

Evaluating the Effectiveness of Mobile Telecommunication Services in Durban & Lagos

By

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ABSTRACT

Telecommunication includes voice, video and internet communication services. Thus, mobile telecommunication services involve voice communication, video streaming, graphics and television services at high speed. Technology development in mobile telecommunication has enabled users to exchange data using cell phones, laptops and other telecommunication devices. More so, understanding the concept of user experience is very important in the context of provision of mobile telecommunication services.

This research will evaluate the effectiveness of mobile telecommunication services in Durban, South Africa and Lagos, Nigeria amongst first-year IT students of the University of KwaZulu-Natal and Lagos State University. The research is focused on the actual experience and perceptions of first-year IT students. The study will examine the factors that influence first-year IT students' judgment of the quality of mobile telecommunication services. It will also assess the impact of quality of mobile telecommunication services on the loyalty of first-year IT students towards their network operator.

However, Technology Acceptance Model (TAM) is the theory adopted for this research, which explains how attitude of users determine the intention to use technology and the intention eventually influences the overall use of such technology. The objectives of this research highlight opportunities associated with understanding first-year IT students' experiences and perceptions of mobile telecommunication services in UKZN, Durban and LASU, Lagos. Other opportunities include giving an insight into the operations of network providers, determine the quality of mobile telecommunication services and understanding the impact of mobile telecommunication services on students in UKZN and LASU. Another significance of this study allows network providers to understand students' behaviour and to respond to their preferences.

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LIST OF ACRONYMS

ANC	African National Congress
ATM	Automated Teller Machine
BBBEE	Broad Based Black Economic Empowerment
CC	Call Control
CDMA	Code Division Multiple Access
CGI	Common Gateway Interface
CSSR	Call Setup Success Rate
DCR	Drop Call Rate
EDGE	Enhanced Data for Global Evolution
ESKOM	South African Power Supply Company
E-TACS	Extended Total Access Communication Systems
GDP	Gross Domestic Products
GIS	Global Information Society
GPS	Global Positioning Systems
GPRS	General Packet Radio Services
GSM	Global System for Mobile Communications (Groupe Spécial Mobile)
HTML	Hypertext Markup Language
ICASA	Independent Communications Authority of South Africa
ICP	Internet Content Provider
ICT	Information and Communication Technology
IMC	Integrated Marketing Communication
IP	Internet Protocol

ISDN	Integrated Services Digital Network
ISUP	ISDN User Parts
IT	Information Technology
ITU	International Telecommunication Union
LAP	Liberty Alliance Project
LASU	Lagos State University (Lagos, Nigeria)
MANET	Mobile Ad Hoc Network
MMS	Multimedia Services
MNC	Multi-national Company
MNO	Mobile Network Operator
MNP	Mobile Number Portability
MSC	Mobile Services Switching
MTN	Mobile Telephone Network
MTS	Mobile Telecommunication Services
MVNO	Mobile Virtual Network Operator
NCC	Nigerian Communications Commission
NEPA	Nigerian Power Authority now PHCN (Power Holding Company of Nigeria)
NEPSKOM	Joint Venture of NEPA and ESKOM
NITEL	Nigerian Telecommunication Ltd
NTT	Nippon Telegraph and Telephone Corporation
PC	Personal Computer
PDA	Personal Digital Assistant
PIN	Personal Identification Number

PSTN	Public Switching Telephone Network
PTT	Post, Telephone and Telegraph
QoS	Quality of Service
RICA	Regulation of Interception of Communication Act
SA	South Africa
SADC	Southern African Development Community
SAPT	South African Post and Telecommunication
SERVQUAL	Service Quality
SMS	Short Messages Services
SMSC	Short Messages Services Centre
SNS	Social Network Site
SPSS	Statistical Package for the Social Sciences
SS7	Signalling System 7
SQ	Service Quality
TAM	Technology Acceptance Model
TDM	Time-division Multiplexing
TDMA	Time Division Multiple Access
TELKOM	South African Fixed line Telecommunication provider
UKZN	University of KwaZulu-Natal (Durban, South Africa)
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
USDOD	United States Department of Defence
USSR	Union of Soviet Socialist Republics

WAP	Wireless Application Protocol
WI-FI	Wireless Fidelity
WLAN	Wireless Local Area Network
WML	Wireless Markup Language
WTO	World Trade Organization

Chapter 1

INTRODUCTION

1.1 Introduction

Technology advancement and change in the social and political sectors have had great effect on telecommunication growth, (Awny, 2004). Telecommunication includes voice, video and internet communication services and telecommunication services involve voice communication, video streaming, graphics and television services at high speed. Technology development in telecommunication has enabled telecommunication users to exchange data using cell phones, laptops and other telecommunication devices like the USB Modems or data cards at affordable rates. The word telecommunication is derived from the Greek word *tele*, which means over a distance, putting the two words together gives telecommunication while *communication* simply means the sharing of information or messages between two or more entities, (Dean, 2003). Telecommunication services always improve in their quality of connectivity as technology advances. Wireless transmission offers many advantages over wire-bound transmission, (ITU, 2011). Generally, mobile telecommunication providers are deploying new technologies that allow users to replace the conventional landline with mobile telephones.

Mobile telephones have become globally accepted as a better means of communication, (Howard & Mazaheri, 2009). Although, this is as a result of an assortment of services that subscribers to mobile telecommunications could use. Mobile telephone service is known to be a system for providing services to multiple, mobile receivers or subscribers using two-way radio communication over a limited number of frequencies, (Basso & Kalva, 2004). Mobile subscribers are subscribers who are connected to a network via a radio link that allows them to move through areas, called cells, which are served by various fixed stations: cellular radio, (Duuren, Kastelein, & Schoute, 1996). The subscribers, in this study, refer to the users of mobile telecommunication services. Subscribers encounter a range of experiences in their use of mobile telecommunication services which often define their perception of the quality of service.

Understanding the concept of user experience is very important in the context of provision of telecommunication services. Generally, user experience is based on the opinion or feeling that users of a particular service have about a company or the service that the company provides, (Meyer & Schwager, 2007). Direct contact of customers with a company includes purchase and use of service while indirect contact involves coming across a company's products or services. The whole idea of quality service is

that user experience should not only be exciting but should be trouble-free. Trouble-free experience is not the only service expected from network providers, provision of service that will increase user's satisfaction is also important, and this can be achieved through the quality in delivery of services. Mobile telecommunication network operators seek to develop the quality of mobile telecommunication services by investing in new technology and adopting innovative ways of communication.

The advancement in telecommunication network and computer based communication is of great importance in global communication. History has shown that telecommunication requires a lot of technology, and it has been observed that the future will bring more technological advancements, (Bechler, Ritter, & Schiller, 2001) which include mobile broadband, Mobile television, Video calling, Wireless LAN (802.11), Mobile WiMAX, HSPA+ and many more. However, telecoms professionals have divided mobile wireless evolution into four stages: the first generation (1G), the second generation (2G) or (2.5G), the third generation (3G) and the fourth generation (4G), (Kuo & Yu, 2006).

In most mobile telecommunication services, quality is ascertained during the service delivery and not prior to the delivery of service. Specifying and managing quality of service is of great importance in distributed computing and networks, (Chalmers & Sloman, 1998). Quality indicates excellence and to evaluate a service or product, its quality parameters have to be specified as well as the corresponding performance values. It is essential to identify the part that quality of service plays in telecommunication services. (Oodan, Ward, Savolaine, Daneshmand, & Hoath, 2003).

1.2 Identification of problems/issues

In the present global age research work in the area of telecommunication is increasing. This research project will evaluate first-year IT student's experiences and perceptions of mobile telecommunication services. It will also examine the impact of the quality of mobile telecommunication services on first-year IT students' loyalty towards the network providers in UKZN, Durban and LASU, Lagos respectively. With reference to the terms, *impact* and *effect* as used in this study, it is instructive to point out at the outset that a weak form of causality is intended.

The experiences and perceptions of users of mobile telecommunication services are important to network providers. Without good standards of quality, network providers will lose users and the latter will go to other network providers with trusted services or technologies. Furthermore, actual sales and subscription trends in the mobile telecommunication industry as well as users' perceptions may serve as mediums through which network providers can measure the acceptability of their services. In order to understand user perceptions of mobile telecommunication services, this study will examine the experiences of first-year IT students across mobile telecommunication networks.

Mobile telecommunication service is a technology that has been accepted by people, (Fuentelsaz, Maicas, & Polo, 2008). All users require a level of quality of their mobile telecommunication service at a competitive price. If the service charges are too high, it is easy for users to switch to network providers with lower service charges and quality that they require. However, the quality of mobile telecommunication services is influenced by some factors. These factors constitute part of the requirements of any mobile telecommunication network's quality of service. Against this backdrop, this research project will examine the factors that influence first-year IT students' judgement of the quality of mobile telecommunication services in Durban and Lagos. The study will assess, from first-year IT students' perspective, the impact of quality of mobile telecommunication services on their academic activities and social life.

1.3 The purpose of this study

There will be a lot of opportunities associated with understanding first-year IT student's experiences and perceptions of mobile telecommunication services in Durban and Lagos. Part of the opportunities will include giving an insight into the operations of network providers, determining the quality of mobile telecommunication services. Understanding the impact of mobile telecommunication services on first-year IT students in UKZN and LASU. Another significance of the study is that it will allow network operators to understand user behaviour and to respond to user preferences accordingly.

1.4 Reason for comparison

The research study evaluates first-year IT students' experiences and perceptions of mobile telecommunication services in Durban and Lagos for salient reasons. The most inspiring motivation for comparing Durban and Lagos is the migration of South African telecommunication network providers to Nigeria; MTN South Africa is the pioneering mobile telecommunication network provider in Nigeria. Vodacom South Africa also was operating in Nigeria for a while. Telkom South Africa owns and provide management services to Nigeria's „Multi-Links Telecommunication Limited' that has been operating as private liability company since 1994 and provides fixed telephony services and digital mobile services i.e., Code Division Multiple Access (CDMA) fixed wireless technology, (Multilinks, 2005).

South African government owned power supply firm ESKOM and Nigerian government owned power supply firm, Nigeria Electrical Power Authority (NEPA) had a joint venture called Nepskom. The joint venture was to lay fibre cable for telecommunication companies in Nigeria, (Ajakaye, 2004). Durban and Lagos have a lot in common. Both Durban and Lagos are cosmopolitan cities, especially in terms of foreign nationalities residing and visiting the two cities. Both cities are of great importance to their nations, as they are strategic economic hubs. Mobile telecommunication network providers have

significant presence in both Durban and Lagos and both cities have huge students' enrolment. The researcher has access to data collection in Lagos due to the fact that the researcher was originally from Lagos.

Furthermore, South Africa has advanced infrastructure and Nigeria has a large population. The two major cities in both countries namely Durban (in South Africa) and Lagos (in Nigeria) are of great importance to the two nations considering population and infrastructure. Besides petroleum, telecommunication is also strategic to the Nigerian economy: close to half of the population of about 140,000,000 citizens are subscribed to mobile telecommunication services, (NCC, 2011).

1.5 Research objectives

The problem statement and sub problems of the study are anchored on the following objectives:

- ❖ To evaluate first-year IT students' experiences and perceptions of mobile telecommunication services in UKZN (Durban) and LASU (Lagos).
- ❖ To examine the factors that influence first-year IT students' judgment of the quality of mobile telecommunication services in UKZN and LASU.
- ❖ To assess the impact of quality of mobile telecommunication services on the loyalty of first-year IT students towards their network operators.

1.6 Research questions

The research questions are broken down into three major parts with sub questions.

1. What are the perceptions of first-year IT Students in UKZN and LASU vis-à-vis mobile telecommunication services in Durban and Lagos?
 - 1.1 What effect does mobile telecommunication services have on first-year IT students' academic endeavour?
 - 1.2 What effect does mobile telecommunication services have on first-year IT students' social life?
2. What factors influence the quality of mobile telecommunication services in Durban and Lagos?
 - 2.1 How do first-year IT students perceive the quality of services offered by telecommunication network providers?
 - 2.2 What challenges do first-year IT students experience vis-à-vis the use of mobile telecommunication services?

3. To what extent does quality of service influence first-year IT students' behaviour in the mobile telecommunication industry?
 - 3.1 How do first-year IT students deal with unsatisfactory service by their mobile telecommunication network provider?
 - 3.2 How do first-year IT students rate the response of their mobile telecommunication network provider to complaints?

1.7 Theoretical framework

The theory adopted for the study is the Technology Acceptance Model (TAM). Technology acceptance model is well known and it is related to technology use and acceptance. "TAM is a theoretical model that has been used to explain and predict user's behaviour in information technology," (Park, 2009). The figure below depicts TAM.

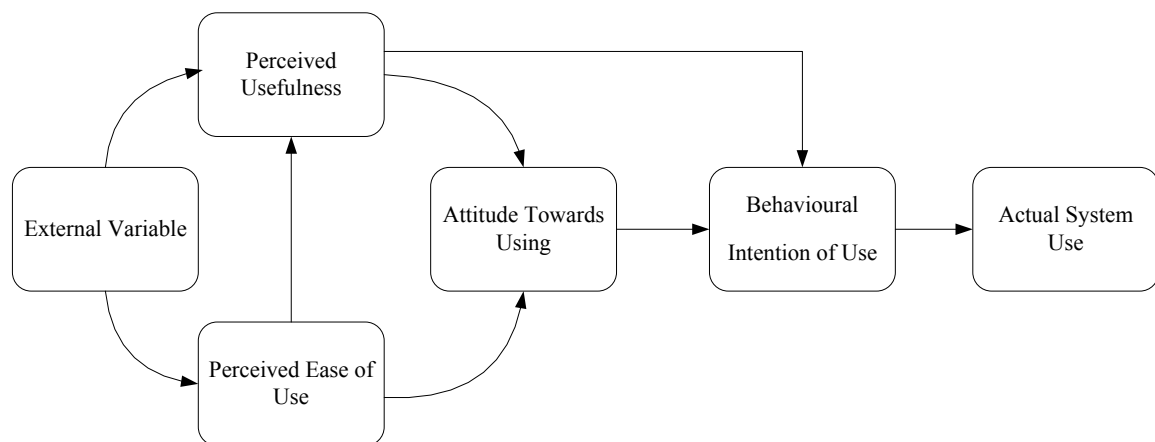


Figure 1.1 Technology Advance Model, (Davis, Bagozzi, & Warshaw, 1989)

TAM provides foundation for identifying the effect of external variables on the internal values, attitudes and the intention to use technology, (Davis et al., 1989). According to TAM the attitude of users determines the intention to use technology and the intention eventually influences the actual use of such technology, (Bertrand & Bouchard, 2008). However, Davis and Venkatesh (1996) deemphasise the significance of attitude as a determinant of the use of technology but argue that perceived usefulness and perceived ease of use are critical factors that influence the use of technology, (Bertrand & Bouchard, 2008).

Adding to factors, the awareness of the availability of technology is crucial to determining the intention of using the technology and the actual use of the technology. The assumptions of TAM offer some utility to this study. The use of mobile telecommunication services by students is dependent on the awareness about the availability of such services. Students' behaviour in the form of their attitudes and

intentions, perceived usefulness as well as perceived ease of use of mobile telecommunication services also determine the actual use of the services. Therefore, it is possible to unpack user behaviour (namely the behaviour of first-year IT students) with reference to the acceptance and use of mobile telecommunication services through the extrapolation of the assumptions of TAM.

Further backing to the research framework adopted for this study was from Siragusa and Dixon, (Siragusa & Dixon, 2008) who stated that the theory of planned behaviour is also used to understand people's intention to engage in a number of activities. Some of the activities were described in this study which includes the use of mobile telecommunication services for academic and social activities. Therefore, the theory of planned behaviour proposed that intentions to involve and relate with a particular programme is achieved by attitudes towards using information and communication technology, supposed social pressure to do so and by perceived control over the interaction, (Fishbein & Ajzen, 1975).

1.8 Research methodology

This comparative study investigates users' experiences on the quality of service they get from mobile telecommunication network providers in Durban and Lagos. The study relied on both primary and secondary sources of data. In order to gather the information required for this study, the following activities were undertaken:

The study adopted a summative type of evaluation and assessments. A quantitative research methodology was implemented.

- a. Distribution of questionnaires to students utilizing a simple random sampling technique. The population were first-year IT students of UKZN and LASU. Population is the largest group of elements in a particular study and the smaller group of elements is the sample (Anderson, Sweeny, Williams, & Williams, 2009).
- b. The researcher performed quantitative analyses on the collected questionnaire using the combination of SPSS and Microsoft Excel.
- c. Analysis of findings to draw logical conclusions and to proffer recommendations.

Therefore the study is exploratory and it is intended to break new grounds as well as furnish new insights into the analysis of service provision in the mobile telecommunication sector in Durban and Lagos.

In addition, secondary sources of data namely (relevant) books, journals, print media (magazines and newspapers) were consulted and carefully analysed. The internet also served as a valuable source of information for the study. The study therefore hopes to synthesize data gathered from both primary and

secondary sources so as to be able to evaluate first-year IT students' experiences and perceptions of mobile telecommunication services.

1.9 Research limitations

Critiquing is a form of systematic way of reviewing the strength and limitation of a study in order to set up its reliability and its significance before putting it in practice, (Valente, 2003) cited in, (Coughlan, Cronin, & Ryan, 2007). The research study relies heavily on the first-year IT student's perceptions of quality of mobile telecommunication services. Data generated based on perceptions of the sample population potentially make generalization difficult. There is also the possibility of bias on the part of respondents. This has implication for objectivity. In order to surmount this challenge and mitigate its effects as well as to ensure objectivity, the researcher will juxtapose respondents' view within and across mobile telecommunication services with a view to determining the accuracy of information. The fact that respondents can be biased is based on their behaviour which is determined by their experiences, perceptions and passion towards the network providers. Some respondents may be unnecessarily passionate about their network provider based on the satisfaction they get from the services which may influence their loyalty.

1.10 Conclusion

The aim of this study is to evaluate the effectiveness of mobile telecommunication services sourcing from the experiences and perceptions of first-year IT students in UKZN Durban, South Africa and LASU Lagos, Nigeria. The research study allowed the researcher to identify the positive and negative effects of mobile telecommunication services amongst the first-year IT students. This chapter has outlined the problem to be studied and has given an overview of the methodology used. The next chapter provides a literature review on the evolution of mobile telecommunications as well as the development of mobile telecommunication services in South Africa and Nigeria.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

The previous chapter motivated the necessity for the study, provided the objectives and the theoretical framework adopted for the study and lastly, identified the research problem. In this chapter, a literature review on the evolution of mobile telecommunication and its services is presented. In the literature, authors have indicated that mobile telecommunication have received substantial attention up to date. Mobile telecommunications have been accepted not only in the social environment but also in the academic environment. This study is unquestionably relevant in both social and academic point of view. Insofar it has redefined the communication sector (mobile phone is a commodity), it has created new forms of business (m-commerce) and considerably changed the behaviour of its users. From the economic view, mobile telecommunications usage is growing fast universally, (Fuentelsaz et al., 2008)

2.2 Trends in user perception studies

There is a need for necessary integration of relevant literature into the methodology, analysis and evaluation of results in a study of this nature. However, perceptions of users around the world on the use of technology are reviewed in this section of the research. In Saudi Arabia, Al-Fahad analysed students' attitudes and perceptions towards the effectiveness of mobile learning using quantitative survey findings to focus on the consequence for mobile learning and teaching in university environment, (Al-Fahad, 2009). It is understandable that students' perception of mobile learning may be influenced by certain distinct variables. Such variables considered in this study were experiences, perceptions and attitudes to the technology. These variables were drawn parallel to that of Al-Fahad's survey mentioned above which considered gender, course of study and attitudes to new technology. This is evident that the trend at which this research study was designed and analysed is substantial.

Numerous studies carried out around the world have used technology acceptance model and theory of planned behaviour to support the strength and credibility of their research. TAM was considered to strengthen this study as it suggests that attitude would be a direct forecaster of the intention to use technology which would in turn predict the actual usage of the technology, (Davis et al., 1989). Bertrand and Bouchard (Bertrand & Bouchard, 2008) applied TAM in the study on the acceptance of virtual reality (VR) with people who are favourable to its use. Standard items were adapted to test the TAM and added perceived cost factor which facilitated the role on intention to use the technology.

TAM was adapted to identify in an empirical method the elements that play a role on the intension to use or not to use the technology in the study. Furthermore, Chen *et al.* (Chen, Gillenson, & Sherrell, 2002) also applied the combination of TAM and innovation diffusion theory (IDT) to examine consumer behaviour in the virtual-store context. The findings stipulated that the primary determinant of consumer attitudes towards using virtual-stores were compatibility, perceived usefulness and perceived ease of use. This study has chosen to follow the line of evaluation to further provide additional understanding to the role of environmental factors: experience, perceptions, attitudes, intension to use, perceived usefulness and ease of use of mobile telecommunication services amongst first-year IT students in UKZN and LASU. Amongst all the theories, technology acceptance model and theory of planned behaviour emerged as the theories of choice.

2.3 Mobile telecommunications: Evolution and development

Mobile telecommunication is experiencing a tremendous revolution that will change the world. Mobile telecommunication network will be everywhere in such a way that computing will migrate from the traditional desktop towards consumer-oriented computing using smart wireless personal multimedia devices that will communicate with each other, (Danneels, 1998). Mobile telecommunication services have been available since the early 1960s and its diffusion was affected by technological innovations such as transition from analogue to digital technology, competition within the industry, spectrum licensing and the harmonization to a common technical standards, (Gruber & Verboven, 2001). Mobile telecommunication technologies have developed in successive generations which includes the first generation (1G) technology, second generation (2G) or Global System for Mobile communications (GSM) technology which is massively used to date, the third generation (3G) technology that depends critically on the incorporation of multimedia services and the fourth generation (4G) technology that produce data rates of 200 Mbps, (Dunnewijk & Hultén, 2007). Mobile phones have become an everyday commodity for millions of people all over the world and are being used more and more in the most developed and developing countries, (Beaubrun & Pierre, 2001).

More so, the regulators in the European Union chose to impose a common standard i.e., GSM. It was criticised initially but in the long run, everyone was inspired with the decision. These days GSM has one of the most wider range of standard in the world of technology and it has stretched all through the continent in a short period of time, achieving the penetration rates that has never been reached before by any other technologies, (Fuentelsaz *et al.*, 2008). The new telecommunication services include; computer communications, facsimile, mobile telephone and paging, video telephone, conference television, view-data, cable television, remote metering, surveillance and alarm services, (Reid, 1978). The drive of universal telecommunications is largely attributed to fast technology growth and progressively more liberal policy environment. It is understood that in the past decade, a number of

developing economies have engaged in reform paths and have experienced a meaningful expansion in their telecommunications networks and outstanding improvement in productivity, (Fink, Mattoo, & Rathindran, 2003). The number of mobile and fixed-line telecommunication subscribers has grown from less than one billion to almost four billion worldwide within 1996 to 2006. The telecommunication industry has experienced tremendous growth and rapid structural change, (Djiofack- Zebaze & Keck, 2009). Telecommunication has transformed the world into a global village, it has resulted in profound changes within the social structure that rivals those within the industrial revolution, (Pitroda, 1976) cited in, (Yang & Olfman, 2006). The role that mobile telecommunication technology has played in social relations has become increasingly important. Ajiboye *et al.* (Ajiboye et al., 2007) stated that the implementation of GSM standards has direct and indirect contribution to the global economic growth, it has contributed to the creation of new employment opportunities and has enhanced the Gross Domestic Product (GDP) of several nations.

