I use internet broadband on .....
    1. My Personal Computer
    2. My iPad
    3. My iPhone
    4. My tablet PC
    5. My SmartPhone



**SECTION C**

**Instructions: please provide your opinion by ticking (√) the appropriate box below. Choose only the service provider you have used. Ggf**

| Stability | Strongly Agree | Agree | Disagree | Strongly Disagree |
|---|---|---|---|---|
| 19. Vodafone broadband is more stable than all other networks in Ghana. | | | | |
| 20. MTN broadband is more stable than all other networks in Ghana. | | | | |
| 21. Tigo broadband is more stable than all other networks in Ghana. | | | | |
| 22. Expresso broadband is more stable than all other networks in Ghana. | | | | |
| 23. Airtel broadband is more stable than all other networks in Ghana. | | | | |
| 24. Glo broadband is more stable than all other networks in Ghana. | | | | |
| Speed | | | | |
| 25. Vodafone broadband is faster than all other networks in Ghana. | | | | |
| 26. MTN broadband is faster than all other networks in Ghana. | | | | |
| 27. Tigo broadband is faster than all other networks in Ghana. | | | | |
| 28. Expresso broadband is faster than all other networks in Ghana. | | | | |
| 29. Airtel broadband is faster than all other networks in Ghana. | | | | |
| 30. Glo broadband is faster than all other networks in Ghana. | | | | |
| Cost | | | | |
| 31. Vodafone broadband is more expensive than all other networks in Ghana. | | | | |
| 32. MTN broadband is expensive than all other networks in Ghana. | | | | |
| 33. Tigo broadband is expensive than all other networks in Ghana. | | | | |
| 34. Airtel broadband is expensive than all other networks in Ghana. | | | | |
| 35. Expresso broadband is expensive than all other networks in Ghana. | | | | |
| 36. Glo broadband is expensive than all other networks in Ghana. | | | | |
| Effect | | | | |
| 37. Broadband has positively impacted on my life style. | | | | |
| 38. Broadband has made it easy to access information anywhere. | | | | |
| Perception | | | | |
| 39. Introduction of broadband has increased the efficiency of work output in Ghana | | | | |
| 40. Introduction of broadband has made people lazy at work | | | | |
| Computer skills | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 41. | I have basic knowledge in using computers/internet. | | | | |
| 42. | I am an expert in using computers/internet | | | | |