2.4 Mobile telecommunications in South Africa

The South African Post and Telecommunication (SAPT) provided telephone, telegraph and post services, the SAPT lawfully monopolized telecommunication and postal services, (Horwitz, 1994). Telkom South Africa Limited was incorporated in 1992, replacing the SAPT. Telkom was given the undivided power and domination to provide telecommunication services, the power to authorize any other entity to carry out telecommunication services in South Africa, (Zlotnick, 1999). Telkom exclusive power and monopoly came to an end when the second network operator running fixed-line services was introduced in the late 2005 under the name, Neotel. Majority owned by India's Tata Communications, Neotel offers telephone and data services with CDMA technology. In a period of 10 years between 1996 and 2006, fixed line telephone had an estimated number of subscribers from 3.919 million to 4.708 million and mobile telephone subscribers increased from 1 million to 19 million in the South African population estimated to be between 44 and 47 million, (Horwitz & Currie, 2007). The country's cellular companies provide mobile services to over 46.4 million subscribers as of 2009, (InfoSA, 2010). The country's mobile telecommunication industry is dominated by MTN, Vodacom, Cell C in third place and Virgin Mobile that is a Mobile Virtual Network Operator (MVNO). MVNOs are network operators that operates in partnership with an existing mobile company i.e., Mobile Network Operator (MNO). They operate without owning a bandwidth license, the MVNOs use the infrastructures of the existing mobile company and they pay MNO a fee for the use of their spectrum, (Cricelli, Grimaldi, & Ghiron, 2011). Virgin Mobile is in partnership with Cell C. There is a new entrant called 8ta powered by Telkom SA. 8ta was not operational as at when this research was approved and it will not be credible to include it now since participants hardly have experience with this mobile telecommunication network operator.

Several reasons has made South African mobile market different from that of European, North American and other African markets, this including social and cultural factors. South Africa has 11 official languages, with sophisticated and modern infrastructures, the mobile penetration level breaks the 100% mark, reported by ITU, 2009. South Africa has a brilliant mobile telecommunication market that uptake very fast since competition has been introduced into the mobile industry. Mobile telecommunication companies are forced to create innovative ideas that will distinguish them from each other in order to retain and gain more customers. South African government came up with regulation to prevent crime. The regulation is called Regulation of interception of commission act (RICA), it is a law that requires everyone to register new or existing cellphone numbers from 1st of July 2009. It is one of South African government key crime prevention initiative towards making South Africa a safer place to live and work, (MTN, 2011).The rapid growth of mobile operators in Southern African region has brought about the agreement of the Southern African Development Community (SADC), members of the SADC states to accept the GSM standards for mobile telecommunication networks in order to allow mobile roaming service within the region, (McCormick, 2003).

2.5 Mobile telecommunications in Nigeria

The appearance of mobile telephony is one of the major revolutions of communication in Nigeria. This is simply because no other technology has been so beneficial to all like the mobile telephony. In the early days of mobile telecommunication technology in Nigeria, only the rich were able to afford the services. Within a few years of it introduction to Nigeria, the technology became commercially available. Many young people were overwhelmed by the GSM technology/handsets, a lot of them spent their savings just to acquire one. Nowadays, mobile phones are no longer possessed only by the rich but now available to whoever cares to have one, (Oyewola, 2007). During the early period of mobile telecommunication technology in Nigeria, the analogue cellular were used which only allow voice communication services. Mobile cellular services made their debut in 1993 on the Nigerian market with a federated service operated by Nigerian Telecommunications Limited (NITEL) and Mobile Telecommunication Services (MTS) that operated within Lagos State only with a joint subscriber base. They offered voice services over an analogue Extended Total Access Communication Systems (E-TACS) network, with basic value added services like paging and voicemail from three switches in Abuja, Enugu and Lagos. MTS closed operations in 1995 due to failure to pay interconnection fees to NITEL. Subsequently, MTel surfaced as NITEL's Mobile service provider. NITEL was owned by the Nigerian government, it was the principal telecommunication company in Nigeria until it was sold to Mtel.

The Nigerian telecommunication market offers many opportunities for telecommunication operators. The Nigerian Communication Commission (NCC) is self-governing national regulatory authority for

telecommunication sector in Nigeria. The commission is accountable for permitting and building environment for competition amongst telecommunication network operators in Nigeria. NCC also ensures the delivery of quality and effective telecommunication services all over the country. The government of Nigeria reopened GSM licensing in 2000 from the GSM licensing process that was cancelled in early 2000, a few winners emerged from the process of auctioning mobile cellular licences which include; Econet Wireless Nigeria, Mobile Telephone Network (MTN) Communications Nigeria and Mtel, the mobile telephony arm of NITEL. The market grew from zero to hero under a period of three years from 2001 to 2003, (Wills & Daniels, 2003). All operators were to operate in the 900MHz and 1800MHz spectrum bands, where there is room for upgrading of future network to General Packet Radio Switching (GPRS), 3G and so on.

The figure below shows Nigeria's GSM market share in 2003. (Data for recent years up to 2010 can be found in the table below.) The pie chart below indicated the growth in GSM market share in Nigeria and it is divided into three parts. There are two multinational mobile telecommunication network operators (MTN and ECONET). ECONET Zimbabwe and Southern government owned Transnet both have interest in ECONET wireless international (EWI). Both companies held a 60% stakes in the Nigerian ECONET, (Masiyiwa, 2002) cited in (Ajiboye et al., 2007). MTN has the highest GSM market share of 54%, ECONET has a market share of 39% and Nigerian Government owned NITEL has the lowest share of the market of 7% as at the end of 2002, (Wills & Daniels, 2003).

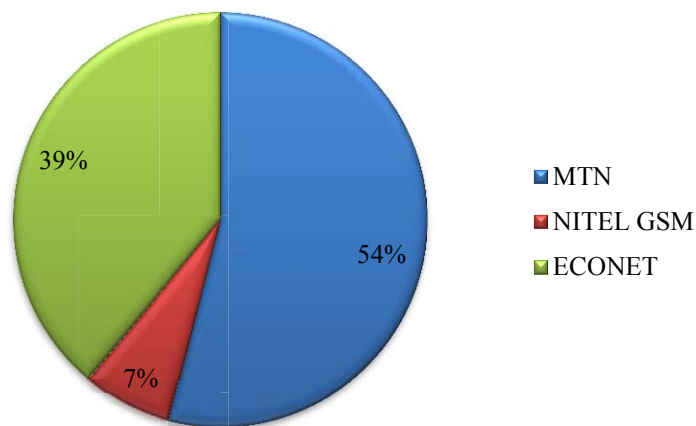


Figure 2.1 Nigerian GSM Market Share in 2003, (Wills & Daniels, 2003).

Recently, the liberalization of the mobile phone market in Nigeria has allowed new telecommunication companies to emerge, and currently there are four major GSM network providers in Nigeria that are operating on the 900/1800 MHz spectrum which include Etisalat, Globacom, MTN and Zain (Airtel). Nigeria only had approximately 500,000 landline for over 100 million people when the GSM technology was first introduced in 2001 (Obadare, 2004) cited in, (Smith, 2006). The introduction of mobile phone made individual cellphone owners became small-scale entrepreneurs by converting their

personal cellphone into informal businesses by opening call centres with one attendant across the country including major cities and rural areas with no/insufficient electricity or no/insufficient water supply. Osibanjo and Nnorom (Osibanjo & Nnorom, 2008) estimated that more than 10,000 people in Nigeria were employed by GSM network operators and estimated that there were 1 million indirect employment opportunities created within the operations of GSM. These include the airtime voucher hawkers (well known as recharge card hawkers in Nigeria) and resellers with canopy phone Kiosks who makes commercial phone calls to the public. The cost of making phone calls has declined over the years in Nigeria. Although, Africa still undergo a higher phone call prices compared to the average world standard and to attain reduction in call prices, more competitors have to make a difference in the African mobile telecommunication sector, (Djiolfack- Zebaze & Keck, 2009). The price of a SIM card has also declined dramatically in the past years, some companies offer free SIM cards as part of their periodic marketing campaigns.

A recent estimates from NCC is depicted in the figure below, the rapid increase of mobile telecommunication subscribers has grown so dramatically in which the figure below shows a tabular teledensity for fixed and mobile telephone subscribers data. From 2001 to 2010, the number of GSM technology subscribers has grown from 266,461 to 96,684,272 respectively from the Nigeria's population of over 150 million citizens. This is evident that mobile telecommunications technology is beneficial and the country has witnessed a meaningful expansion of their telecommunications network and outstanding productivity.

	OPERATOR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Connected Lines	Mobile (GSM)	266,461	1,569,050	3,149,472	9,174,209	18,295,896	32,184,861	N/A	N/A	N/A	96,684,272
	Mobile (CDMA)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12,132,584
	Fixed Wired/Wireless	600,321	702,000	872,473	1,027,519	1,223,258	1,673,161	N/A	N/A	N/A	2,736,373
	Total	866,782	2,271,050	4,021,945	10,201,728	19,519,154	33,858,022	N/A	N/A	N/A	111,517,229
Active Lines	Mobile (GSM)	N/A	N/A	N/A	N/A	N/A	N/A	40,011,296	56,935,985	65,533,875	81,195,684
	Mobile (CDMA)	N/A	N/A	N/A	N/A	N/A	N/A	384,315	6,052,507	7,565,435	6,102,105
	Fixed Wired/Wireless	N/A	N/A	N/A	N/A	N/A	N/A	1,579,664	1,307,625	1,418,954	1,050,237
	Total	N/A	N/A	N/A	N/A	N/A	N/A	41,975,275	64,296,117	74,518,264	88,348,026
Installed Capacity	Mobile (GSM)	N/A	N/A	N/A	N/A	N/A	N/A	76,545,308	95,291,096	121,785,526	131,319,542
	Mobile (CDMA)	N/A	N/A	N/A	N/A	N/A	N/A	1,540,000	10,611,867	14,829,931	17,172,670
	Fixed Wired/Wireless	N/A	N/A	N/A	N/A	N/A	N/A	6,578,303	6,830,245	9,388,145	9,347,771
	Total	N/A	N/A	N/A	N/A	N/A	N/A	84,663,611	112,733,208	146,003,602	157,839,983
	Teledensity	0.73 ^[2]	1.89	3.35	8.5	16.27	24.18	29.98 ^[3]	45.93	53.23	63.11

Table 2.1 Annualized Telecoms Subscribers Data from 2001 to 2010, (NCC, 2011).

The Nigerian telecoms statistics share of telecommunication services as at December 2010 is described in the figure below. GSM has the largest telecommunication services statistics share of 92%. Next is the CDMA with 7% telecommunication services statistic share and lastly the fixed line telecommunication service of 1%. The figure below buttressed all that has been explained regarding mobile telecommunication network operators in Nigeria.

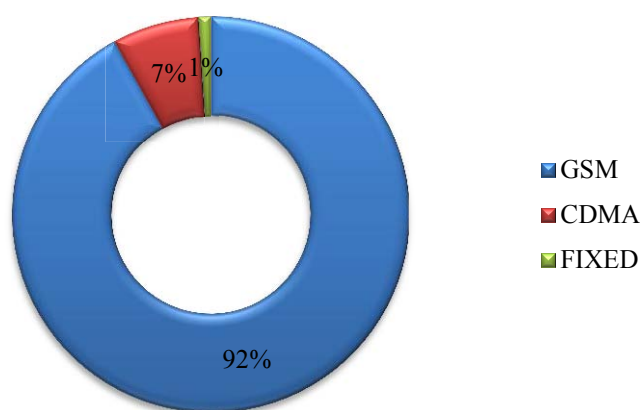


Figure 2.3 Nigerian Telecommunications Statistics Share of Telecoms Services, (NCC, 2011).

The market share of mobile network operators in Nigeria telecommunication is shown in the figure below. The figure indicates that MTN has the highest market share of mobile operation with the highest number of 47.64%, Globacom in second place with 24.17% of market share, Zain (Airtel) in third place with 19.5% of the market share, Etisalat in fourth place with market share of 8.36% and in fifth position with the lowest market share of mobile operation is Mtel with 0.32%.

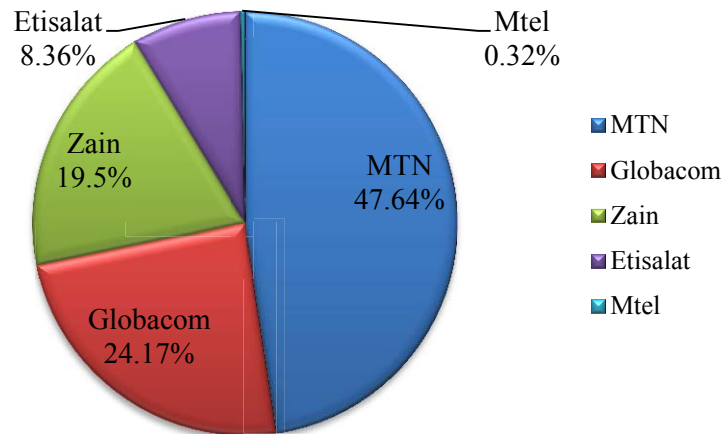


Figure 2.4 Market Share of Mobile Operators in Nigeria – December 2010, (NCC, 2011).

2.6 Overview of mobile telecommunication services

In the early 90's, three countries which include United Kingdom, United States of America and Japan allowed competition in fundamental telecommunication services but later rose to 11 countries in 1995. It rose to about 40 countries in the developed and developing world including only Uganda from Africa in 1998. In 2006, the number had grown to about 120 countries worldwide, (ITU, 2007; WTO, 1998) cited in, (Djiofack- Zebaze & K eck, 2009). “The vision of future communication is information anytime, anyplace in any form, based on the idea of an open market of services,” (Magedanz, 1996, p. 233). The category of mobile telecommunication services include the general services offered to end users of mobile telecommunication technology. These services are usually offered by service providers or a specific service plan of a service provider. Some of the services offered by service providers include; Multimedia messaging, short messaging services, GPS, Voice and video call etc.

Telecoms network is categorically the most important infrastructure with unrelenting outcome on the performance of an economy, (McCormick, 2003). The introduction of Universal Mobile Telecommunications System (UMTS) or 3G over the 2G mobile technology played a significant role in the mobile telecommunication industry. UMTS has taken the place of the GSM mobile technology in its design, In the modeling of the UMTS, Time division multiple access (TDMA) was substituted with CDMA which supports the highest bandwidth of 2Mbps and it is said to be sufficient for future mobile telecommunication loads, (Ou, H wang, & J an, 2007). However, mobile telecommunication service

providers offer two forms of service plans including pre-paid mobile services commonly referred to as *Pay as you go or pay as you talk* depending on the service provider and post-paid mobile services. Prepaid mobile service is the process in which credit is purchased in advance of service use, if there is no credit available on the mobile phone then, access is denied by the mobile phone network, the credit purchased is used to pay for mobile phone services. Users of the prepaid service plan are usually able to top up their credit at any time using a variety of payment methods and credit ranges in different amount. There are so many ways in which users of prepaid mobile phone can top up their phone, this could be done on the phone by signing up for cell phone banking, this cell phone line is linked to the bank account of the user. The balance could also be topped up directly from the bank account using ATM, credit card or debit card, in a retail store by purchasing airtime voucher or ‚recharge card’ popularly called in Nigeria, these vouchers are printed in unique codes often under a scratch-off panel which must be entered into the phone after being scratched to add the credit onto the current balance on the phones. Airtime transfer could also be done from one cell phone to the other depending on the service provider or network operator services.

The post-paid mobile services is the process in which service is provided by a prior arrangement with the service provider, where users consent to a minimum fixed month-to-month spend and pay at the end of the month. The user in this category is billed after collecting all the fact according to their usage of the services at the end of the month. Usually, most mobile telecommunication firms often entice users to become post-paid by means of a well gained usage rates and mobile phones subsidies, (Choi, Lee, & Chung, 2001). Usually, the customer’s contract specifies a limit of talk time minutes, text messages, data bundles and so on, any usage above the limit incurs extra charges. As a matter of fact, the user in this category does not have a limit on the use of mobile telecommunication services and as a result, they have unlimited credit. This service is good for people with a secured income or stable job. Further investigation into the contracts binding post-paid customers indicate there are negative and positive effects, the negative effects is usually the switching cost which is termination penalties and one of the positive effects is the cellphone subsidy. These effects have raised questions about the attitude and behaviour of prepaid customers versus post-paid customers, but this study is not permitted to go into investigating the attitude and behaviour of prepaid versus post-paid customers.

2.6.1 Conference call

Conference call can be obtained in current network surroundings in fixed wire or wireless systems, (Chen, Wang, & Wen, 2007). Therefore, conference call in mobile telecommunication network is a form of phone call in which the calling person desires to have more than one called persons to listen in to or participate in the audio part of the call. There are several mobile devices that are capable of supporting the technology such as, most Nokia phones, BlackBerry phones, Sony Ericsson phones and

so on. Two trends have been witnessed over the last decade which include; increasing people availability and increasing information availability. Mobile telephone services have made it possible to communicate or talk with people even if they are not residing in a particular location, (Bar-Noy & Malewicz, 2004).

2.6.2 Data services

The key objective for the creation of GSM technology was to provide a system that will provide consistently reliable mobile communications suitable for both speech and data, (Hamling, 1995). Data is delivered through the GSM systems using an adapted integrated services digital network (ISDN) based protocol, this is the CCITT V.110 rate adaptation scheme. For instance, the scheme converts user data of 1200kbit/s into frames suitable for the ISDN 64kbit bearer through two stages of rate adaptation, (Hamling, 1995). GSM General Packet Radio Service (GPRS) is a kind of data carrier which is packet based, it communicates with many different data sources but only consume GSM network resources when data is actually being conveyed, (Hamling, 1995). The development was still limited for the application of the package-switching technology of GPRS, it brought the development of 3G technology to triumph over the limitations and permitted higher transmission rates and more intricate e-commerce connections rigorously dropping user's waiting period for transmission, (Barnes 2002) cited in, (Kuo & Yu, 2006). The transition from the 2G mobile cellular networks to 3G networks was motivated by the introduction of multimedia services, convergence of mobile technologies and internet. The capability of 3G networks to carry sound and video clips has been perceived as large business potentials for mobile network operators (MNO), (Olla & Patel, 2002). Wireless network and application service providers powerfully rely on 3G technology to carry out a range of communication and entertaining services, such as the Wireless Time Division Multiplexing (TDM) to wire-line IP video, point-to-point video telephony, Video enabled instant messaging (IM), chats, Video conferencing, Video streaming, Video mail and video call answering, Remote monitoring and surveillance, Multimedia real-time gaming, (Basso & Kalva, 2004).

2.6.3 Global systems positioning (GPS)

USSR (Soviet Union) launched the low-earth orbit satellite, Sputnik 1 on October 4, 1957 which may possibly mark the beginning of Global Positioning Systems (GPS) technology, (Kumar & Moore, 2002). The purpose of the launching was meant for military use in providing complex navigation and timing capability. The US Department of Defence (U.S. DOD) created the use of the navigation systems for military use and later made it available for civilian use in the 90s. As of 2000, GPS was fully operational and available for civilian use, at least 24 satellites were available worldwide day and night, (Gili, Corominas, & Rius, 2000). GPS is a navigation system and it is made up of network of satellites

positioned in the orbit. GPS technology was also used for tracking hunting dogs or other animals with the use of appropriate map software that will send location information to the receiver by GSM module as an ordinary SMS via GSM mobile phone network to a personal computer (PC) equipped with a GSM modem, GSM mobile phone or commercial internet server capable of receiving SMS, (Sundell, Kojola, & Hanski, 2006). Looking at the world of today, GPS has not only made provisions for military use but has been backbone for unstable economy. It was understood during the Sputnik satellite programme that if it was possible to track the position of a satellite then it is possible to track the position of a person on earth if they could read the signal from the satellite in conjunction with knowing the exact orbit of the satellite, (Kumar & Moore, 2002). GPS works in any weather condition, there are probably no subscriptions for the use of GPS navigation systems on the mobile phone, data charges may be incurred in some cases depending on the network provider. GPS operates in such a magnificent way that the satellites goes round the earth twice daily in a specific orbit and information signal is transmitted to earth. The receiver obtain this information and use a triangulation application to determine the user's exact location, speed, trip distance, distance to destination, bearing, sunrise and sunset time, track and many other information depending on the number of satellites the receiver is locked to at the time, (Garmin, 2011).

2.6.4 International roaming

The ability to keep mobile phone working when travelled to a foreign country is referred to as international roaming. The user is able to receive and make mobile phone calls, type text messages and even have access to the internet to download contents. Mobile telecommunication services such as SMS, voice calls and other data services will be operated by the overseas mobile network provider, reason being that the home mobile network providers usually do not operate in roaming country. However, the overseas mobile network operator charges the home mobile network operator for any of these services utilized by the user abroad and the home mobile network operator passes the charges to the user by deducting from the available credit on the phone if the user is on prepaid plan or send the bill to the user at the end of the month if the user is on post-paid plan. MTN operates in both South Africa and Nigeria which makes roaming more suitable for users of the network in Africa, Zain/Airtel for example also operates in other African countries which also make international roaming convenient for their subscribers.

2.6.5 Multimedia messaging services (MMS)

Within the mobile telecommunication industry, the messaging market that include MMS, SMS and mobile e-mail services are growing so fast, the value of these messaging market was increased from US17.4 billion to more than US29 billion in 2006, (Hsu, Lu, & Hsu, 2007). MMS is a developed

process from SMS, the logic and behaviour of the service are similar to each other, MMS utilizes richer content types than SMS which include large colour images and graphics, longer text messages, speech, music and video clips, (Coulombe & Grassel, 2004). MMS users are able to send multimedia messages by means of internet content providers (ICP), this application has made MMS to reform the structure of mobile communication services, creating a more resourceful, more personal, more entertaining and even more expensive than ever before, (Hsu et al., 2007). The trendiest use of MMS is to send pictures from camera equipped mobile phones. However, different groups of users have different preference and behaviour in the use of MMS, the results will provide an insight for MMS marketing strategies, it is used as one of the factors that determine the effectiveness of mobile telecommunication services.

2.6.6 Short messages services (SMS)

Mobile cellphones plays an essential role in young people's lives and are accepted as valuable tools, (Furber, et al., 2011). Some people describes SMS has the „killer' application of mobile phone services. SMS has exceeded all expectations in terms of usage, its contribution to this growth is because of the low cost it incur, the asynchronous nature and its ability for quiet or private use, (Markett et al., 2006). Short messages service (SMS) has provided a great source of revenue for carriers and mobile telecommunication service providers world over as it was forecasted and reported in 2004 by the GSM Association that 547.5 billion SMS messages were sent worldwide, (Coulombe & Grassel, 2004). However, contents that can be transmitted on SMS are limited to that of MMS, this include short text messages, ringtones and small graphics. GSM provides the use of SMS to deliver data messages up to 160 characters, (Tang et al., 2001). SMS users are able to exchange these alpha numeric messages across the world with any other users of digital cellular network within seconds of sending the messages, (Peersman et al., 2000). In this situation, SMS will offer a straight forward and effective way to cover the abovementioned tasks to any user while on the move, (Boukas et al., 2009).

Furthermore, due to the personal features of mobile phones, the utilization of MMS and SMS for marketing purposes all over the world has drastically increased. For instance, a report issued by Portio Research shows that the yearly sales revenue of the SMS market reached \$50 billion world over in the year 2010 adding up to about 2.38 trillion text messages sent, (Hallet, 2005) cited in, (Okazaki & Taylor, 2008). There are two major types of SMS services which include Cell broadcast and point-to-point, the cell broadcast are SMS usually transmitted to all active handsets that are subscribed to a particular information service while the point-to-point messages can be sent from one mobile phone to another or sometimes from computer to mobile phone and vice versa, (Peersman et al., 2000). All these messages are maintained and transmitted by a short message service centre (SMSC), SMSC is an electronic form of ordinary mail postal service that stores and then forward the messages when they can be delivered, (Peersman et al., 2000). For this service to be operational, all GSM network must support

one or more SMSC to sort and route the messages. Some Agencies and marketers are taking advantage of the increase in the use of SMS services by integrating SMS advertisement as a part of integrated marketing communication (IMC) strategy, (Okazaki & Taylor, 2008). The table below reviewed some of the essential terms of mobile telecommunication technology used for advertising.

Terms	Definitions
3G	Third-generation mobile communication systems. Key features of 3G systems include a high degree of commonality of design worldwide, worldwide roaming capability, support for a wide range of Internet and multimedia applications and services, and data rates in excess of 144 kbps.
Alert Short	Message sent to mobile users to keep them updated about the news, weather, traffic conditions, etc.
FeliCa	A multi-functional electronic wallet with contactless electronic IC chips developed by Sony. In combination with NTT DoCoMo's "i-appli" (Java-based applications), users can use FeliCa for diverse transactions, such as commuter pass, electronic money, membership card, and movie tickets, among others, simply by waving their phone in front of enabled sensors.
GPS	Global Positioning System. A U.S. government-owned technology based on the use of three or more satellites (triangulation) to provide 24-hour positioning information that indicates the precise location of any compatible receiver unit.
i-mode	NTT DoCoMo's mobile Internet service. Its portal manages a critical mass of numerous "official" i-mode sites, including e-mail, transaction services such as ticket reservations, banking, and shopping, as well as infotainment and directory service.
MMS	Multimedia Messaging Services. A standard for telephony messaging systems that allows sending messages that include multimedia objects, such as images, audio, video, or rich text, in addition to text messages.
SMS	Short Message Service. A service for sending messages of up to 160 characters to mobile phones.
UMTS	Universal Mobile Telecommunications System. UMTS/WCDMA is the 3G wideband standard jointly developed by Europe and Japan.
WAP	Wireless Applications Protocol. De facto wireless Internet standard capable of running on top of almost any bearer service.
WCDMA	Wideband Code Division Multiple Access. Essentially the same 3G standard as UMTS.

Table 2.2 Key Mobile Advertising Terms, (Okazaki & Taylor, 2008)

2.6.7 Voice call

Since the first GSM network operation started in 1991, a lot of countries all over the world have adopted the standard, millions subscribers of GSM networks are now offered global coverage with excellent voice quality over a whole range of functional conditions and a range of value-added services, (Peersman et al., 2000). GSM mobile standard is a fully developed technology with an established mobile Call Control (CC) protocol, (Foster, Pous, Sesmun, Kenneally, & Pesc h, 2003). The figure below shows the architecture of a GSM network and call control model. The GSM 04.08 mobile call control functions between the mobile and the Mobile Services Switching Centre (MSC). Amid the MSC and the edge of the Public Switch Telephone Network (PSTN), Signalling Systems 7 (SS7) ISDN User parts (ISUP) is carried out over the distinctive ISDN based PSTN. In addition, from the PSTN to the fixed phone either analogue TUP or a continuation of SS7/ISDN connects the fixed phone, (Foster et al., 2003).

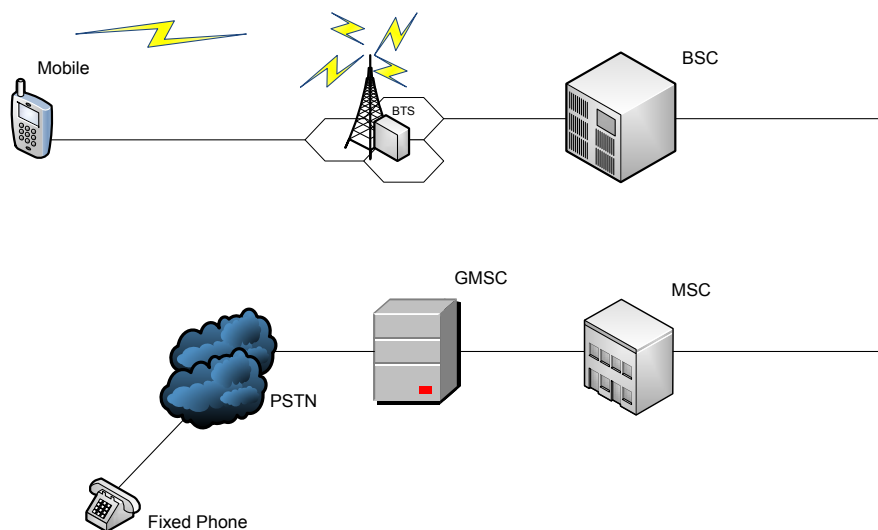


Figure 2.5 GSM Architecture, (Foster et al., 2003).

There are many mobile phones that do not only support voice call over cellular network but also on other broadband radio technologies such as Skype on mobile phones. Most Nokia, Blackberry, Samsung, Ericson, HTC, Motorola, Apple devices supports both GSM and Wi-Fi technologies.

2.6.8 Wireless application protocol (WAP)

The mobile commerce (m-commerce) has gained and achieved remarkable success from the experienced gained from its predecessors, electronic commerce (e-commerce) and the internet, (Xianjun, Changping, & Hongping, 2009). WAP applications is specified with application structure and

network procedures or protocols for wireless devices specifically the pagers, personal digital assistants (PDAs) and mobile phones, (Abu El-Ata, 2000). The creation of these devices gives the right to use business information from the area using an international data transfer standard, (Boyle, Robbins, & Williams, 2005).

The figure below depicts WAP model, the model permit content and services to be hosted on a standard web server, this is developed by using Common Gateway Interface (CGI) and Java, WAP uses proxy technologies to connect between the world wide web and the wireless domain that consist of Protocol Gateway which translate transactions from the WAP stack to the world wide web protocol stack and content encoder and decoder to translate WAP content into compact-encoded format. Wireless Markup Language (WML) is similar to Hypertext Markup Language (HTML) with a smaller subset of function, smart mobile devices use the same Wireless Markup Language as the early WAP enabled technology to display information comparable to a web browser, (Boyle et al., 2005). Following the introduction of the WAP services in 1998, many commercial organisation have been using the technology to send location sensitive advertisement and news alerts to users of mobile phones, (Sadeh, 2002) cited in, (Okazaki & Taylor, 2008).

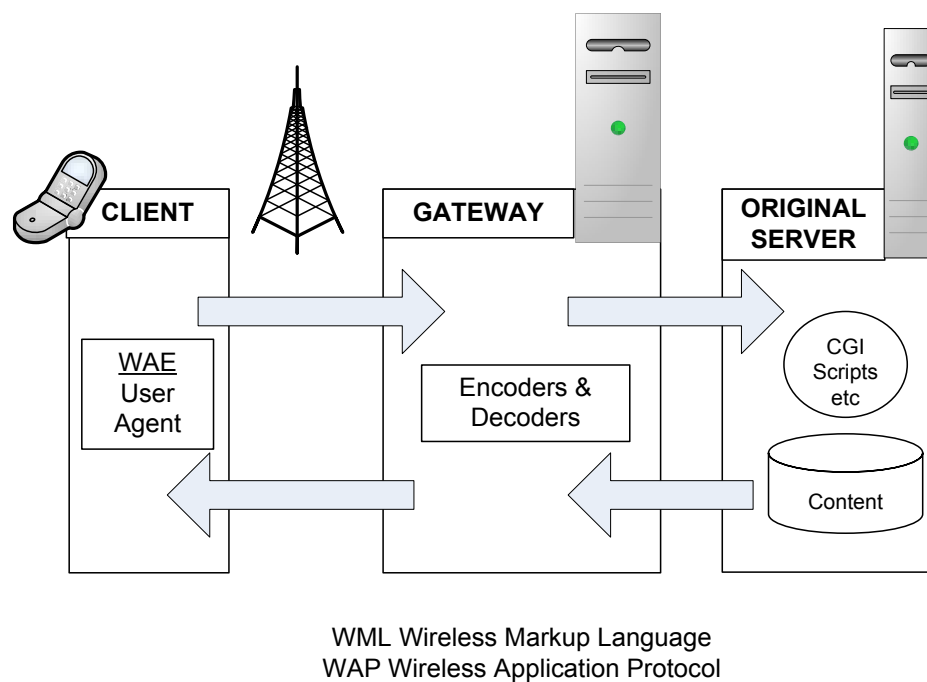


Figure 2.6 The WAP Model, (Abu El-Ata, 2000).

2.7 Factors in the provision of mobile telecommunication services

Most of the countries in Africa with telecommunication systems were traditionally ran by their governments, (Keck & Djiofack-Zebaze, 2009). According to Gruber and Verboven, (Gruber &

Verboven, 2001) the roles played by governments in the issue of licenses to mobile telecommunication operators and the technological developments have affected the diffusion pattern of mobile telecommunication services. Privatisation and liberalisation has transformed and expanded telecommunications market, (McElhinney, 2001). Literature shows that the demand of mobile phones in Africa in the last few years has been more than expected and currently continues to expand. Before a user can gain access to typical mobile telecommunication services (i.e., voice call and IP connectivity), the user ought to be subscribed to a mobile network operator, (Koutsopoulou, Kaloxylos, Alonistioti, & Merakos, 2007). The growth of m-commerce is anticipated to accelerate with the convergence of internet-telephony networks and hybrid computing-communications devices, either the usage of the 3G mobile network or the operation of the hybrid 4G networks, (Roussos, Peterson, & Patel, 2003). Telecommunication sectors helps in enabling countries to achieve socio-economic goal and also assist in competing in the international economy, (McCormick, 2003). Cricelli *et al.* (Cricelli et al., 2011) described the component of mobile telecommunication operators in the figure below. The description states that mobile telecommunication operators render a variety of services and products at different level of a value chain: mobile telecommunication network infrastructure which includes mobile network equipment, spectrum and operations, mobile service improvement and supply which includes mobile billing, tariffing, mobile network services and products, and lastly, the section involving the end-users which includes distribution, marketing and customer care services.



Figure 2.7 The Components of Mobile Operator Value Chain, (Cricelli et al., 2011).

Mobile network operator generally operates the entire process independently from the beginning of the value chain to the end by delivering mobile telecommunication services to users of the mobile telecommunication network, (Audestal et al., 2006; Kim and Seol, 2007) cited in (Cricelli et al., 2011). There are many determinants that could create a high level of customer satisfaction in mobile telecommunications such as the price, call quality, network coverage, network availability and value, but the main determining factor of user satisfaction is the user's own perceptions, (Zeithaml & Bitner, 1996) cited in, (Iqbal, Zia, Bashir, Shahzad, & Aslam, 2008). An adequate communications links within countries, regions and globally is accepted by stakeholders as a vital mechanism to aid international and local trade leading to socio-economic development. However, users are able to trust and adapt to the factors of mobile devices if both application navigation and content delivery reflects their necessary needs, and acceptable mobile information services provision systems needs to operate within a

trustworthy environment, (Roussos et al., 2003). The impact of these factors will affect all areas of human activity greatly, causing an urgent need for the development of advanced national and international networks that would create regional information globally. These infrastructures would enable developed and developing nations to participate in the foreseen Global Information Society (GIS).

Factors like the release of IMT-2000, growth of the wireless internet and the implementation of mobile number portability (MNP) contribute to the evolution phases of mobile telecommunication services market, (Kim, Park, & Jeong, 2004). The introduction of mobile wallet (eWallet) has also added to the factors in providing mobile telecommunication services. Mobile wallet has the ability to succeed the conventional leather wallet, it is a more advanced flexible application that consist of elements of mobile transactions and other items that can be found in a leather wallet i.e., loyalty cards and travel cards. The mobile wallet is capable of storing personal information like the credit card information, PIN codes, online shopping accounts and many more, (Shin, 2009). According to Jupiter Research, (Shin, 2009) one of the first mobile telecommunication company to launch mobile wallet is Nippon Telegraph and Telephone Corporation (NTT, Docomo), it has signed over 15 million users for mobile wallet. This allows people with smart phones and other compatible 3G handsets to make payments via their phones, models of these phones include; iPhone, Blackberry, Sony Ericson, Fujitsu and many more. It is obvious that there is more demand for voice services as opposed to data services. The demand for mobile telecommunication services is driven fast as it enhances social usage such as keeping in touch with family and friends. Other benefits of mobile telecommunication services include a sense of wellbeing, help in the arrangement of cash transfer from family or friends enhancing income and reduce human risk (i.e., call for assistance or emergency). Fadare and Salami (Fadare & Salami, 2004) also contributed to telecommunication research topics which argued that some people believed that telecommunication services may reduce travel demand in Nigeria in such a way that telecommunication infrastructure and the usage of phones may change people's travel behaviour. The need for interpersonal contact will reduce and may also reduce the number of road traffic accidents that occur.

2.7.1 Cost/Billing services

The integration of the internet with the mobile telecommunication services has modified existing business models in such a way that network operators and service providers are able to control the cost sharing of provided services, (Koutsopoulou, Kaloxylos, Alonistioti, & Merakos, 2007). Although, mobile telecommunication operators traditionally target urban areas, but the rate at which mobile phones are demanded from rural and low income areas in Africa have exceeded all expectations, (Scott, Batchelor, Ridley, & Jorgensen, 2004). For instance, in 1999, Nigeria's minister of communication promised that cellphone services will be an affordable universal access to the nation. According to

Onwumechili, (Onwumechili, 2001, p. 220) “The ultimate question is whether the rural poor of the country will be able to afford cellphone service if it is made available? If they cannot, then the affordable universal access cannot be achieved.” Yet, liberalization and privatization is said to be the drive to lessen prices and enhance mobile telecommunication services available to users, (McElhinney, 2001). Various companies (i.e., mobile telecommunication companies) lay down its own functional components for billing and charging users or subscribers utilizing their services, (Koutsopoulou et al., 2007).

However, Batt & Katz, (Batt & Katz, 1998) stated that given the high risk involved in the converging market of mobile telecommunications, the limits of user or consumer spending behavior may determine the future of telecommunication services and the service providers. In addition, Meyer, (Meyer & Schwager, 2007) indicated that anyone who recently signed up for mobile phone services has faced a demanding test trying to outline the cost of free calls versus carry-forward minutes. The transition of mobile telecommunication services from analogue technology to digital technology had several impact on the diffusion of mobile telecommunications, (Gruber & Verboven, 2001). Hence, the mobile telecommunications technology development stimulates monopolist operators to reduce their service charges to attract more subscribers. According to Horwitz and Currie, (Horwitz & Currie, 2007) despite the impressive growth of mobile telecommunications subscriber from a million to 19 million within a period of 10 years, the prices of telecommunication services in South Africa together with mobile telecommunication services are ridiculously high compared with other countries with almost similar infrastructures or characteristics.

2.7.2 Customer care services

Literature survey indicated that in the real world, it is not too easy to satisfy customers, but as long as customers indicates a satisfied response, then the company-customer relationship is strong, (Jones & Sasser, 1995, p. 89). Marketing concepts proposed that the logical place to start the search for new product ideas is best to consider customer’s needs, wants, preferences, attitudes, lifestyles and so on, (Kotler, 1991) cited in, (Oyeniya & Abiodun, 2008). Zeithaml and bitner (Zeithaml & Bitner, 2003) defined customer service as a string of activities designed to enhance the feeling that a product or service has met customer’s expectation. The link between customer satisfaction and service quality creates value and help the customer to make decision whether the service justifies the cost of the service, (Ahmed, Nawaz, Usman, Shaukat, Ahmad, & Iqbal, 2010). Furthermore, customer care services give support to users by means of solutions proposal through question-and-answer assistance and other support services such as on-line interactive product tutorial, software patch downloads and so on, (Oliveira, Roque, Sedillot, & Carrapatoso, 2001). Mobile telecommunication network operators lay emphasis mainly on acquiring new customers at the early stages of their market growth but as the

market matures, the importance of keeping hold of current customers escalates which leads to network providers acquiring substantial information about their current customers in order to be able to analyze these valuable information to understand their behaviour and preferences, (Seo, Ranganathan, & Babad, 2008). However, network providers aiming to improve customer care may need to keep an eye on delivery of customer care services through internal measures by considering the time to answer a query from customers or rate of recurrence of faults, (Stone, Bond, & Foss, 2004).

2.7.3 Network availability and stability

Mobile telecommunication services market is boosted by the rapid development in the information and communications technology and an increase in demand from users which has changed the pattern of mobile telecommunication services from voice oriented communication to a mixture of data communication and multimedia services, (Kim et al., 2004). One of the major factors when considering network design is its availability to users, (Sauvé & Coelho, 2001). The study of network long-life is essential to have operation maximum performance, (Akbar, Yoon, & Kim, 2005). Network availability is referred to as network ability to respond to the request made by those accessing or using the network. However, Durvy *et al.* (Durvy et al., 2003) defined the availability of mobile network as the actual percentage of the available total network bandwidth to transmit the traffic. Hence, there should be enough available spare bandwidth to retransmit the traffic without any reduction in performance.

However, some users may say their network is 99.999 percent available. Oggerino (Oggerino, 2001) describes a percentage method in relation to the availability of a network, the essential use of the availability percentage is to figure out how much downtime the user have over a year-long period. Network users determine downtime by multiplying the number of minutes in a year by the percentage of availability. This gives the minute per year the user will be operational. The balance is the downtime user can expect. The convergence of mobile telephony and internet network become more a part of our lives, people are dependent on them to carry out our personal, social and business activities. People rely on them and thus, people also need them to be highly reliable, in other words, the networks must work all the time (i.e., network must be highly available). Huda *et al.* (Huda et al., 2005) described the approaches to manage a mobile ad hoc network (MANET) as minimizing the cost of routing degrades network stability (i.e., network life time) and the other approach is the improvement of network stability degrades the routing cost. Hence, minimizing the cost results in poor network stability.

2.7.4 Security

According to Kurtz, (Kurtz, 2002) mobile telecommunication industry faces various challenges while trying to protect their networks from external and internal fraud. Further estimated a combined financial loss to mobile telecommunication companies may be in excess of \$25 billion dollars. Liberty Alliance

Projects (LAP, 2004) states that as internet services continues to grow rapidly, it is reported that misuse or theft of individuals' information appears from every corner of the world on identity theft which poses a threat to the expansion of e-commerce. Pato, (Pato, 2003) defined identity management as the set of procedures, tools and social agreement that establishes, maintains and also terminates digital identity for systems, services and people so as to protect admittance to an expanding set of systems and application. Shi *et al.* (Shi et al., 2008) proposed an authentication system simply applicable to both WLAN and cellular networks for integrated network services. In other words, the application is useful for event tracking in cellular networks. However, mobile identity management can address both usability and trust concerns in mobile business, so therefore it is created as a core service for next generation mobile telecommunication infrastructure, (Roussos et al., 2003). Identity management has been the main component of mobile system security environment, it has been used for the maintenance of accounting information for login access to a system or applications, (Pato, 2003). Literature identifies that many identity management products and solutions are available which supplies functionalities as authentication, auditing, data storage and so on. However, identity managements targets various types of users such as the mobile telecommunication service providers and government organizations, (Mont, Bramhall, & Pato, 2003).

When subscribers communicate using mobile telecommunication networks, there is much data generated which needs to be handled in a very secure way, (Federrath, Jerichow, Kesdogan, & Pfitzmann, 1995). Security measures such as authentication, encryption and non-repudiation are very important aspects of mobile telecommunication network management, (SUN, 2001). Hence, these security measures must be able to protect unauthorized operations from the network but still with the need to grant access to numerous users or devices. Protection of confidentiality, Protection of integrity and protection of availability are the major requirements public mobile telecommunication networks should meet for data protection. Not only user data and switching data related to a certain person (subscriber) are considered to be protected but the location of the person using the mobile station also, (Federrath et al., 1995). Due to the historic trust relationship between mobile telecommunication network operators with their users, which involves the protections of subscribers' data and billing services and the relative absence of spam in voice telephone network services, it is believed that all public mobile telecommunication network operators currently have advantage over web companies and other new entrants, (LAP, 2007). A lot of companies have failed not just for poor services and products or even lack of capital but rather failed because of their failure to conform to acknowledged standards or legitimacy, (Ahlstrom & Bruton, 2001; Chen, Griffith, & Hu, 2006) cited in, (Low & Johnston, 2008). Hence, organizations that conform to legitimacy pressure survive longer in an environment than the organizations that do not conform, (Zaheer, 1995).

2.7.5 User satisfaction

“There is only one boss – the customer. And he can fire everybody in the company from the chairman on down simply by spending his money somewhere else.” – Sam Walton, Wal-Mart.

Services users get from their network providers are paid for by the users in form of tariffs, (Duuren et al., 1996). However, User satisfaction can be attained if the users are able to reach out to the people they require at a particular time. This study is examining the factors that influence first-year IT students’ judgement of the quality of mobile telecommunication services in UKZN and LASU, the study is also assessing the impact of quality of mobile telecommunication services on the loyalty of first-year IT students towards their network operators based on their experience and perception. Past studies on factors affecting loyalty focused on user satisfaction and the switching barrier (e.g., Dick & Basu, 1994; Schindler, 2001; Kim, Park, & Jeong, 2004; Gerpott, Rams). According to researchers, as user satisfaction positively influences customer loyalty, it is not always an enough condition as in a number of cases this satisfaction may be unsuccessful to produce the likely effect on the market. Furthermore, it was suggested that future researchers should consider analysing other potential influential factors and in the context, concepts of switching barriers was introduced, (Jones et al., 2002).

In addition, switching barrier performs the function of an adjustment variable in the relationship between customer satisfaction and loyalty. This is one of the motivating factors of this research and its ability for a comparative analysis on participants from UKZN, Durban and LASU, Lagos. Switching behaviour can be articulated as the process of being loyal to one service provider and switching to another service provider due to dissatisfaction or any other problem in service quality, (Sathish, Kumar, & Naveen, 2011). Sathish *et al.* (Sathish et al., 2011) further explained that even if a customer is loyal to a particular service provider and the service provider does not satisfy the customers’ needs, the costumers switch to a competitor brand. However, switching incur some cost, (Oyeniya & Abiodun, 2009). According to Jackson, (Jackson, 1985) switching cost is defined as the mental and physical cost users encounter as well as the economic costs they face when changing network provider.

User response to the state of fulfilment and the user judgment of the fulfilled states is referred to as user satisfaction, (Oliver, 2010). There are lots of definitions proposed for satisfaction; the list below shows some of the definitions that are still valid today. Thus, these definitions are not dictionary based definitions, they define key concepts and the mechanisms by which these concepts interact. The definitions are stated in the table below.

- ❖ “An evaluation rendered that the (consumption) experience was at least as good as it was supposed to be.”
- ❖ “The summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer’s prior feelings about the consumption experience.”
- ❖ The consumer’s response to the evaluation of the perceived discrepancy between prior expectations (or some norm of performance) and the actual performance of the product as perceived after its consumption.”

Table 2.3 Proposed definition of satisfaction, (Oliver, 2010).

It is important to follow and understand the satisfaction and loyalty of customers as a group, it is equally significant to understand the attitudes and behaviour of individual customers, (Jones & Sasser, 1995). However, the number of essential factors affecting customer loyalty is dependent on the level of loyalty of the customers, (Kuusik, 2007). Customer loyalty is defined as a scale to which a customer exhibits repeated purchasing activity from a network provider. The customer exhibits a positive nature of attitude to the network provider and always considers using the network provider when the need for such service occur, (Sathish et al., 2011). In a telephone survey carried out in Germany, Gerpott *et al.*, (2001) cited in (Seo et al., 2008) stated that only call quality and price were significant and not customer services in affecting customer satisfaction. In a similar study on South Korea, Kim *et al.*, (2004) cited in (Seo et al., 2008) stated that customer services with two other services such as call quality and value-added services were important in affecting user satisfaction and not price. The only factor that the two studies had in common was the call quality while they differed in the importance of customer services and price. Ability to measure satisfaction or dissatisfaction of customers is based on one of four basic ways; customers may be loyalists, defectors, mercenaries or hostages, (Jones & Sasser, 1995). From the measure, customers in the category of the loyalist get high satisfactory level of service, their loyalty level is high and portray the behaviour of staying and supportive to the company or service provider. In the case of defectors, they get a low to medium satisfaction level of service from the service provider, their loyalty level is equally low to medium and they probably leave or having left unhappy. Next, Mercenaries who gets a high level of satisfaction of services have a high level loyalty to their service provider and they show a low to medium or low commitment to their service provider. Lastly, the Hostage are customers who gets low to medium services yet, they are highly loyal because they are unable to switch or trapped with the service provider. Table below depicts the four basic ways satisfaction or dissatisfaction is measured.

Individual Customer Satisfaction, Loyalty, and Behaviour			
	Satisfaction	Loyalty	Behaviour
Loyalist	High	High	Staying and supportive
Defectors	Low to medium	Low to medium	Leaving or having left, unhappy
Mercenaries	High	High	Low to medium; low commitment
Hostage	Low to medium	High	Unable to switch; trapped

Table 2.4 Individual Customer Satisfaction, Loyalty, and Behaviour, (Jones & Sasser, 1995).

Furthermore, customer's own perceptions of service quality (SQ) are the main factor that determines customer satisfaction, (Zeithaml & Bitner, 2003). This research will define SQ as customers' dissatisfaction or satisfaction gained from their experience of using mobile telecommunication service, (Parasuraman, Zeithaml, & Berry, 1988). SERVQUAL provides technology for measuring and managing service quality. Study on service quality was first published by Parasuraman *et al.* in 1985. Buttle (Buttle, 1996) indicated that service quality is viewed as the driver of corporate marketing and financial performance. Hence, service quality has become important in several research topics because of its apparent correlation to customer satisfaction, cost, customer retention and profitability. Parasuraman *et al.*, (Parasuraman *et al.*, 1988) identified ten components of service quality in their first publication which include competence, responsiveness, reliability, courtesy, access, communication, security, credibility, understanding/knowing the customer and tangible. Some of these components were used in the construction of this study to measure service quality of mobile telecommunication services. Without further questions, any critiques of SERVQUAL must be within the broader context of strong endorsement by Parasuraman *et al.*

2.8 Challenges of mobile telecommunication services – South Africa

South Africa once faced restructuring process in its telecommunication sector and policies that requires putting an end to many questions as regards the boundaries between domination and competitive telecommunication services, tariffs adjustment and many more, (Horwitz, 1994). However, even as the growing telecommunication market is creating opportunities for new growth in South African mobile telecommunication market and beyond, the also changing democracy posed regulations to aid the progressive goals of socioeconomic and racial changes on all functional companies in the South Africa, (Sánchez, 2008). Business expansions of post-Apartheid South Africa influence the expansion of

foreign multi-national companies (MNC) in Africa and learning from the renewed economic involvement. Another challenge that the multi-national companies face is the Broad-based black economic empowerment (BBBEE) strategy, (Sánchez, 2008). According to Iheduru, (Iheduru, 2004) the term „black’ in black economic empowerment refers to non-white population. Hence, the South African government and African National Congress (ANC: ruling South African political party) indicated a clear preference for the black African populations. However, South Africa’s telecommunication sector has been one of the several sectors where monopoly enterprise has been cut loose or privatized from the direct ministerial control with different level of competition, (Horwitz, 1994).

South African telecommunication network is very sophisticated and large, the South African telecommunications has a high level of digitization and it is made up of increasing fibre optics percentage, (Horwitz, 1994). There are other challenges that mobile telecommunication operators undergo in making sure they deliver quality service to their customers in South Africa. On the 30th of June 2011, there was a report that states as follows: “We are currently experiencing network issues in some areas. Our engineering team is working hard to resolve the problem. We apologise to all affected customers,” said Vodacom spokeswoman Ashleigh Dubbelman, (Dailynews, 2011). More on the report indicated that MTN and Vodacom had network problems prior to the news in June 2011, ICASA announced that it will be instructing all network operators to present a report as to why there were problems with their network. The report stated that network operators explained that problem was not in relation with the June 30 Rica deadline to register SIM Cards, (ICASA, 2011). More online on the 1st of July 2011 indicated that three of South Africa’s cellphone operators (MTN, Vodacom, Cell C) were yet to meet the minimum requirements for Call Set Up Success Rate (CSSR) as well as dropped Call Rate (DCR) reported by the ICASA. According to the report, CSSR is described as the number of attempts to make a call that is unsuccessful and the amount of time people were cut off in the middle of their conversations, (ICASA, 2011).

2.9 Challenges of mobile telecommunication services – Nigeria

Most African countries are still at their developing or partially developed phase regarding technology usage, (Obadare, 2006). Surprisingly, mobile telecommunication technology is a form of struggle to assert state power in a country like Nigeria. Hence, it is not a surprise that the emergence of mobile telephony came with the rebirth of the civilian rule in May 1999, (Obadare, 2006). This provides evidence that there is politic interference) in telecommunications transformation. Two researchers have worked on topics related to the politics of telecommunications (e.g., Horwitz & Currie, 2007; Herrera, 2002; Obadare, 2006). According to Diso, (Diso, 2005) Nigeria is faced with different challenges that has to be addressed in its ICT formulation policy. The major challenge indicated is stability of power (electricity) source provided by Power holding company of Nigeria (PHCN), Electricity is a necessary

condition for effective ICT operation environment. The growth of mobile telecommunications in Nigeria has exceeded all estimations and predictions. The question has not been where the demand is but instead the question has been how to meet the demand considering the huge population of subscribers.

2.10 Students and mobile telecommunications

Frankel (Frankel, 1970) predicted that the relationship of telecommunication to education will shape the society and feature of teaching scheme will depend on it in the future. The role telecommunication is playing in social relations is becoming increasingly important. Today, the popularity of social networking sites has also increased dramatically. Although prior to social networking sites, SMS, MMS and telephone technologies had significant impact on social interactions. According to Markett *et al.*, (Markett et al., 2006) due to the commonness of mobile phones among students, the ringing, vibration and beeping of mobile phones in classrooms is a continuous nuisance. In addition, despite the nuisance mobile phone constitutes in classrooms, mobile phone usage for typing SMS within the classroom amongst students is a low-threshold application to quickly send a brief, text-based messages for interactions at any time.

According to Selwyn, (Selwyn, 2003) it was estimated that nine in ten United Kingdom secondary school students possess a mobile phone, and people within the ages of 10 to 16 years are the largest consumer of mobile telephony. Mobile technology devices like the cellphones, Tabs, laptops represent the new variety of mobile technological innovations that offers easier and quicker access to communication and information amongst students at any given time. These technological innovations have led to the increasing attraction of the social network sites (SNSs) to students, academic and industry researchers because it is reachable and affordable, (Boyd & Ellison, 2007). Since the introduction of these SNSs, it has attracted millions of users world over. Some of these SNSs include the Facebook, Twitter, MySpace and many more. A recent report on Facebook statistics (Facebook, 2011) indicated that there are more than 350 million active users currently accessing the Facebook website through the use of mobile devices and there are more than 475 mobile network operators worldwide working to set up and support Facebook mobile products. Boyd and Ellison (Boyd & Ellison, 2007) stated that there are hundreds of social network sites supporting a wide range of interest and practices. According to Selwyn, (Selwyn, 2003) educators should acknowledge that the growth of mobile telephony is more or less a trend or affection of youth culture and fashion. Therefore, these networks redefine student's lives.

2.11 Conclusion

In this chapter, findings from the literature show that scholars have researched on mobile telecommunication services and a very few have done work related to students on their experience and perceptions towards mobile telecommunication services especially in Africa. However, research concerned with the evaluation of mobile telecommunication services is best measured by service quality as customers express their dissatisfaction or satisfaction in the use of these services from their experience, (Parasuraman et al., 1988). Hence, service quality is important in research topics because of its link to customer satisfaction, retention and profitability, (Buttle, 1996). In this chapter, the literature of the evolution, development and overview of mobile telecommunication services were presented. At this level, there are no similar studies in both South Africa and Nigeria. The next chapter present the research methodology utilized in achieving the objectives of this study.

Chapter 3

RESEARCH METHODOLOGY

3.1 Introduction

In the previous chapter, a review of literature on the effective mobile telecommunication services in correlation to user satisfaction, retention and loyalty, was presented. This chapter discusses the research methodology applied in accomplishing the objectives of this research. Research methodologies have direct impact on the validity and generalization of a study, (McGrath & Brinberg, 1983). Validity of a study can be expressed as the instrument measuring ability of what it is intended to measure, (Coughlan, et al. 2007). Furthermore, research should not be explored with one vision but rather with varieties of views to allow multiple faces of the research to be revealed and realized, (Pamela & Susan, 2008). According to Cohen and Morrison, (Cohen & Morrison, 2007) research can be done through different data collection techniques and making meaning out of the data collected. Hence, methodology seeks to help researchers to understand the procedures and products of scientific enquiry. This chapter presents the design, principles, research methodology, data collection and techniques, instruments used, sampling and analysis methods of this research.

3.2 The research design

Mobile telecommunications evolution and development has seen researchers contributing from differing backgrounds such as engineering and information systems disciplines playing a powerful role to the existing literature. The research design facilitates the researcher's overall plan for obtaining answers to the research questions guiding the research. In order to obtain a legitimate result for this research, an exploratory quantitative design was implemented to identify, analyse and describe the factors influencing the effectiveness of mobile telecommunication services. The study is exploratory because it explored the experience and perception of first-year IT students in UKZN and LASU as well as the impact of the quality of mobile telecommunication services on first-year IT students. Quantitative techniques are more often mathematically or computationally based and it provides numerical probabilities and frequencies of the results of a research, (Baker, Ponniah, & Smith, 1998).

3.3 Data collection methods and techniques

A self-administered questionnaire was designed for the primary data collection procedure. A letter requesting permission to conduct research amongst first-year IT students was given to the Registrar of

Lagos State University in Lagos State, Nigeria. Permission was also granted to conduct research in the University of KwaZulu-Natal, Durban amongst the first-year IT students at the end of November 2010.

3.3.1 Questionnaire

Two forms of questionnaire were created. One was given to first-year IT students in LASU and the other to first-year IT students in UKZN. They were self-administered questionnaires, structured questionnaires with a collection of close format, biographical and rating scale type of questions. The two forms of questionnaires can be found in the appendix A of the thesis.

3.3.1.1 Questionnaire for UKZN and LASU

Data collection for this research was done using a formal standardized survey questionnaire. All the questionnaires were distributed in hardcopies to first-year IT students in both UKZN and LASU. The questionnaires were arranged in the following format.

A- Background information

The questions focused on the background information of UKZN first-year IT students such as gender, age and race. In the case of LASU first-year IT students, the questions focused on gender, age and citizenship (Nigerian or Non-Nigerian).

B- Mobile telecommunication network operator

The questions focused on the mobile telecommunication network providers that both UKZN and LASU first-year IT students use as well as the period that they have been with the network operator.

C- Mobile telecommunication services

The questions focused on the mobile telecommunication services that both UKZN and LASU first-year IT students use on their network such as conference call, data services, GPS services, international roaming, multimedia messages services, short messages services and voice call. It also focused on how they rate such mobile telecommunication services on their mobile telecommunication network. Further questions focused on the significance of factors in determining the quality of mobile telecommunication services such as cost/billing services, customer care services, network availability and stability, user satisfaction and voice clarity. It also focused on the challenges they experience using mobile telecommunication services identified above as well as the effect mobile telecommunication services have on their academic and social life.

Justification for research methodology is of essential. Theorists have advocated for empirical studies to have well-designed questions in order to obtain an effective, reliable and valid analysis, (Feldman &

Lynch, 1988: p.432) cited in (Davis & Venkatesh, 1996). Questionnaires designed for this study were written in English. The questionnaires measure the perception toward the use of mobile telecommunication services adopted from TAM. Measuring attitudes were based on the loyalty of the first-year IT students of both UKZN and LASU. Perceived ease of use is measured with the help of scale reliabilities by Davis, (Davis et al., 1989). The theory of planned behaviour utilized in this study was to support technology acceptance model. Theory of planned behaviour in essence is an extension of TAM. It broadens the theory of reasoned action by including perceived behavioural control as a third factor that represents someone's beliefs about their ability to implement the behaviour requested, (Ajzen, 2002).

3.4 The research population

The subjects of the study were first-year IT students in UKZN, Durban and first-year IT students in LASU, Lagos.

3.4.1 Sampling

To legitimately be able to use a sample to extrapolate the results to the whole population requires the use of the following statistical sampling techniques:

1. Convenience sampling
2. Simple random sampling

3.4.1.1 Convenience sample

Convenience sampling is said to be convenient when researchers have convenient access to subjects and in this case, the elements could be selected in parts or in whole, (Lunsford & Lunsford, 1995). Furthermore, Williamson noted that convenience sample is used in exploratory research where the researcher is interested in getting an inexpensive approximation of the fact. Both UKZN and LASU constitute a convenience sample.

3.4.1.2 Simple random sampling

Simple random sampling of finite population is described by choosing elements randomly from a population one step at a time and at each step the remaining elements in the population are guaranteed that they have the probability of being selected, (Anderson et al., 2009). This study uses a simple random sampling to collect data from students in UKZN and LASU amongst the first-year IT students. The following logic was applied:

- ❖ The population of first-year IT students in UKZN was estimated at 945 and the population of first-year IT students in LASU was estimated at 950 based on the 2011 student roll for both institutions. A 50% simple random sample was selected by distribution of 500 questionnaires to each population. A total number of 313 questionnaires were obtained out of the 500 handed out in UKZN and a total of 310 questionnaires were obtained out of 500 handed out in LASU.

The table below depicts the frequency of students in UKZN who participated in the study based on gender. Total number 129 male students constituted approximately 41% of participants and 183 female students constituted approximately 59% of participants who responded to the questionnaires.

Description of Sample - UKZN					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	129	41.2	41	41.3
	Female	183	58.5	59	100.0
	Total	312	99.7	100.0	
Missing	System	1	.3		
Total		313	100.0		

Table 3.1 Description of Sample - UKZN

The table below depicts the frequency of students in LASU who participated in the study based on gender. The same number of male students as it was in UKZN (129) constituted approximately 42% of participants and 178 female students constituted approximately 58% of participants who responded to the questionnaires.

Description of Sample - LASU					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	129	41.6	42.0	42.0
	Female	178	57.4	58.0	100.0
	Total	307	99.0	100.0	
Missing	System	3	1.0		
Total		310	100.0		

Table 3.2 Description of Sample - LASU

3.5 Method of analysis

The aim of the quantitative research method applied for this study is to produce information about the relevant issues on the use of mobile telecommunication services amongst first-year IT students in both UKZN and LASU. The conceptual models (Technology Acceptance Model and Theory of Planned Behaviour) are used to interpret the findings of this study. The analysis here essentially extrapolates the assumptions of TAM. One of such assumptions presupposes that the use of technology is a function of the awareness of the existence and usefulness of such technology by a potential or actual user. In the context of this study, the use of mobile telecommunication services by first-year IT students is dependent on the awareness about the availability of such services. Students' behaviour in the form of their attitudes and intentions, perceived usefulness as well as perceived ease of use of mobile telecommunication services also determine the actual use of the services. The attitudes and intentions of first-year IT students towards technology in general and mobile telecommunications in particular are reflected in their use of mobile telecommunication services for specific activities namely academic and social activities. The academic activities entail finding new information, information sharing, research and the use of SMS to check examination results. Some of the social activities include keeping in touch with family, keeping in touch with friends, making new friends and using data services for social networking sites i.e., Facebook. Consequently, there is a possibility of unpacking user behaviour (namely the behaviour of first-year IT students) with reference to the acceptance and the usage of mobile telecommunication services through the extrapolation of the assumptions of TAM. Furthermore, the theory of planned behaviour implies that the intention to connect and relate with a programme or application has an effect on the attitudes directed at the usage of mobile telecommunications.

The data and information collected are pre-structured according to the assumed relationship between the concepts of the models used, (Mills et al., 2010). Data analysis was elaborated using set of statistical techniques for data diagnosis such as data preparations, data descriptions and scale analysis so as to improve the validity and reliability of this study. A descriptive and inferential analysis was used to analyze the collected data. Basic features of the collected data were described and interpreted. A combination of statistical software SPSS and Microsoft Excel was used for the data analysis.

3.5.1 Descriptive statistics

Useful statistics will be ascertained namely, frequency distribution of the sample in the form of tables and graphs.

3.5.2 Inferential statistics

A correlation analysis will be done with the aim of establishing relationships amongst the variables of the study. Both parametric and non-parametric tests such as regression, analysis of variance, Chi-Square tests and Z-tests will be conducted to establish relationships amongst the independent and dependent variables.

3.5.3 Statistical concepts

This section of the thesis explained the statistical concepts utilized in this research. The concepts of probability of sampling and significance of findings were used for the analysis of findings. Thus, “probability is the sample design in which the elements of the population have some known chances or probability of being selected as sample subjects,” (Sekaran, 2003, p. 421). The result of these analyses will show confirmation of the hypothesis by examining the p-value which is explained in chapter 5 (evaluation of research findings). A p-value less than or equal to 0.05 ($p \leq 0.05$) indicate a statistically significant hypothesis i.e., significance is established. Significance criterion represents the standard of proof that the phenomenon exists, (Cohen J. , 1988). A power analysis revealed that the test for this study had a power of 0.95 in detecting a 0.05 change in the proportion of variance explained in the statistical analysis, Cohen, 1987. This indicated that 5% of the time would the study have failed to detect a change of 0.05 that existed. This type of low type II error emphasizes the significance of the findings.

3.6 Conclusion

The methods described in this chapter were used for obtaining findings of the study and were also used to present research findings in Chapter 4 of this study.

Chapter 4

PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

The research method and data collection techniques were presented in chapter 3. In doing so, the questionnaire through which data was generated for this study was presented. The chapter also showed the research population, the sampling method and the sample population. The method of data analysis that the study utilizes was also highlighted in chapter 3. The research findings were presented in this chapter. As a prelude to the discussion of the study's findings, background information of first-year IT students at UKZN and LASU is presented. This chapter also identifies the mobile telecommunications operators in South Africa and Nigeria. The range of services that they offer are highlighted. Lastly, the chapter then describes students' perceptions of mobile telecommunication services and follows with the assessment of the impact that such services have on students' academic life and social life. Chapter 5 will evaluate the research findings presented in this chapter and follow with a cross-national analysis with reference to participants' responses from both UKZN and LASU.

4.2 Background information

This section presents background information on the participants who were involved in the research.

4.2.1 Background information of first-year IT students - UKZN

A total of 313 first-year IT students in UKZN participated in the study. In this section, background information of participants in UKZN is presented in relation to gender, age and race.

Gender

As figure 6 below shows there were more female participants than males. Male students constituted 41.35% and female students constituted 58.65%.

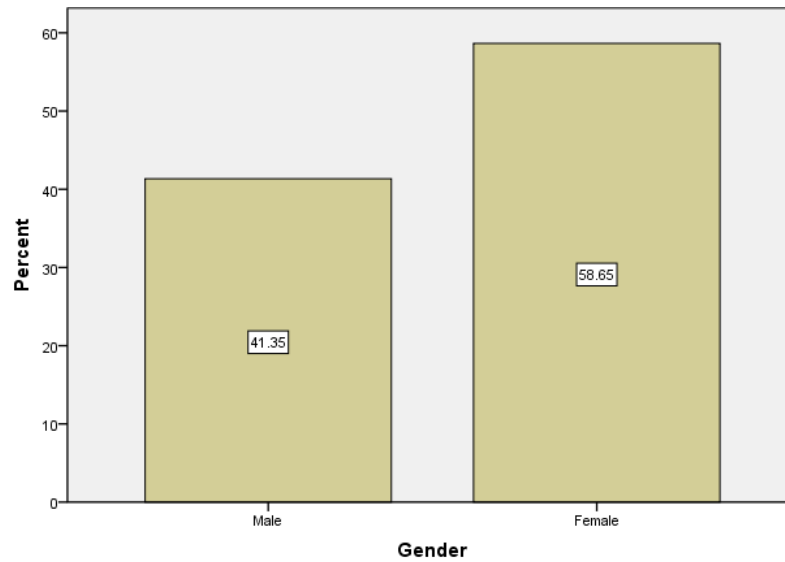


Figure 4.1 Gender distribution of participants in UKZN

Age

As can be seen in Figure 5 below, a sizable number – 65.7% of participants – were within the age bracket of 19-24, followed by students below 18 years of age at 31.7%. Participants within the age bracket of 25-29 constituted 1.6%.

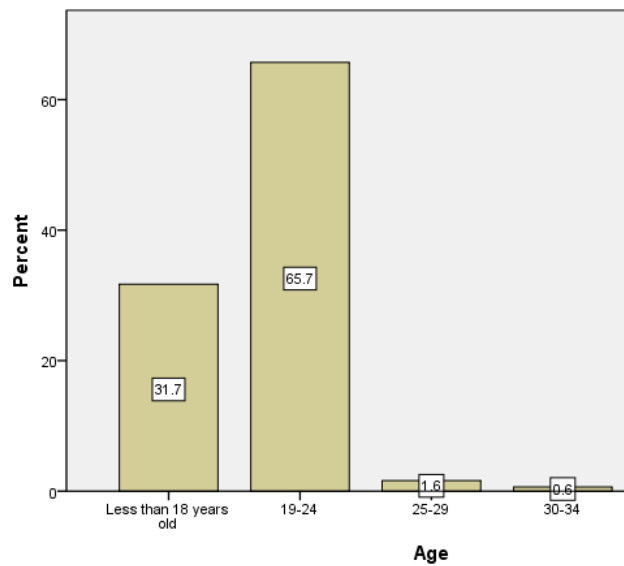


Figure 4.2 Age distribution of participants in UKZN

Race

56.5% of participants were Indians, 39.4% were Africans, Whites and Coloured had the same percentage component of 1.6% each. 0.3% of participants indicated “Another group” while 0.6% did not indicate their race.

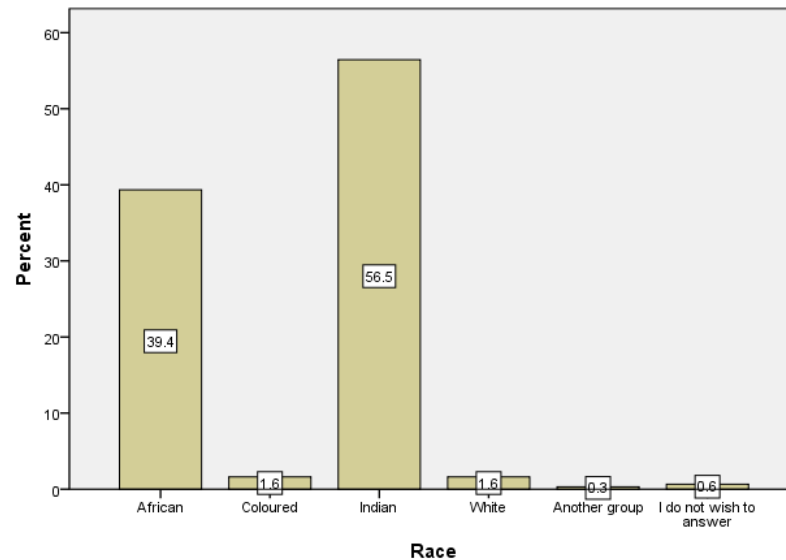


Figure 4.3 Race distribution of Participants in UKZN

4.2.2 Background information of first-year IT students – LASU

With reference to LASU, a total of 310 first-year IT students participated in the study. In this section, background information of participants in LASU is presented in relation to gender, age and citizenship.

Gender

As was the case in terms of the gender profile of participants at UKZN, more female students participated in the LASU component of the study. The gender distribution of participants is 57.98% for females and 42.02% for males.

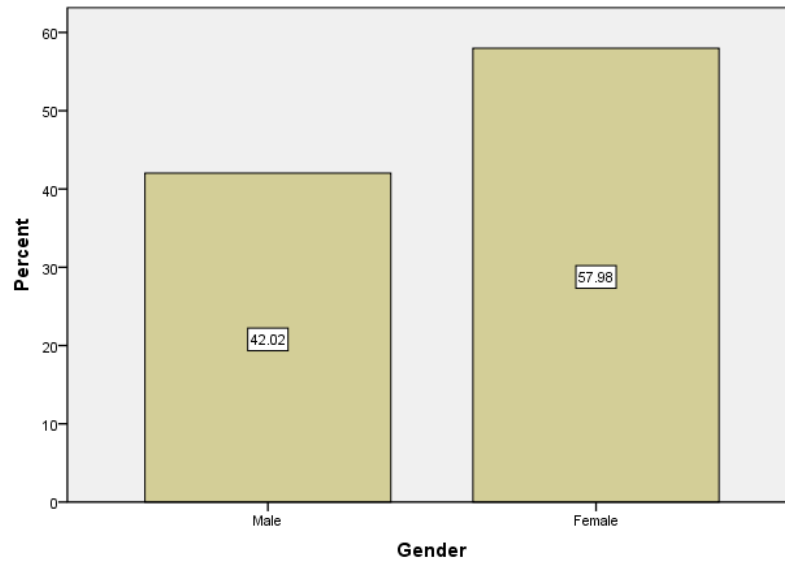


Figure 4.4 Gender Distribution of Participants in LASU

Age

The majority of participants in LASU were within the age bracket of 19-24 representing 71.8%. The next sizable age bracket was 25-29 years at 15.9%, followed by 9.4% for participants between the ages of 30 and 34. A small number of students, comprising 2.9%, were below the age of 18 years.

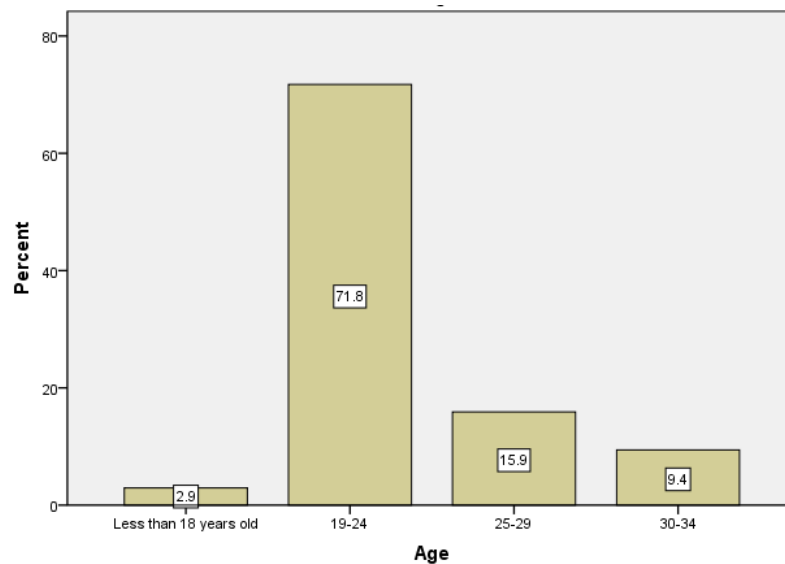


Figure 4.5 Age Distribution of Participants in LASU

Citizenship

Nigeria is not multi-racial society and as such, race was not a factor in identifying participants. However, the student populations of most universities consist of Nigerians and non-Nigerians. In this study, Nigerians made up 98.7% of participants, while non-Nigerians constituted 1% and 0.3% did not provide an answer.

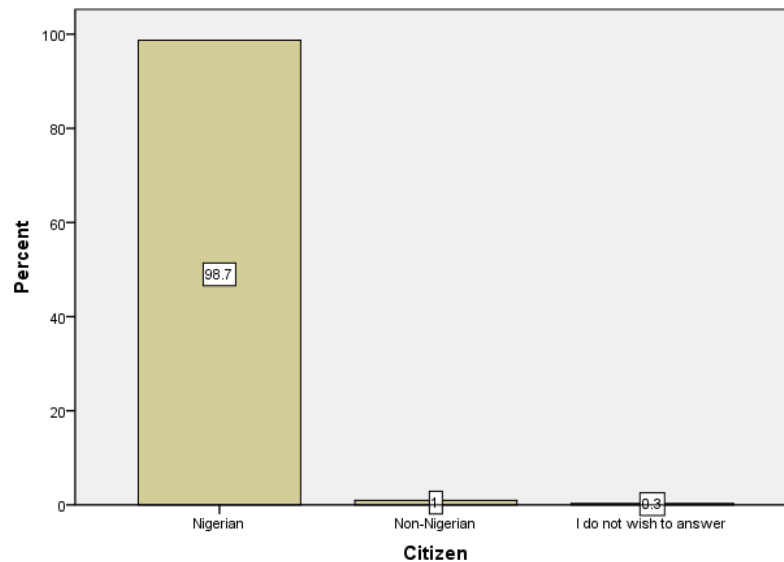


Figure 4.6 Distribution of Citizenship in UKZN

4.3 Mobile telecommunication network operators – South Africa

At the time of data collection, South Africa had four major mobile telecommunication operators namely Cell C, MTN South Africa, Virgin Mobile and Vodacom. Other major mobile telecommunication operators (Redbull mobile and 8ta) were launched after the completion of the fieldwork. This section identifies the mobile telecommunication network operators that first-year IT students at UKZN subscribed to out of the four major ones at the time of the study.

The figure below shows that 42.1% of participants subscribed to Vodacom, 34.7% to MTN South Africa, 19.9% to Cell C, and 0.6% to Virgin Mobile. Some of the participants subscribed to more than one mobile telecommunication network operator. It was gathered that 1.6% of participants subscribed to both Vodacom and MTN South Africa, 0.6% to MTN South Africa and Cell C, and 0.3% to Vodacom and Cell C. Differentiations in mobile telecommunication services and cost accounted for subscription to more than one network.

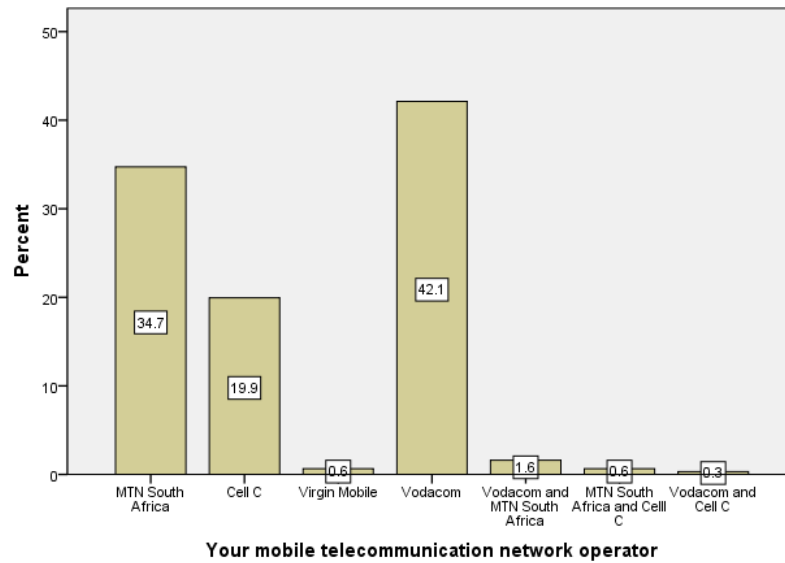


Figure 4.7 Distribution of Mobile Telecommunication Network Operators – South Africa

Duration of Subscription to Mobile Telecommunication Network

To help in determining the experiences of first-year IT students in UKZN vis-à-vis their use of mobile telecommunication services, it was necessary to find out the number of years they have been subscribed to their network provider. As shown in the figure below, 36.7% had subscribed to their preferred mobile telecommunication network for more than 5 years. 16.2% had subscribed for more than 1 year but less than 2 years, 13.6% for more than 3 years but less than 4 years, 10.1% for more than 4 years but less than 5 years. Subscribers who had been on their network for more than 2 years but less than 3 years constituted 7.5%. Participants who had been on their network for more than 6 months but less than 1 year made up 6.8%. The percentage of participants who subscribed to the mobile telecommunication network less than 6 months at the time of the study was 9.1%.

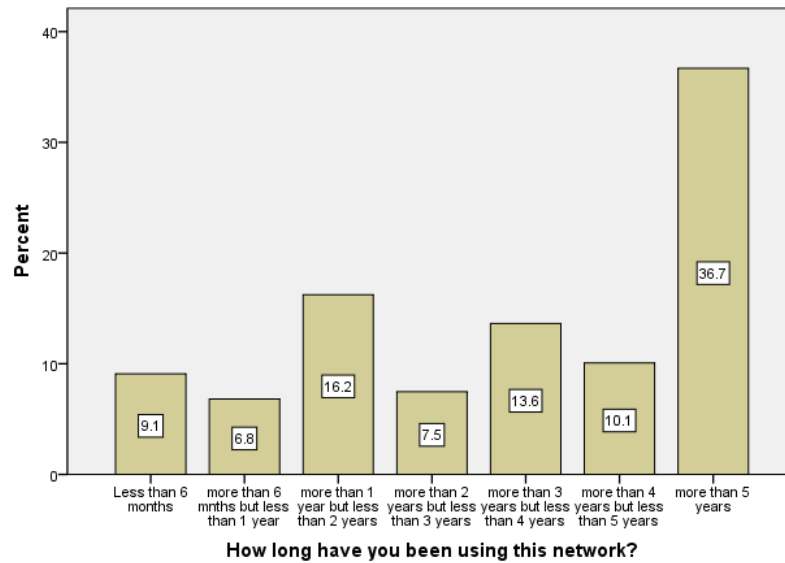


Figure 4.8 Distribution of Period with Network Operators - UKZN

4.4 Mobile telecommunication network operators – Nigeria

There are four major mobile telecommunication network operators in Nigeria. These are Etisalat, Glomobile, Zain/Airtel, and MTN Nigeria. 32.04% of participants were subscribed to MTN Nigeria, 28.48% were subscribed to Glomobile, 21.36% to Etisalat and 18.12% to Zain/Airtel. An interesting finding here is that no participants subscribed to more than one network. Ostensibly, this is attributable to the reason that all mobile telecommunication network operators render identical services which obviates the need for an alternate service.

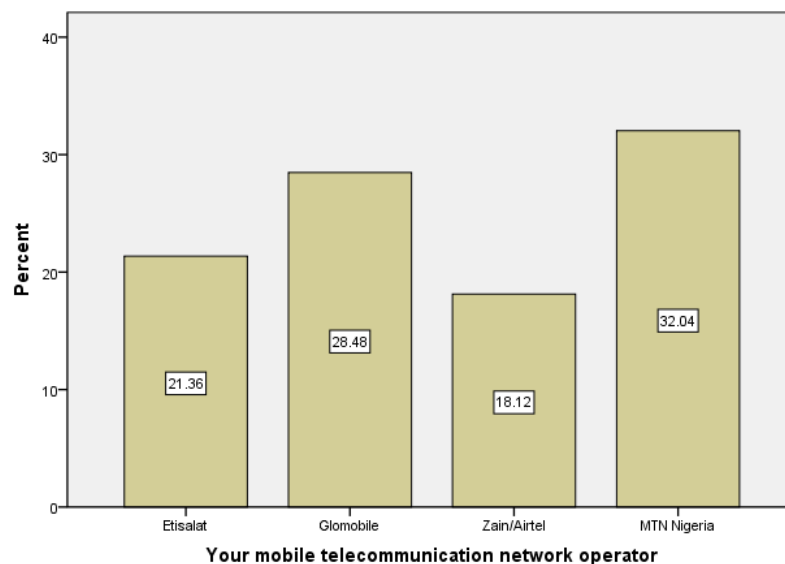


Figure 4.9 Distribution of Network Operators – Nigeria

Duration of Subscription to Mobile Telecommunication Network

The figure below depicts that 26.3% of participants had subscribed to their network operator for more than 1 year but less than 2 years, 22% for more than 2 years but less than 3 years, 15.5% for more than 6 months but less than 1 year, 12.2% for more than 3 years but less than 4 years, 9.5% more than 5 years, 8.2% for less than 6 months. 6.3% of participants subscribed for more than 4 years but less than 5 years. The higher percentages for participants who had subscribed for less than 2 years seem to reflect a common assumption that most students in Nigeria do not have access to mobile phones until their first year at the university.

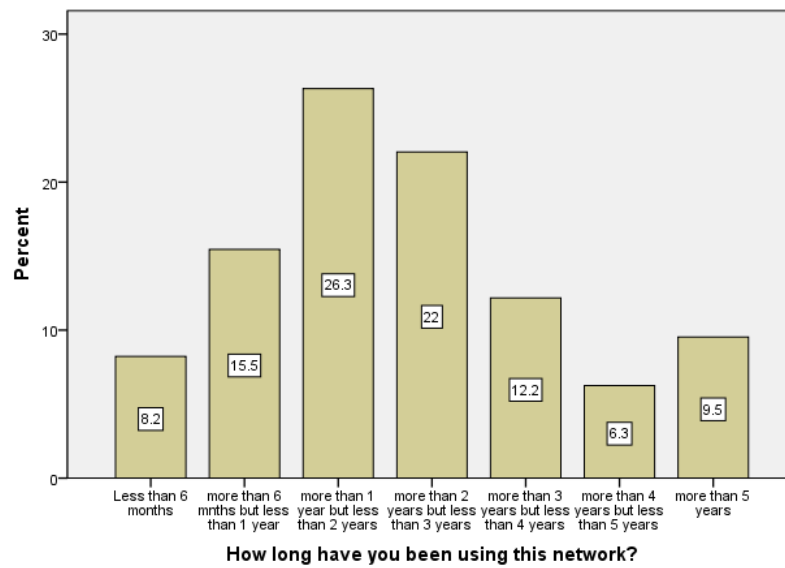


Figure 4.10 Distribution of Period with Network Operators - LASU

4.5 Students' perceptions of mobile telecommunication services – UKZN

Mobile telecommunication network operators offer a range of services through which students could satisfy their academic and social needs. Participants were asked to indicate the mobile telecommunication services that they use. The table below shows the number and corresponding percentage of participants who use each service. The use of each service is measured in relation to all 313 participants at UKZN. An overwhelming majority of students (89.8%) use SMS, followed by 69.6% who use MMS. Voice call is used by 65.8% of participants while 46.6% use data services. 36.1% and 10.9% of students use GPS services and International roaming respectively. 26 students, with the lowest percentage of 8.3% use conference call.

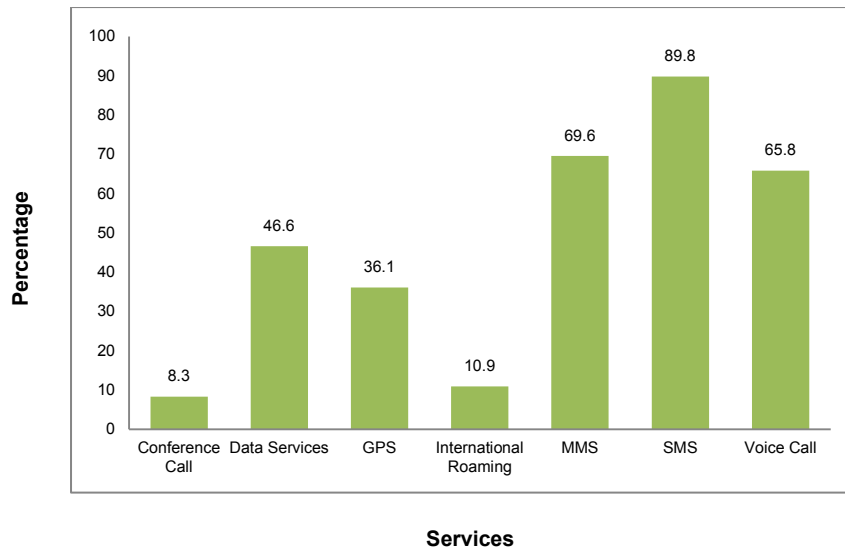


Figure 4.11 Distribution of Mobile Telecommunication Services - UKZN

Participants were also asked to indicate the quality of these services on the mobile telecommunications network. This question was intended to offer insight into how the quality of mobile telecommunication services could affect the activities (academic and social) that students engage in. With respect to each services, participants were required to indicate on a scale of 1 -5 their perceptions of the quality of mobile telecommunication services with the possible answers being *very poor*, *poor*, *average*, *good* and *very good*. The researcher took special cognizance of services that have a direct impact on the academic and social life of students. The assumption is that the higher the quality of the services the more likely that they could enhance the academic and social life of students. A significant number of participants rated data services as of good quality: 41.8% (good) and 22.1 (very good). The same can be said of MMS services, in which case 38.2% and 37.9% rated the services as good and very good respectively. SMS had the highest rating in terms of quality with 34.4% participants indicating that the service was good while 54.6% indicated that the service was very good. Voice call had the third highest rating in which 33% of participants stated that the service was good and 47.5% indicated that it was very good. It can be seen from the table below that participants generally perceived the quality of mobile telecommunication services as of good quality.

Services	Rating (% of respondents)				
	Very poor	Poor	Average	Good	Very good
Conference Call	9.4	4.7	25.8	37.5	22.7
Data Services	4.2	7.5	24.4	41.8	22.1
GPS	4.7	7.9	25.3	35.8	26.3
International Roaming	10.5	7.5	27.8	33.8	20.3
MMS	2.9	3.9	17.1	38.2	37.9
SMS	1.7	0.7	8.6	34.4	54.6
Voice Call	1.5	3.4	14.6	33	47.5

Table 4.1 The Rating of Mobile Telecommunication Services - UKZN

To probe the formation of opinions about the quality of mobile telecommunication services, the researcher required participants to indicate the significance of factors that are thought to determine the quality of services. The responses of participants are presented in the table below which shows that each factor identified is *very significant* in determining the quality of mobile telecommunication services. With reference to all factors, the percentage of participants was higher than 50%. This is an indication that participants perceive these factors as critical to their use of mobile telecommunication services and their potential to enhance or undermine their academic or social agendas.

Factors	Level of significance (% of respondents)				
	Of no significance	Of little significance	Of some significance	Significant	Very significant
Cost/Billing Services	2.1	3.4	13.1	30.2	51.2
Customer Care Services	1.7	5.9	7.6	27.2	57.6
Network Availability	2.4	2.7	7.1	17.3	70.4
Network Stability	1.4	3.1	7.9	21	66.7
User Satisfaction	1.7	2.4	7.2	25.3	63.4
Voice Clarity	1.4	3.5	3.8	30.2	61.1

Table 4.2 Significance of Factors - UKZN

In order to determine the overall perception of the quality of services, participants were asked to identify the challenges that they encountered using of mobile telecommunication services. The table below indicates Yes or No responses to some of the challenges that could impair the use and benefits of mobile telecommunication services. From the table, it is evident that comparatively lower number of participants experienced challenges related to the use of mobile telecommunication services. This confirms the high quality rating of mobile telecommunication services as described in table 4.2 above. The table below shows the Yes or No responses to questions regarding the challenges in the use of mobile telecommunication services.

Challenges	Participants' answers (%)	
	Yes	No
Call drop	15.8	84.2
Delayed SMS delivery	43.09	56.91
Delayed MMs delivery	36.5	63.5
Poor voice quality	22.4	77.6
Low data speed	37.5	62.5
Unstable network	43.09	56.91

Table 4.3 Challenges in the Use of Mobile Telecommunication Services - UKZN

Drawing from the high quality rating of specific mobile telecommunication services as well as comparatively lower number of participants experiencing challenges, it is not surprising that significantly fewer participants (as shown in the figure below) described the overall service provision by mobile telecommunications networks as very poor (4.6%) and poor (8.8%). What this suggest is that overall service provision is deemed to be good.

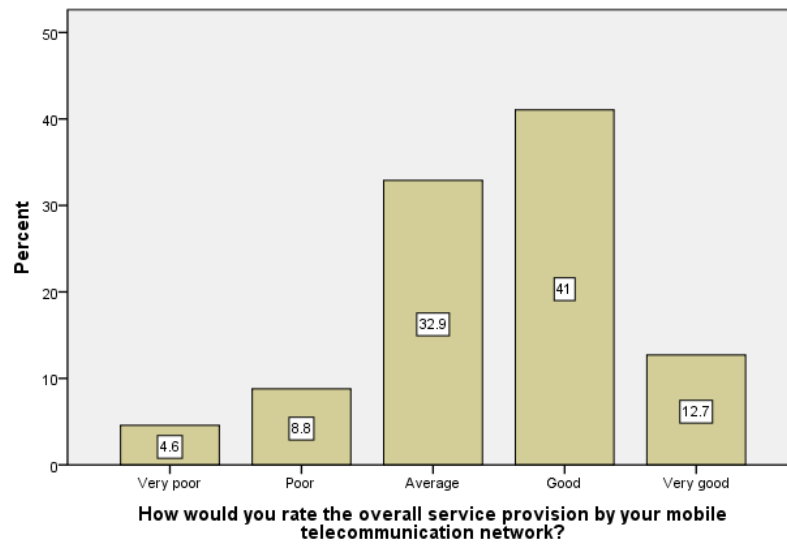


Figure 4.12 Distribution of Overall Service Provision – UKZN

A Z-test is conducted to determine whether the average and good results are significantly different.

How would you rate the overall service provision by your mobile telecommunication network?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	14	4.5	4.6	4.6
	Poor	27	8.6	8.8	13.4
	Average	101	32.3	32.9	46.3
	Good	126	40.3	41.0	87.3
	Very good	39	12.5	12.7	100.0
	Total	307	98.1	100.0	
Missing	System	6	1.9		
Total		313	100.0		

a. Location = Durban

Table 4.4 Frequency Results on the Rating of Overall Service Provision by MNO - UKZN

	Total	Frequency	Proportion
Average	307	101	32.9%
Good	307	126	41.0%
Overall	614	227	36.97%

Table 4.5 Proportion Table for Average and Good Results - UKZN

To test H0: The two proportions are equal

H1: the two proportions are not equal

$$\text{Test Statistic is } Z = \frac{P_{\text{Good}} - P_{\text{Average}}}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{0.41 - 0.329}{\sqrt{0.369 \times 0.631 \left(\frac{1}{307} + \frac{1}{307}\right)}} = 2.097$$

The critical Z value at the 5% significance level is 1.96 so H0 is rejected. The two proportions are significantly different.

In view of the generally positive rating of service provision, most participants found the quality of service by their network operator to be somewhat satisfactory (65.5%) or satisfactory (29%). A tiny fraction of participants (5.5%) described the quality of service by their network operator as not satisfactory.

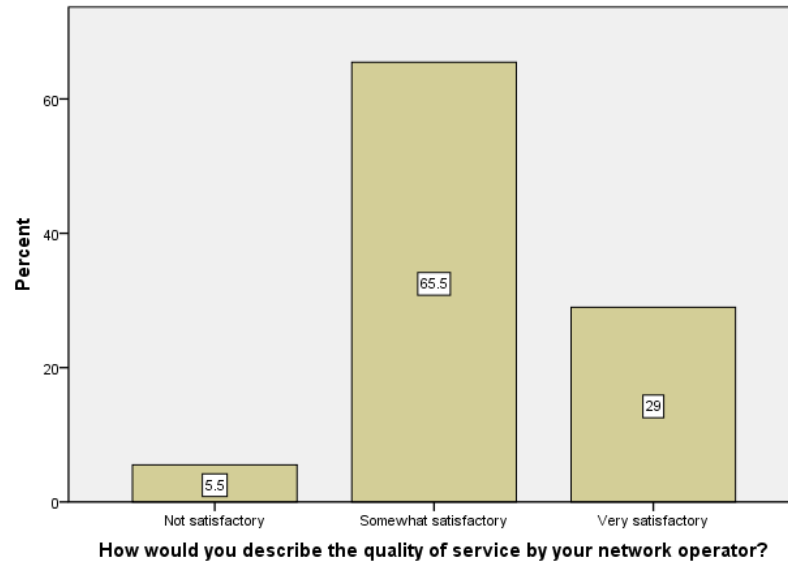


Figure 4.13 Distribution of the QoS by Network Operators - UKZN

It is acknowledged that mobile telecommunication network operators may experience problems that disrupt or make the provision of services difficult. The frequency of such problems may affect user satisfaction and even the fortunes of the operator. They also test the loyalty of users to the network operator. To assess the response and impact of such problems, students were asked to specify what action they would take during cases of persistent poor quality services. The figure below presents the responses of participants to the question. A small number of participants at 8.9% indicated that they would ignore the problem. This presupposes that these participants would do nothing about persistent poor quality services. In the view of others (11.6%) reaction to persistent poor quality service would take the form of complaints to friends. The highest number of participants constituting 41% indicated that they would switch to another network operator. This implies that persistent poor quality service by network operators potentially undermines user loyalty and induces change from one network to another that is perceived as less riddled with service-related problems. Another group of participants (38.6%) would call customer care centre to report persistent service related problems rather than switch from one network operator to another. Whatever the action taken by users it is evident from the study that persistent poor quality service elicits some kind of reaction which does not project a positive image of the network operator.

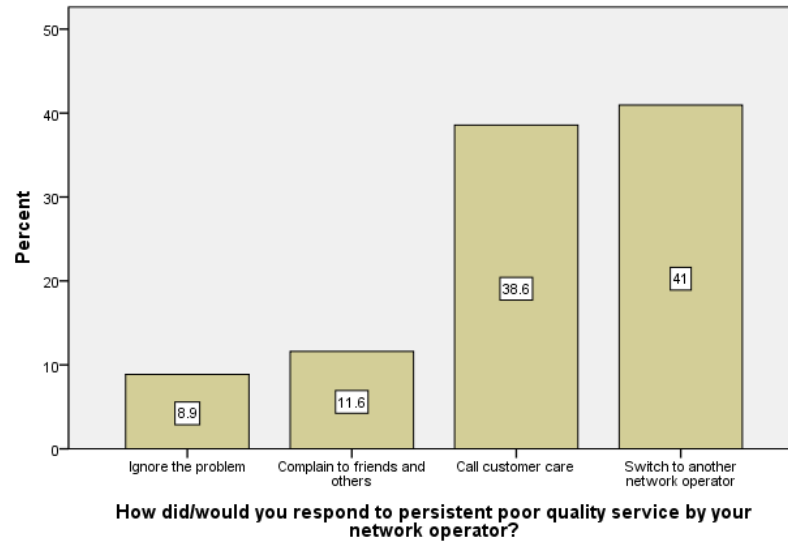


Figure 4.14 Distribution of Persistent Poor QS by Network Operators – UKZN

How did/would you respond to persistent poor quality service by your network operator?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ignore the problem	26	8.3	8.9	8.9
	Complain to friends and others	34	10.9	11.6	20.5
	Call customer care	113	36.1	38.6	59.0
	Switch to another network operator	120	38.3	41.0	100.0
	Total	293	93.6	100.0	
Missing	System	20	6.4		
Total		313	100.0		

a. Location = Durban

Table 4.6 Frequency Results on Persistent Poor Quality Services by MNO – UKZN

	Total	Frequency	Proportion
Call Customer Care	293	113	38.6%
Switch to another network	293	120	41.0%
Overall	586	133	39.8%

Table 4.7 Proportion Table for 38.6% and 41% Results - UKZN

To test H0: The two proportions are equal

H1: the two proportions are not equal

$$\text{Test Statistic is } Z = \frac{P_{\text{switch}} - P_{\text{Call}}}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} = \frac{0.41 - 0.386}{\sqrt{0.398 \times 0.602 \left(\frac{1}{293} + \frac{1}{293}\right)}} = 0.593$$

The critical Z value at the 5% significance level is 1.96 so H0 is NOT rejected since the test statistic is smaller than the critical value. The two proportions are NOT significantly different.

4.6 Students' perceptions of mobile telecommunication services – LASU

A total of 310 first-year IT students at LASU indicated the mobile telecommunication services that they use. As in the case in 4.5 above, the table below shows the number and corresponding percentage of participants who use each service. The use of each service is measured in relation to all participants at LASU. The vast majority of students constituting 92.9% use SMS, followed by the use of MMS at 62.9%. Voice call is used by 59.4% of students surveyed while conference call and data services are used by 54.5% and 52.9% respectively. GPS services and International roaming have the lowest percentage usage of 19.7% and 11.6% respectively.



Figure 4.15 Distribution of Mobile Telecommunication Services - LASU

First-year IT students at LASU were required to indicate the quality of each of the services offered by mobile telecommunications network operators. The same assumptions made in section 4.5 above in respect of services apply here. A number of participants (45.2%) rated the quality of data services as average while 25.3% noted that data services were of good quality and 27.8% deemed the quality of

data services as very good. In the case of MMS services, 34.8% considered the services as average, 30.8% of participants indicated that the quality of MMS services was good and 34.1% noted the service quality as very good. As was the case with participants at UKZN, SMS had the highest quality rating amongst first-year IT students at LASU in which 79.1% of participants responded that SMS service quality was very good. Many participants, comprising 59.1% of those surveyed rated the quality of voice call positively in the category of very good. Positive ratings for mobile telecommunication services were generally higher in the case of UKZN participants than their LASU counterparts. Apparently, this is attributable to the very challenging operational environment within which mobile network providers operate in Nigeria. The environment is characterized by deficient infrastructure and unstable electricity supply but a very huge subscriber base. Thus, the lower percentages of LASU participants vis-à-vis quality ratings in the good and very good categories may be situated in the context of Nigeria’s operational environment.

It can be seen from the table below that participants generally perceived the quality of mobile telecommunication services as of good quality even though the percentages were lower than those obtained from UKZN participants. The exception to the foregoing pertains to the percentage of participants who rated the quality of SMS services as very good.

Services	Rating (% of respondents)				
	Very poor	Poor	Average	Good	Very good
Conference Call	0.5	1.6	68.9	11.5	17.5
Data Services	0	1.8	45.2	25.3	27.8
GPS	0	0.6	59	24.2	16.3
International Roaming	0	1.3	8.2	74.1	16.5
MMS	0	0.3	34.8	30.8	34.1
SMS	0.3	1	4.3	15.3	79.1
Voice Call	0.7	0.3	29.6	10.3	59.1

Table 4.8 The Rating of Mobile Telecommunication Services - LASU

Several factors were identified as crucial to determining the quality of services and participants were required to indicate the significance of these factors in the context of the choices they made above. The responses of participants are presented in the table below. As the table shows, over 90% of participants thought that each factor was *very significant* in determining the quality of mobile telecommunication services. More participants at LASU than at UKZN felt that these determinants were very significant. The table below depicts these participants’ perceptions of the significance of these factors.

Factors	Level of significance (% of respondents)				
	Of no significance	Of little significance	Of some significance	Significant	Very significant
Cost/Billing Services	0.3	0.7	0.7	2.6	95.7
Customer Care Services	0	0	0.3	1.7	98
Network Availability	0	0	0	0.7	99.3
Network Stability	0	0	0	1.3	98.7
User Satisfaction	0	0	0.7	2.3	97
Voice Clarity	0.3	1.3	0.3	1	97

Table4.9 Significance of Factors - LASU

As in the case of UKZN participants, challenges encountered by LASU participants in the usage of mobile telecommunication services serve to determine the perceptions as to the quality of services. In the table that follows, participants' responses in the form of Yes or No to questions about challenges related to the use of mobile telecommunication services are captured to reflect the extent to which they determine the quality of services. The biggest challenge relates to unstable network with 68.5% of participants experiencing this problem. The significance of the problem of network instability is that it affects all other mobile telecommunication services. Perhaps, this explains why majority of LASU participants had lower service quality ratings than their UKZN counterparts.

Challenges	Participants' answers (%)	
	Yes	No
Call drop	11	89
Delayed SMS delivery	21.4	78.6
Delayed MMS delivery	38.3	61.7
Poor voice quality	23.7	76.3
Low data speed	40.58	59.42
Unstable network	68.5	31.5

Table 4.10 Challenges in the Use of Mobile Telecommunication Services - LASU

Drawing from the comparatively lower quality rating of specific mobile telecommunication services as well as comparatively higher number of participants experiencing the problem of network instability, it is intriguing that significant numbers of LASU participants described overall service provision by mobile telecommunication networks as good (38.5%) and very good (36.2%). A combination of both percentages gives 74.7% of participants who ranked the overall service provision as good. Another group of participants constituting 23.6% classified overall service provision in the average category while a very small percentage (1.6%) of participants ranked overall service provision as poor. It is instructive to note that the overwhelmingly positive ranking of service provision is situated in the context of extremely challenging operational environment of mobile telecommunication networks and

challenges associated with service provision. The figure below presents participants' articulation of overall service provision.

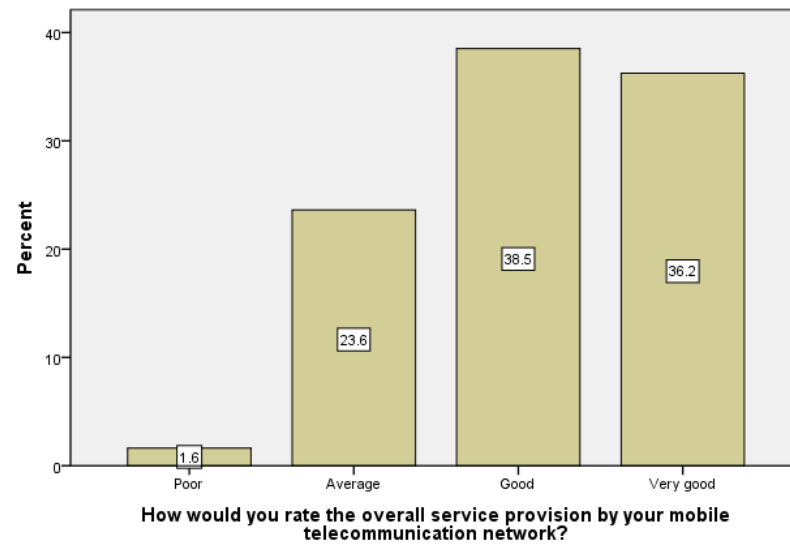


Figure 4.16 Distribution of Overall Service Provision - LASU

Against the backdrop of the rating of service provision and the challenges identified, participants rated the quality of service by their network operator as shown in the figure below. An overwhelming majority of participants making up 82.2% of those surveyed in LASU considered the quality of service by their network operator as somewhat satisfactory. A small number of participants, at 15.5%, described the quality of service as very satisfactory. A minute number of participants (2.7%) regarded the quality of service by their network operator as not satisfactory. It is trite to say that the highest number of participants in the somewhat satisfactory category takes cognisance of the challenges faced by mobile network operators and users as well as the provision of service despite the challenges.

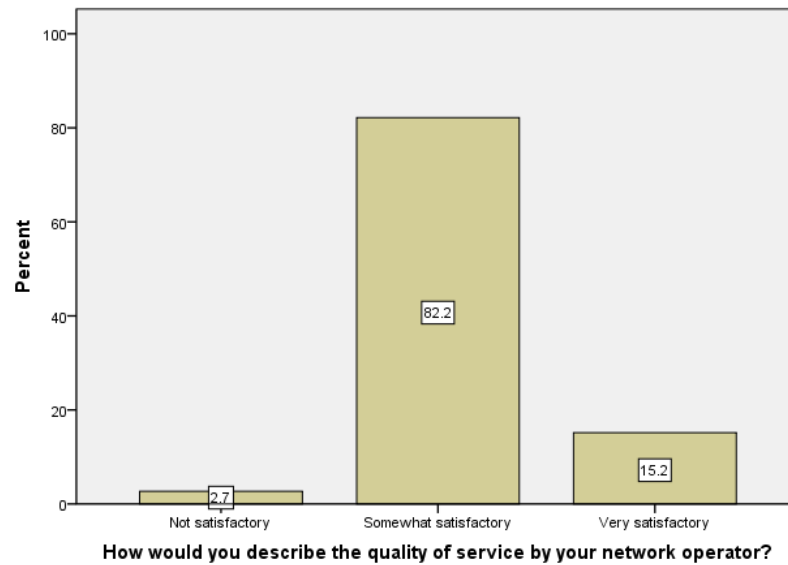


Figure 4.17 Distribution of the QoS by Network Operators - LASU

The same assumptions made in section 4.5 about user satisfaction and loyalty to mobile network operators are applicable here. To assess the response and impact of such problems, participants were asked to specify what action they would take in cases of persistent poor quality services. The figure below depicts the varying responses of participants. As the figure shows, participants would hardly ignore the problem. As opposed to 8.9% of UKZN participants who would ignore the problem, only 0.7% of LASU participants would do so. Even the number of LASU participants who would complain to friends and others (2.7%) is lower when compared to those who would take the same action amongst UKZN participants (11.6%). Only 15.7% of LASU participants would switch to another mobile telecommunication network in the face of persistent poor quality services, comparatively lower number given that 41% of UKZN participants would do so. The figure below indicates that the highest number of LASU participants (81%) would respond to the problem by calling customer care to report persistent service related problems. This is markedly different from the dominant response of UKZN participants which would be to switch to another mobile network operator. The reasoning and the dominant response amongst LASU participants which would be to call customer care rather than switch network could be attributed to the fact that all mobile telecommunications network are affected by the same operational challenges and that there are no significant differences in level and quality of service delivery. In other words, switching from one mobile telecommunication network to another may not materially improve user experience and enjoyment of mobile telecommunication services.

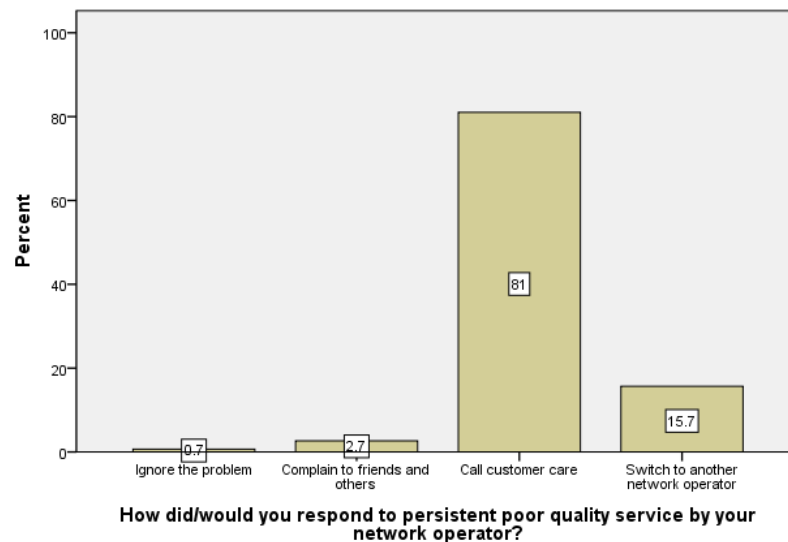


Figure 4.18 Distribution of Persistent poor QS by Network Operators - LASU

4.7 Impact of mobile telecommunication services on students' academic life – UKZN

This section presents UKZN participants' articulation of the impact of mobile telecommunication services on their academic life. In order to gain insight into the impact that these services have on students' academic life, the study considers participants' use of mobile telecommunication services for academic purposes. The frequency at which participants make use of these mobile telecommunication services in their performance of academic functions is also considered.

First, students were asked to state the extent to which they considered mobile telecommunication services as critical to their academic activities. This question was intended to find out if participants recognized the value or relevance (if any) of mobile telecommunication services to the performance of academic work. In other words, do mobile telecommunication services lend themselves to the execution of academic tasks? It is essential to find out how students in IT-related disciplines think about the interface between technology and education. In this case, students had the opportunity to indicate the relevance of mobile telecommunication services to academic activities. The figure below presents participants' understanding of the extent to which mobile telecommunication services are critical to the performance of academic activities. More than half of the number of participants (60.1%) considers mobile telecommunications as somewhat critical or necessary for academic activities. A group of students constituting 22.1% of participants consider mobile telecommunications as critical or very critical for academic activities. On the other hand, 17.8% of participants indicated that mobile telecommunications were not critical or necessary at all for academic activities. The overarching perception is that mobile telecommunications offer some utility to the performance of academic tasks.

There is a recognition or an acknowledgement of the usefulness of mobile telecommunications in teaching and learning.

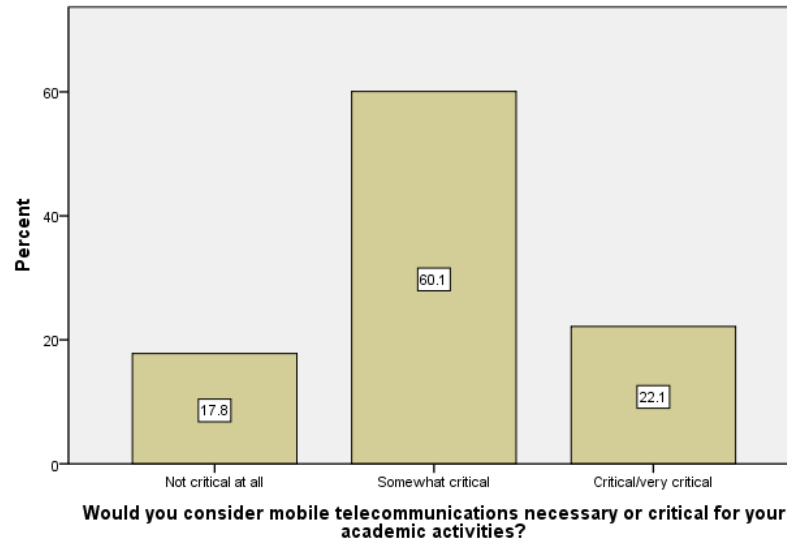


Figure 4.19 Relevance of Mobile Telecoms to Academic Activities – UKZN

UKZN first-year IT students were asked to identify the academic activities that they use mobile telecommunication services for and to subsequently identify the frequency at which they use the services in order to enhance their academic agendas. The table below shows the different academic activities that participants use mobile telecommunication services for. Finding new information is the greatest attraction that mobile telecommunication services have for UKZN participants. As the table shows, 64.4% of participants from UKZN use mobile telecommunication services for the purpose of finding new information. The second highest attraction that mobile telecommunication services have is for research as 58.31% of participants use mobile telecommunication services for this purpose. According to 55.59% of participants, mobile telecommunication services enabled them to obtain their exam results. The use of mobile telecommunication services for academic activities such as communicating with tutors/mentors (42.9%) as well as communicating with lecturers (28%) ranked lowest amongst UKZN participants. The reason for this is not difficult to fathom, given that tutors and lecturers in particular do not generally provide their cell phone numbers to students. The fact that students use mobile telecommunication services for research, finding new information, sharing information and obtaining exam results is significant in that these are important academic activities especially for students in IT-related disciplines.

Academic Activities	Participants' answers (%)	
	Yes	No
Research	58.31	41.69
Finding new information	64.4	35.6
Information sharing	54.4	45.6
Communicating with lecturers	28	72
Communicating with tutors/mentors	42.9	57.1
Getting exam results	55.59	44.41

Table 4.11 Academic Activities - UKZN

The importance of the use of mobile telecommunication services for academic activities from the perspective of participants is reflected in the figure below, which indicates the frequency of the use of mobile telecommunication services for academic purposes. The highest number of participants (37.9%) use mobile telecommunication services for academic purposes *every day*. Furthermore, in terms of frequency 18.6% of participants use mobile telecommunication services for academic activities *every week*. Mobile telecommunication services are used for academic purposes *once in every two weeks* by 7.8% of participants. About a quarter of participants that is 26.5% *rarely* use mobile telecommunication services for academic purposes while 9.2% *never* use mobile telecommunication services for their academic activities. Having said that, more than half of the participants (taking into consideration those in the everyday and every week categories) use mobile telecommunication services regularly for their academic work.

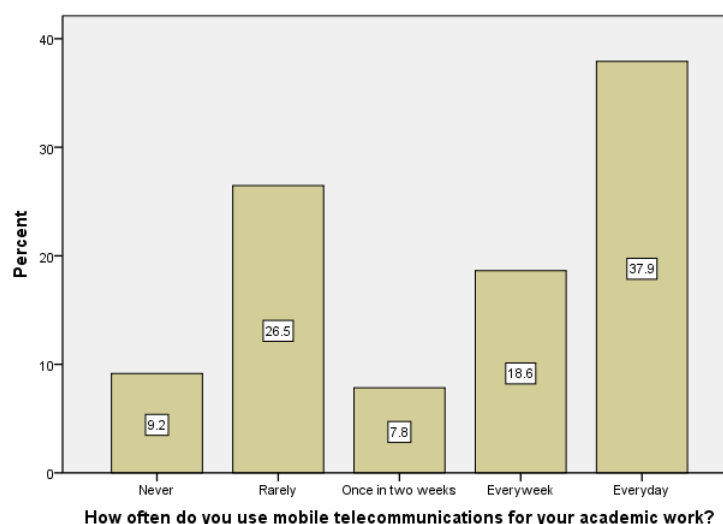


Figure 4.20 The Often Use of Mobile Telecoms for Academic Activities - UKZN

In light of the foregoing, it is necessary to find out from participants' perspective the impact that mobile telecommunication services have on their academic life. The figure below provides pertinent

information on the impact of mobile telecommunication services on participants' academic endeavour. The description of the findings in this aspect of the study is presented according to the sequence of impact assessment as portrayed in the figure below. The lowest number of participants (4.1%) described the impact of the use of mobile telecommunication services on their academic endeavour as overwhelmingly negative. Next is another group of participants (23.7%) who described the impact as somewhat negative. It should be said that negative impact assessment is underscored by the potential and actual drawbacks related to the usage of mobile telecommunication services namely possible disruptions to academic routine and distractions as well as addiction to technology. The highest number of participants (43.7%) did not know the impact that mobile telecommunication services had on their academic endeavour. It may be said that students in this category could not or had yet to establish a correlation or interface between academic performance/outcomes and their use of mobile telecommunication services for academic purposes. The third highest number of participants (23.4%) identified the impact of the use of mobile telecommunication services on their academic endeavour as somewhat positive. The last group of students in terms of sequence, representing 5.1% of participants indicated that the impact of mobile telecommunication services on their academic endeavour is overwhelmingly positive. For the students in these latter categories (Somewhat positive and overwhelmingly positive) there is a beneficial correlation between the use of mobile telecommunication services for academic purposes and academic performance. It is noted therefore that the use of mobile telecommunication services for academic purposes, while avoiding the potential drawbacks, may engender positive outcomes.

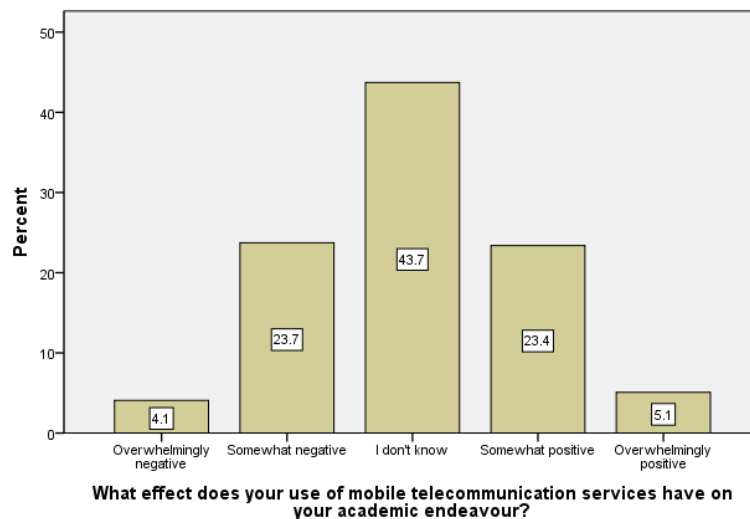


Figure 4.21 The Effect of Mobile Telecoms on Academic Endeavours - UKZN

4.8 Impact of mobile telecommunication services on students' social life – UKZN

This section unpacks UKZN participants' articulation of the impact of mobile telecommunication services on students' social life. In what follows, the study presents participants' description of the extent to which they considered mobile telecommunication services as necessary or critical to social interactions. Furthermore, the study highlights the different social activities that participants use mobile telecommunications for. Next the study depicts the frequency of the use of mobile telecommunications for such social activities. Finally, participants' review of the overall effect of mobile telecommunications on social life is presented.

The question as to the necessity of mobile telecommunication services to social interactions was posed to establish the relevance that participants attached to technology in enhancing social life. The figure below shows how participants perceive mobile telecommunications as critical or not to social activities. The highest percentage of students (50.5%) thought that mobile telecommunications were somewhat critical for social activities. Another 38.8% of participants deemed mobile telecommunications as critical or very critical for social activities. The third category of students representing 10.7% of participants felt that mobile telecommunications were not critical at all. The dominant view is that mobile telecommunications were necessary or critical for social activities. The preponderance of opinion in the direction of positive correlation between mobile telecommunications and social activities is shown in the figure below.

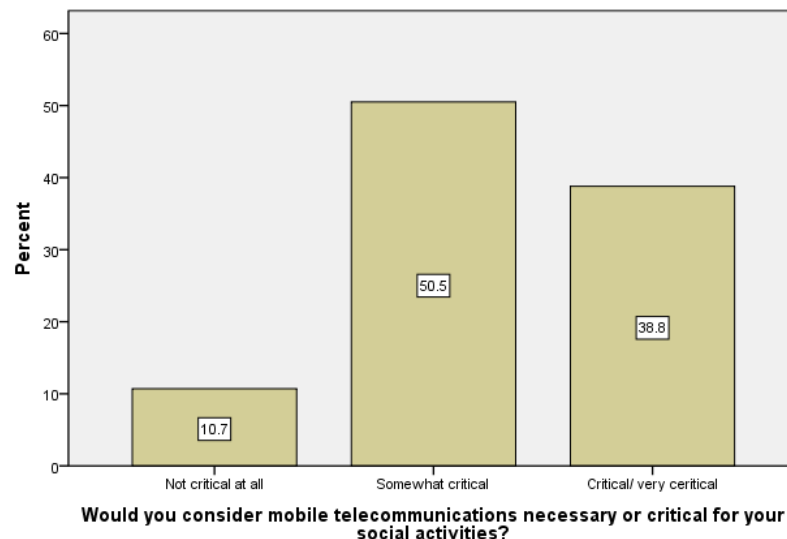


Figure 4.22 Relevance of Mobile Telecommunication Service to Social Activities - UKZN

UKZN participants were asked to indicate the social activities that they use mobile telecommunications for. The table below exhibits the social activities for which students use or do not use mobile

telecommunication services. While 63.7% of participants make new friends through the use of mobile telecommunications, the foremost social activities that participants use mobile telecommunications for is keeping in touch with family and friends. The percentage of participants at 69.3% is the same with reference to both social activities namely keeping in touch with family and keeping in touch with friends. The second significant social activity is indicated by 66.7% of participants as social networking. The high percentage of participants in this category suggests that mobile telecommunications as a tool for social networking may serve the purpose of keeping in touch with family and friends. Mobile telecommunications also serve the purpose of entertainment, given that 42.24% of participants use mobile telecommunications to download Mp3s and videos. Only a few participants (8.9%) use mobile telecommunications for shopping. This is not a curious finding in the sense that participants are students, the majority of whom are dependent on financial support from parents or are funded through scholarships/bursaries. As such they may not be able to engage in business transactions using mobile telecommunication platforms such as eWallet.

Social Activities	Participants' answers (%)	
	Yes	No
Social networking	66.7	33.3
Shopping	8.9	91.1
Keeping in touch with family	69.3	30.7
Making new friends	63.7	37.3
Keeping in touch with friends	69.3	30.7
Downloading (MP3s & Videos)	42.24	57.76

Table 4.12 Social Activities - UKZN

The relevance of mobile telecommunications to social interaction is implied in the figure below which depicts the frequency of the use of mobile telecommunication services for social activities. Participants' responses are described using the sequence in the figure below. A few participants (3.7%) never use mobile telecommunications for social activities. A further 15.4% of students surveyed rarely use mobile telecommunications for social activities. A small group of students representing 3.3% of participants use mobile telecommunications for social activities once in every two weeks. The figure shows that 8.7% of participants use mobile telecommunications for social activities every week. The highest number of participants (68.9%) use mobile telecommunication services for social activities *every day*. This follows logically from the table above in which the highest number of participants use mobile telecommunications to keep in touch with family and friends. Approximately two-thirds of participants (those in the everyday and every week categories) use mobile telecommunication services regularly for social activities. Therefore, it can be said that there is a sense in which mobile telecommunications contribute to social interaction.

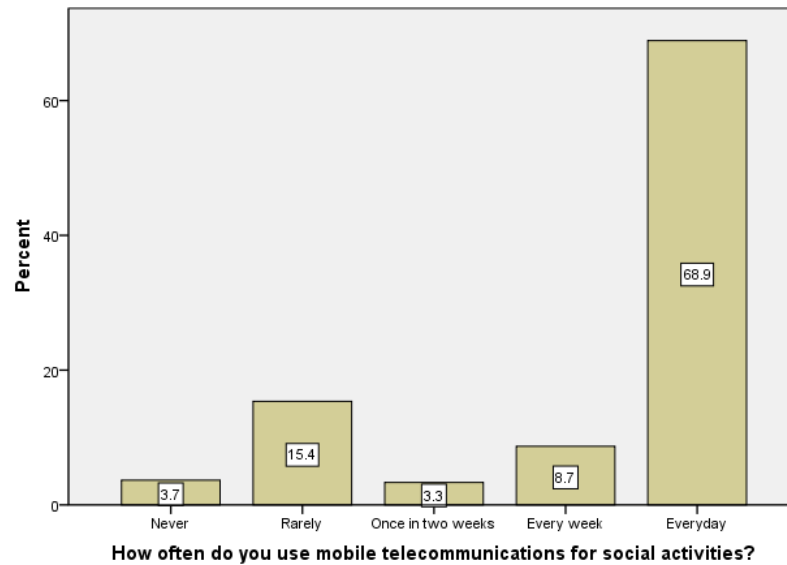


Figure 4.23 The Often Use of Mobile Telecoms for Social Activities - UKZN

In view of the frequency of the use of mobile telecommunications for social activities, the study considers participants’ articulation of the impact of mobile telecommunications on their social life. The figure below describes the impact assessment from participants’ perspectives. The description of the findings in this aspect of the study is presented according to the sequence of impact assessment as portrayed in the figure below. The lowest number of participants (2.3%) described the impact of the use of mobile telecommunication services on their social life as overwhelmingly negative. This is followed by the group of participants (9.7%) who described the impact as somewhat negative. It should be said that negative impact assessment is underscored by the potential and actual drawbacks associated with the use of mobile telecommunication services namely possible impairment of interpersonal physical contact and distractions as well as addiction to technology. Another group of students representing 23.8% of participants did not know the impact that mobile telecommunication services had on their social life. The highest number of participants (49.3%) identified the impact of the use of mobile telecommunication services on their social life as somewhat positive. The last group of students in terms of sequence, representing 14.8% of participants indicated that the impact of mobile telecommunication services on their social life is overwhelmingly positive. It can be said that students in the last two categories (Somewhat positive and overwhelmingly positive) implied positive correlation between the use of mobile telecommunication services for social activities and improved social interactions.

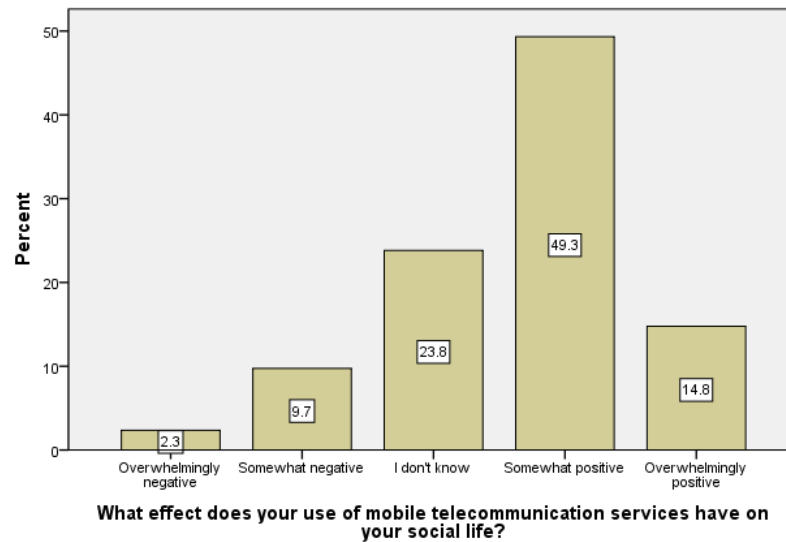


Figure 4.24 The Effect of Mobile Telecommunication Services on Social Life - UKZN

4.9 Impact of mobile telecommunication services on students’ academic life – LASU

This section also presents LASU participants’ articulation of the impact of mobile telecommunication services on their academic life. The study reflects on participants’ use of mobile telecommunication services for academic purposes as well as considering the frequency at which participants make use of these mobile telecommunication services in their academic performance.

To start with, LASU participants were asked to state the extent to which they considered mobile telecommunication services as critical to their academic activities. This question was intended to find out if participants recognized the value or relevance (if any) of mobile telecommunication services to the performance of academic endeavour. LASU students had the chance to point out the significance of mobile telecommunication services to academic activities. The figure below presents participants’ understanding of the extent to which mobile telecommunication services are critical to the performance of academic activities. A high number of LASU participants (47%) consider mobile telecommunications as not critical at all for academic activities. Another group of students constituting 39.5% of participants consider mobile telecommunications as somewhat critical or very critical for academic activities. Lastly, 13.5% of participants indicated that mobile telecommunications were critical or very critical for academic activities. The combination of participants who indicated that mobile telecommunications are somewhat critical and very critical constituted a total of 53%. This is also an acknowledgement of the usefulness of mobile telecommunications in teaching and learning.

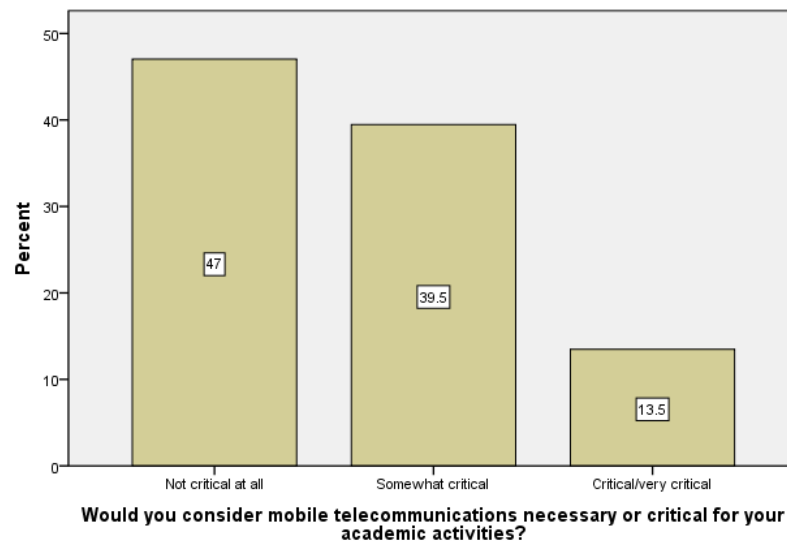


Figure 4.25 Relevance of Mobile Telecoms to Academic Activities – LASU

The same questions were asked in LASU amongst the first-year IT students in respect to identifying the academic activities that they use mobile telecommunication services for and as well identify the frequency at which they use the service in order to enhance their academic agendas. The table below depicts the different academic activities that LASU participants use mobile telecommunication services for. Communicating with lecturers is the greatest attraction that mobile telecommunication services have for participants in LASU. As it depicts from the table, 87.2% of participants from LASU use mobile telecommunication services to communicate with their lecturers. The reason for this is because lecturers in LASU provide their cell phone numbers to students. The second greatest attraction that mobile telecommunication services have is for information sharing as 79.9% of LASU participants use mobile telecommunication services for this purpose. Third position attraction that mobile telecommunication services have is finding new information as 68.9% of participants in LASU use mobile telecommunication services for this purpose. About 50.809% of participants indicated that they use mobile telecommunication services for their research works, another 40.33% of participants use mobile telecommunication services to communicate with tutors/mentors and a very minute amount of participants with 10.5% indicated that they use mobile telecommunication services to get their exam results. This shows that participants in LASU do not use mobile telecommunication services to obtain their exam results as a result of lack of infrastructural amenities. From the result gathered in LASU, it shows that students use mobile telecommunication services to communicate with their lecturers, find new information, share information which are significant to academic activities.

Academic Activities	Participants' answers (%)	
	Yes	No
Research	50.809	49.191
Finding new information	68.9	31.1
Information sharing	79.9	20.1
Communicating with lecturers	87.2	12.8
Communicating with tutors/mentors	40.33	59.67
Getting exam results	10.5	89.5

Table 4.13 Academic Activities - LASU

Another important use of mobile telecommunication services for academic activities from the perspective of participants is reflected in the figure below. It indicates the frequency of the use of mobile telecommunication services for academic purposes in LASU. A number of participants (48.9%) *rarely* use mobile telecommunication services for academic activities. Over a quarter of participants that is 34% use mobile telecommunication services for academic purpose *every day*. Furthermore, in terms of frequency 8.4% of participants use mobile telecommunication services *every week* for academic activities. Another group with 7.8% participants also use mobile telecommunication services for academic activities *once in two weeks* and only 1% of participants *never* use mobile telecommunication services for academic activities. Taking into consideration, those in the category of *every day*, *every week* and *once in two weeks* constituted over half of the participants. The total amount of those in that category (50.2%) use mobile telecommunication services regularly for their academic work.

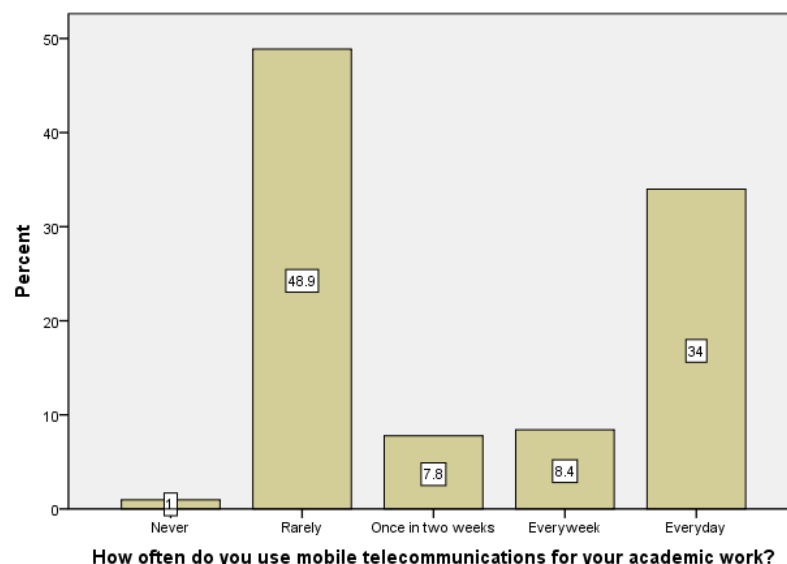


Figure 4.26 The Often Use of Mobile Telecoms for Academic Activities - LASU

The figure below provides relevant information on the impact of mobile telecommunication services on participants' academic endeavour in LASU. It is necessary to find out the impact of mobile telecommunication services have on participants' academic endeavour based on participants' perceptions. The description of the findings in this aspect of the study is presented according to the sequence of impact assessment as portrayed in the figure below. Only 1.3% of participants described the impact of the use of mobile telecommunication services on their academic endeavour as overwhelmingly negative. Next is another group of participants (14.4) who described the impact of mobile telecommunication services on their academic endeavour as somewhat negative. The lowest number of students with only 1% of participants did not know the impact that mobile telecommunication services had on their academic endeavour. It is said that participants in this category could not or had yet to establish a correlation between academic performance and their use of mobile telecommunication for their academic purposes. A very huge and the highest number of students with 77.5% of participants identified the impact of the use of mobile telecommunication services on their academic endeavour as somewhat positive. The last group of participants in terms of sequence, representing 5.9% of participants indicated that the impact of mobile telecommunication services on their academic endeavour is overwhelmingly positive. Putting into consideration, the students in the category of somewhat positive and overwhelmingly positive. There is a positive relationship between the use of mobile telecommunication services for academic purposes and academic performance. It is considered that the use of mobile telecommunication services for academic purposes produced positive impacts.

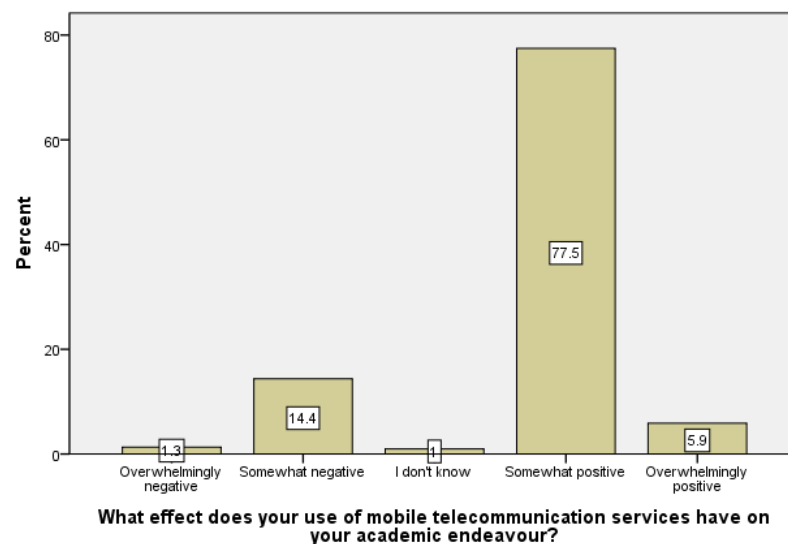


Figure 4.27 The Effect of Mobile Telecoms on Academic Endeavours - LASU

4.10 Impact of mobile telecommunication services on students' social life – LASU

This section unfolds LASU participants' articulation of the impact of mobile telecommunication services on students' social life. In order of presentation, the study presents participants' description of the extent to which they considered mobile telecommunication services as necessary or critical to social interactions. The study outlines the different social activities that participants use mobile telecommunications for and also depicts the frequency of the use of mobile telecommunications for such social activities. Lastly, the assessment of participants in LASU based on the overall impact of mobile telecommunications on their social life is presented.

The figure below shows how participants perceive mobile telecommunications as critical or not to social activities. The question as to whether it is necessary to use mobile telecommunication services to interact socially was posed on participants to establish the relevance that participants attached to technology in enhancing their social life. The highest number of students with 44.2% thought that mobile telecommunications were somewhat critical for social activities. Another 39.3% of participants reckoned mobile telecommunications were not critical at all for social activities. The last group of students (16.5%) thought mobile telecommunications were critical or very critical for social activities. The overriding view is that mobile telecommunications were necessary or critical for social activities putting into consideration the participants in the categories of somewhat critical and critical/very critical with an overall amount of 60.7% of participants.

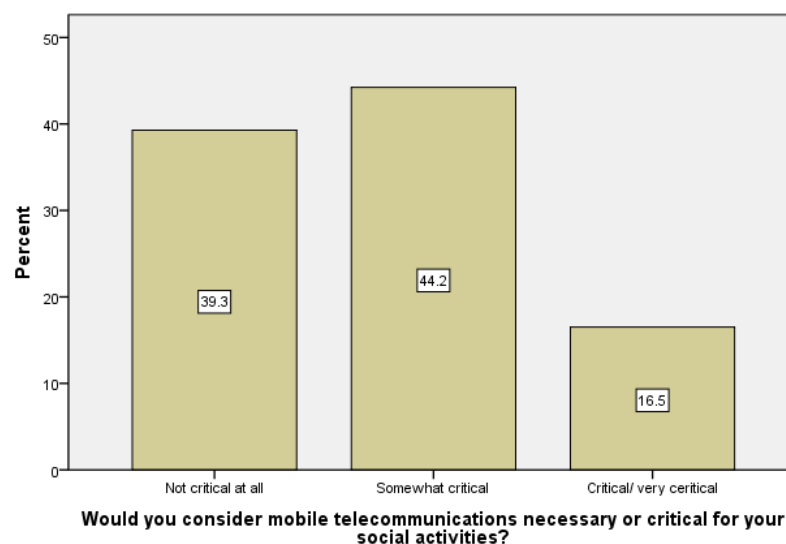


Figure 4.28 Relevance of Mobile Telecommunication Service to Social Activities - LASU

LASU participants were asked to indicate the social activities that they use mobile telecommunications for. The table below shows the social activities for which students use or do not use mobile

telecommunication services. As compared to their UKZN counterparts, 36.4% of LASU participants make new friends through the use of mobile telecommunications and a high percentage of 85.5% of participants keep in touch with friends through the use of mobile telecommunications. The highest percentage of students (95.1%) use mobile telecommunications to keep in touch with family. The third highest percentage of students constituting 45.6% suggests the use of mobile telecommunications for social networking. Only a very few participants (30.9%) use mobile telecommunications for downloading Mp3s and multimedia videos while the smallest amount of students constituting 9.4% of participants indicated their use of mobile telecommunications for shopping. As indicated earlier, majority of the students that participated in the study are either funded by parents or through scholarships/bursaries. So they may not have the ability to engage in mobile payments but it is significant that they engage in social activities by keeping in touch with family and friends through the use of mobile telecommunications.

Social Activities	Participants' answers (%)	
	Yes	No
Social networking	45.6	54.4
Shopping	9.4	90.6
Keeping in touch with family	95.1	4.9
Making new friends	36.4	63.6
Keeping in touch with friends	85.7	14.3
Downloading (MP3s & Videos)	30.9	69.1

Table 4.14 Social Activities - LASU

The figure below depicts the frequency of the use of mobile telecommunication services for social activities and the relevance of mobile telecommunication s to social interaction is implied. The smallest percentage of participants (1.3%) never use mobile telecommunications for social activities. A quarter (25.2%) of participants rarely use mobile telecommunications for social activities. A small group of students representing 6.6% of participants use mobile telecommunications for social activities once in every two weeks. A further 9.6% of participants use mobile telecommunications services for social activities every week. The highest percentage of students with 57.1% of participants use mobile telecommunication services for social activities every day. Referring to the table above where the highest number of participants use mobile telecommunications to keep in touch with family and friends. Almost two-third of participants (those in the everyday and every week categories) use mobile telecommunication services regularly for social activities. it is evidence that there is sense in which mobile telecommunication contribute to social interactions.

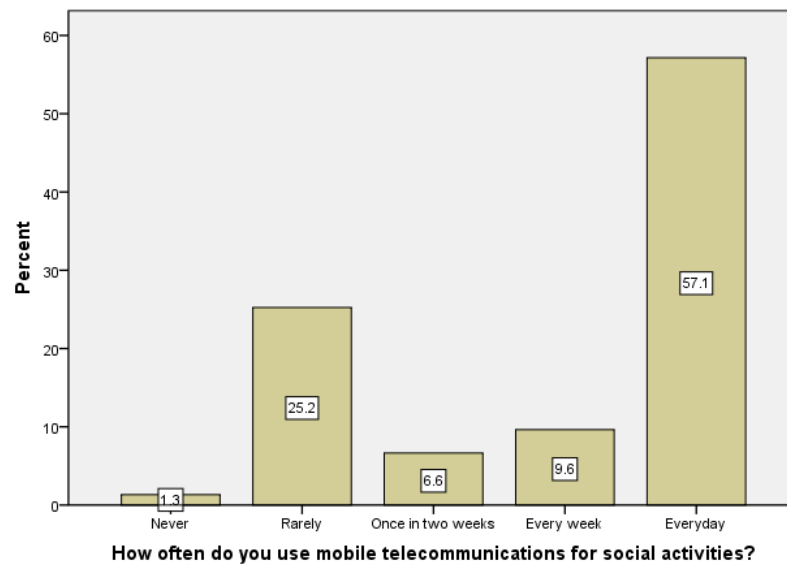


Figure 4.29 The Often Use of Mobile Telecoms for Social Activities - LASU

In the light of the frequency of the use of mobile telecommunications for social activities, the study considers participants articulation of the impact of mobile telecommunications on their social life. The figure below depicts the impact assessment from participants’ perspectives. The description of findings is represented according to the sequence of impact assessment as portrayed in the figure below. A small amount of students (0.7%) described the impact of mobile telecommunication services on their social life as overwhelmingly negative. It is followed by the group of participants (3.6%) who described the impact of mobile telecommunication services as somewhat negative. Having said that negative impact assessment is underscored by the potential and actual drawbacks associated with the use of mobile telecommunication services namely possible impairment of interpersonal physical contact and distraction as well as addiction to technology. The smallest group of students representing 0.3% of participants did not know the impact that mobile telecommunication services have on their social life. The highest number of students (48%) described the impact of the use of mobile telecommunication services as somewhat positive. The last group of students in terms of sequence with 47.4% of participants identified that the impact of mobile telecommunication services on their social life is overwhelmingly positive. It can be said that participants in the last two categories (Somewhat positive and overwhelmingly positive) implied positive correlation between the use of mobile telecommunication services for social activities and improved social interactions.

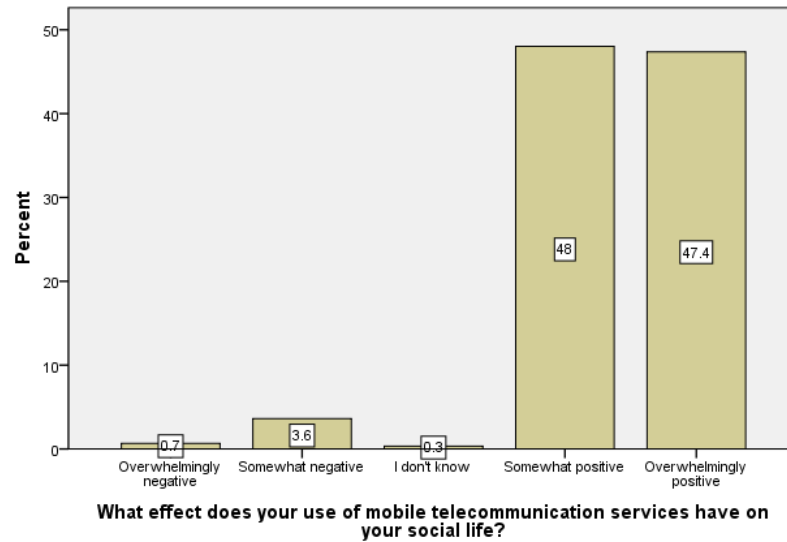


Figure 4.30 The Effect of Mobile Telecommunication Services on Social Life - LASU

4.11 Conclusion

In this chapter, research findings in the form of participants’ articulation of responses to research questions were presented. Findings from the survey showed the different mobile telecommunication networks that UKZN and LASU students use as well as their level of loyalty to the mobile telecommunication network operators. The chapter also identified the different mobile telecommunication services that students use for their academic and social activities. Findings in terms of experiences and perceptions of students regarding the impact of mobile telecommunication services on their academic and social life were also described. The next chapter evaluates the research findings, presents the cross-national analysis of research results and concludes the thesis.

Chapter 5

EVALUATION OF RESEARCH FINDINGS

5.1 Introduction

This final chapter of thesis evaluates the research findings presented in the previous chapter. Given the comparative perspective of the study, this chapter deals with the cross-national analysis of salient aspects of the study with reference to participant's responses from both UKZN and LASU.

5.2 Significance of research findings

The evaluation of research findings is done in the context of the research questions using inferential statistics mainly in the form of cross-tabulations and Chi-Square tests. These means of analysis enable the understanding of the significance of the variables and their influence on participant's perceptions. Therefore, the responses of participants are cross-tabulated and Chi-Square tests are used to establish the significance of factors that could offer answers to the main research questions. According to Haggard, (Haggard, 1958) a Cross-tabulation is the procedure with which a table of two or more category variables is produced, in order to compare the incidence of one characteristics against the other. If there is no association then (p is greater than 0.05) it means there is no evidence of bias. A low p -value indicates rejection of the null hypothesis and in this case implies bias.

The overriding question that the study seeks to address is the perception of first-year IT students about mobile telecommunication services. In order to understand the perceptions, participants were asked to state the impact of mobile telecommunication services on both their academic and social life. With reference to the impact that mobile telecommunication services have on students' academic life, a number of factors were taken into consideration. Some of these factors include the use of mobile telecommunication services for a range of academic activities. In the final analysis, participants' assessment of the impact of mobile telecommunication services on their academic life is summed up in a few categories that may be broadly portrayed as either negative or positive. An inferential analysis of this research sub-question pertaining to the effect of mobile telecommunication services on students' academic life is presented in tables 5.1 and 5.2 below. In line with the definition of Cross-tabulation above, significance is established where $p \leq 0.05$.

Crosstab

Count		What effect does your use of mobile telecom services have on your academic endeavour?					Total
		Overwhelmingly negative	Somewhat negative	I don't know	Somewhat positive	Overwhelmingly positive	
Location	Durban	12	70	129	69	15	295
	Lagos	4	44	3	237	18	306
	Total	16	114	132	306	33	601

Table 5.1 Cross-tabulation Results on Effect of Telecom Services on Academic Endeavours

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	222.584	4	.000
Likelihood Ratio	262.134	4	.000
Linear-by-Linear Association	84.417	1	.000
N of Valid Cases	601		

Table 5.2 Chi-Square Tests on Effect of Telecom Services on Academic Endeavours

As can be seen from the tables above, data from both UKZN and LASU indicate a significant correlation between mobile telecommunication services and academic life. From these tables, it can be inferred that a significant number of first-year IT students of both Universities perceive mobile telecommunication services to have positive impact on their academic life. This perception is due to the usefulness of mobile telecommunication services to performing a number of academic tasks.

Still on first-year IT students' perception of mobile telecommunication services, the other sub-question relating to the effect of mobile telecommunication services on students' social life also engendered useful data which is Cross-tabulated and subjected to Chi-Square tests in tables 5.3 and 5.4 below.

Crosstab

		What effect does your use of mobile telecommunication services have on your social life?				Total	
		Overwhelmingly negative	Somewhat negative	I don't know	Somewhat positive		Overwhelmingly positive
Location	Durban	7	29	71	147	44	298
	Lagos	2	11	1	146	144	304
Total		9	40	72	293	188	602

Table 5.3 Cross-tabulation Results on Effect of Mobile Telecom Services on Social Life

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	132.082	4	.000
Likelihood Ratio	156.594	4	.000
Linear-by-Linear Association	97.282	1	.000
N of Valid Cases	602		

Table 5.4 Chi-Square Tests on Effect of Mobile Telecom Services on Social Life

The tables above indicate significance of mobile telecommunication services on first-year IT students' social life. This perception is based on the reliance of first-year IT students on mobile telecommunication services for activities such as social networking and keeping in touch with friends and family.

Apart from the above research questions, the study seeks to identify those factors that determine the quality of mobile telecommunication services. From the data generated from responses of participants, it is evident that factors such as cost/billing services, customer care services, network availability, network stability, user satisfaction and voice clarity determine the quality of mobile telecommunication services. The tables that follows indicates the significant of these factors.

Crosstab

Count		Cost/billing Services					Total
		Of no significance	Of little significance	Of some significance	Significant	Very significant	
Location	Durban	6	10	38	88	149	291
	Lagos	1	2	2	8	289	302
Total		7	12	40	96	438	593

Table 5.6 Cross-tabulation Results on Cost/Billing Services

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	152.569	4	.000
Likelihood Ratio	172.707	4	.000
Linear-by-Linear Association	105.913	1	.000
N of Valid Cases	593		

Table 5.7 Chi-Square Tests on Cost/Billing Services

The tables above show that cost/billing is significant in determining the quality of mobile telecommunication services.

Crosstab

Count		Customer care services					Total
		of no significance	of little significance	of some significance	significant	Very significant	
Location	Durban	5	17	22	79	167	290
	Lagos	0	0	1	5	296	302
Total		5	17	23	84	463	592

Table 5.8 Cross-tabulation Results on Customer Care Services

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	142.121	4	.000
Likelihood Ratio	168.874	4	.000
Linear-by-Linear Association	107.006	1	.000
N of Valid Cases	592		

Table 5.9 Chi-Square Tests on Customer Care Services

From the Chi-Square tests above in table 5.9 above, $p \leq 0.05$. This suggests the significance of customer care services as a factor in determining the quality of mobile telecommunication services.

Crosstab

Count		Network Availability					Total
		of no significance	of little significance	of some significance	significant	Very significant	
Location	Durban	7	8	21	51	207	294
	Lagos	0	0	0	2	299	301
	Total	7	8	21	53	506	595

Table 5.10 Cross-tabulation Results on Network Availability

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	97.960	4	.000
Likelihood Ratio	123.086	4	.000
Linear-by-Linear Association	73.465	1	.000
N of Valid Cases	595		

Table 5.11 Chi-Square Tests on Network Availability

Network availability is also significant in determining the quality of mobile telecommunication services as illustrated in the inferential statistical data above.

Crosstab

Count		Network stability					Total
		of no significance	of little significance	of some significance	significant	Very significant	
Location	Durban	4	9	23	61	194	291
	Lagos	0	0	0	4	298	302
Total		4	9	23	65	492	593

Table 5.12 Cross-tabulation Results on Network Stability

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	107.801 ^a	4	.000
Likelihood Ratio	131.909	4	.000
Linear-by-Linear Association	84.458	1	.000
N of Valid Cases	593		

Table 5.13 Chi-Square Tests on Network Stability

From participants' perspective, a stable network has an impact or significant effect on the quality of mobile telecommunication services. The table above confirms the foregoing as $p \leq 0.05$.

Crosstab

Count		User satisfaction					Total
		of no significance	of little significance	of some significance	significant	Very significant	
Country	KwaZulu Natal	5	7	21	74	185	292
	Lagos	0	0	2	7	293	302
Total		5	7	23	81	478	594

Table 5.14 Cross-tabulation Results on User Satisfaction

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	107.379	4	.000
Likelihood Ratio	124.009	4	.000
Linear-by-Linear Association	82.384	1	.000
N of Valid Cases	594		

Table 5.15 Chi-Square Test on User Satisfaction

The quality of mobile telecommunication services is also determined by the extent of satisfaction that users derive from the services. From the Chi-Square tests it can be seen that user satisfaction is statistically significant.

Crosstab

Count		Voice clarity					Total
		of no significance	of little significance	of some significance	significant	Very significant	
Country	KwaZulu Natal	4	10	11	87	176	288
	Lagos	1	4	1	3	292	301
Total		5	14	12	90	468	589

Table 5.16 Cross-tabulation Results on Voice Clarity

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	119.628	4	.000
Likelihood Ratio	141.563	4	.000
Linear-by-Linear Association	65.163	1	.000
N of Valid Cases	589		

Table 5.17 Chi-Square Test on Voice Clarity

Voice clarity is equally a significant variable in determining the quality of mobile telecommunication services. In the table above, $p \leq 0.05$.

On the third research questions regarding user behaviour, the data generated is Cross-tabulated as follows. It is noted that there are different forms of behaviour or response to persistent poor quality

services by mobile telecommunication network operators. Some users may ignore the problem while others may complain to friends or call customer care centre. A form of response that impacts on loyalty is one which suggests that some users would switch to another mobile network operator.

Crosstab

Count		How did/would you respond to persistent poor quality service by your network operator				Total
		Ignore the problem	Complain to friends and others	Call customer care	Switch to another network operator	
Location	Durban	26	34	113	120	293
	Lagos	2	8	243	47	300
Total		28	42	356	167	593

Table 5.18 Cross-tabulation Results on Persistent Poor Quality Services (Loyalty)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	115.982	3	.000
Likelihood Ratio	123.248	3	.000
Linear-by-Linear Association	.000	1	.992
N of Valid Cases	593		

Table 5.19 Chi-Square Tests on Persistent Poor Quality Services (Loyalty)

As shown in the tables above, some responses to persistent poor quality services by mobile network operators may be statistically significant while others may not be. The responses by some LASU participants indicated that they would not switch to another mobile network operator while others would remain with the same network despite the problems. In this case, persistent poor quality service may not be a significant factor in determining user loyalty as suggested by research findings in LASU. It is noted that participants at LASU may not switch from one mobile network operator to another due to little or no difference in service quality amongst mobile telecommunication network operators. In view of this scenario the logical response is probably to remain on the network. On the other hand, UKZN participants would readily switch from one network to another based on the perception that they could receive improved services by doing so. In this case, research findings suggest that persistent unsatisfactory service by mobile network operator could impact on user behaviour in terms of loyalty towards the mobile network operator. From the foregoing, it can be said that customer loyalty depends

on factors external to the mobile network operator such as the availability or lack of credible alternatives or efficient competitors.

5.3 Cross-national analysis of research findings

A comparative analysis of research findings on the impact of mobile telecommunication services on first-year IT students at UKZN and LASU shows similarities and differences across the variables and issues covered by this study. Some of the important factors that will be compared include the number of mobile network operators, the range of mobile telecommunication services and the academic as well as social activities that students use the services for.

As at the time of data collection, there were four mobile telecommunication network operators each in South Africa and Nigeria. In effect students in both UKZN and LASU could choose any one network or a combination of network operators. Remarkably, none of the participants in LASU subscribed to more than one network. This perhaps reinforces the perception that there is no substantial or marked differences in the quality of services across mobile telecommunication network operators in Nigeria. However, a number of participants in UKZN subscribed to more than one network, usually a combination of not more than two networks as shown in the figure below.

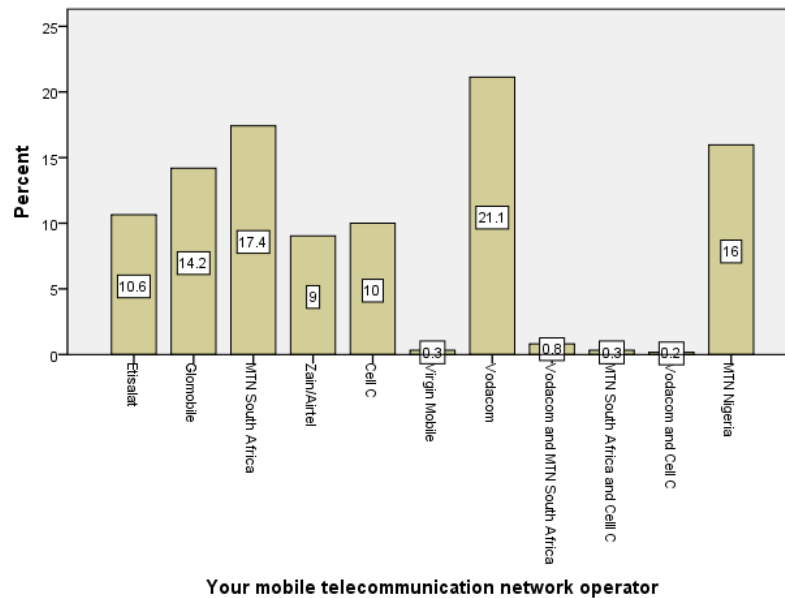


Figure 5.1 Students' Subscription to Mobile Telecommunication Network Operators

Subscription to more than one network by UKZN participants is attributable to considerations around cost/billing and service quality which vary from one network to another in South Africa. For example, free voice calls and free SMSs between subscribers to the same network are important factors in this

regard. Such free value-added services are useful especially to students' social activities such as keeping in touch with friends and family.

As far as mobile telecommunication network operators are concerned, the similarity between South Africa and Nigeria is in terms of the number of operators (i.e., prior to the new entrant 8ta in South Africa). Another similarity is the presence of one mobile network operator (namely MTN) in both countries. The differences lie essentially in the number of mobile telecommunication networks subscribed to by UKZN participants on one hand and LASU participants on the other.

Another factor to consider within this study's comparative framework is the use of mobile telecommunication services by first-year IT students in UKZN and LASU. Here again, there are similarities and differences between UKZN and LASU participants. In terms of similarities, SMS, MMS and voice calls are mobile telecommunication services of choice amongst participants in both UKZN and LASU. The preference for SMS usage partly reflects the dynamics of students' life generally conditioned by the availability of financial resources that are often limited. Hence, most students opt for relatively cheaper mode of communication, for example SMS. The differences relate to the varying levels of usage of, for instance, conference call and GPS services. Research findings suggest that more UKZN participants use GPS services than their LASU counterparts. A plausible explanation for this is the existence of ICT and satellite services support as major backbone for GPS services in South Africa. On the other hand, more LASU participants use conference call than their UKZN counterparts. The comparatively lower cost of conference call in Nigeria makes the services an attractive option for students. The figure below illustrates the similarities and the differences as explained here.

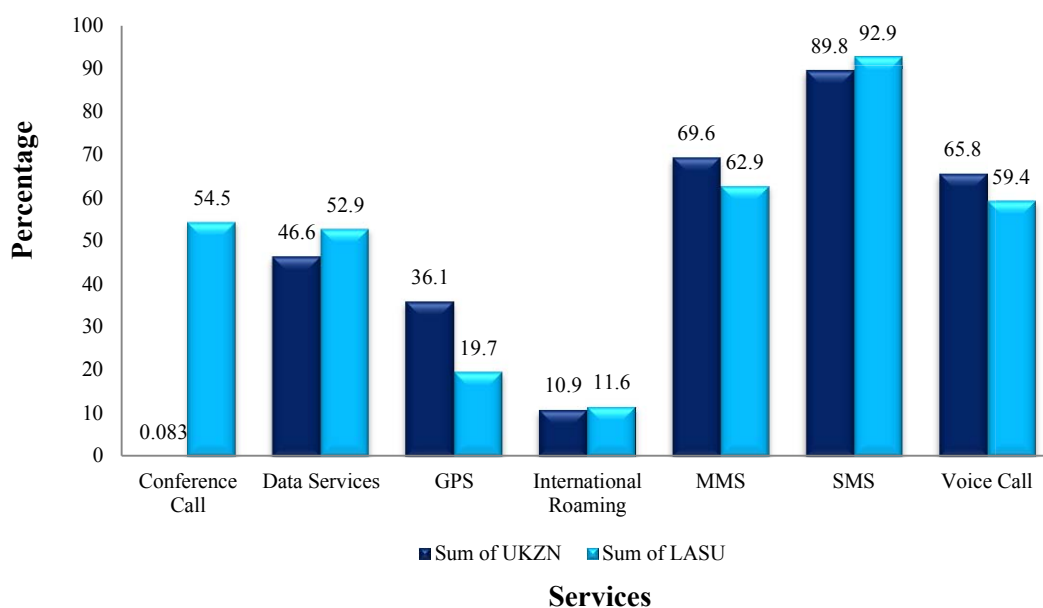


Figure 5.2 Comparative Use of Mobile Telecommunication Services in UKZN and LASU

There are similarities and differences in the area of challenges experienced in the use of mobile telecommunication services. A common trend is that UKZN and LASU participants hardly experience call drop problems and poor voice quality. The difference however, is that a significantly higher number of LASU participants are affected by unstable network. This problem can be situated in Nigeria's national context characterized by huge population and high number of subscribers but deficient infrastructure. This reality impacts on quality of services and user experience.

Research findings also suggest similarities and difference in the type of academic activities that first-year IT students use mobile telecommunication services for. In terms of similarities, both UKZN and LASU participants use mobile telecommunication services to find new information using search engines such as Google mobile, Bing and WikiMobile. The search for new information through the use of search engines which are compatible with mobile telecommunication services assists students in preparation of assignments and research reports. In terms of differences, UKZN participants use mobile telecommunication services to obtain examination results while LASU participants do not. The reason for this difference can be located in what basically constitute an institutional factor: UKZN offers a platform that supports multiple electronic access to examination results (online, cellphone and phone-in options); LASU does not. Another remarkable difference is that LASU students use mobile telecommunication services to communicate with lecturers, which is a rarity in UKZN. An infrastructural factor is responsible for this difference: students in UKZN are able to contact lecturers via e-mails, and land lines which are reliable communication channels; LASU participants have to rely on mobile telecommunication services as landlines are generally not available or dysfunctional and e-mail services are often erratic. In essence, the differences in the use of mobile telecommunication services for academic purposes are informed by the fact that UKZN and LASU participants operates within different institutional and structural environment.

There are no marked differences between UKZN and LASU participants in the use of mobile telecommunication services for social activities. Research findings suggest similarities in the use of mobile telecommunication services for keeping in touch with family and friends and for social networking. This seems to suggest a commonality of youth preferences across national boundaries as far as the use of mobile telecommunication services for social activities is concerned.

In terms of first-year IT students' evaluation of the impact of mobile telecommunication services on their academic life, research findings show considerable differences between UKZN and LASU participants. There was a split among UKZN participants who described the impact as somewhat positive and somewhat negative. The majority of UKZN participants did not know the impact of mobile telecommunication services on their academic life, despite their use of such services for critical academic activities. However, an overwhelming number of LASU participants described the impact of

mobile telecommunication services on their academic life as somewhat positive even though they had limited range of academic activities for mobile telecommunications. It appears that LASU participants could readily discern the link between their use of mobile telecommunication services (for instance, to communicate with lecturers) and academic outcomes.

There is a shared perception between UKZN and LASU participants regarding the impact of mobile telecommunication services on their social life. A reflection of similarity is that the highest number of participants from both UKZN and LASU described the impact as somewhat positive. In terms of difference, the second highest number of participants in UKZN did not know the impact while those in LASU indicated an overwhelmingly positive impact. Here again, it is instructive to note that a sizable number of first-year IT students in UKZN did not know the impact of mobile telecommunication services on their social life despite their use of such services for critical aspects of social existence. These research findings furnish important insights or lessons upon which the study's recommendations are based.

Chapter 6

CONCLUSION AND FURTHER RESEARCH

6.1 Introduction

The final section concludes the thesis. This chapter rounds off the discussion and analysis of students' perception of the impact of mobile telecommunication services on their academic and social life. It also proffers a number of recommendations drawn from observations and deductions based on the views expressed and implied in participants' responses.

6.2 Dissertation conclusion

Although a weak form of causality – an inherent limitation – is contained in the research design, it is possible to draw logical inferences from the responses of first-year IT students to the research sub-questions. Research findings from UKZN and LASU show varying degrees of similarities and differences that are informed by context specific factors. An important research finding is that students are aware of usefulness of mobile telecommunication services to academic endeavours and to social interactions. Finally, it is expected that this study's recommendations will serve to consolidate students' awareness of the usefulness of mobile telecommunication services. More importantly, the recommendations will enhance the appreciation of the centrality and significance of technology in the cognitive, personal and social development of students.

6.3 Recommendations

This study makes a number of recommendations including a suggestion for further research on students' use of mobile telecommunication services.

6.3.1 Use of mobile telecommunication services in teaching and learning

Although students are using mobile telecommunication services for academic activities, such use is largely self-defined or at the discretion of students. The varying academic uses of mobile telecommunication services suggest that mobile telecommunications could serve as an important pedagogic tool. It is envisaged that the integration of mobile telecommunications into teaching and learning in the universities will facilitate student-centered learning. The integration of mobile telecommunication services lends itself readily to efforts at main-streaming ICTs into the teaching and learning processes in universities across the world.

6.3.2 Introduction of electronic platforms to support teaching and learning

The limited use of mobile telecommunication services for academic purposes in LASU is emblematic of the general trend in Nigerian universities. As noted earlier, this problem is attributable, not to the lack of awareness or unwillingness on the part of students to use mobile telecommunications, but to an institutional factor namely the absence or inadequacy of electronic platforms in the universities. To this end, it is suggested that Nigerian universities create systems and adopt procedures conducive to the use of mobile telecommunication services for such activities as students' registration and obtaining examination results.

6.3.3 Awareness of the link between the use of technology and life outcomes

Research findings suggest that many students seem not to understand the impact of the use mobile telecommunication services on their academic and social life. Therefore, attempts at integrating mobile telecommunication into teaching and learning should, by logical necessity, teach important life lessons. It is important that students understand the link between behaviour or actions and outcomes. In the context of this study, students ought to understand not just the rationale for the use of mobile telecommunication services for academic and social activities but also the consequences or the results of the use of such services. Until students are able to understand the impact of mobile telecommunication services on their academic and social life the use of such services may not hold any real significance in their consciousness. It is expected that formal teaching and learning mechanisms that specifically highlights the use of mobile telecommunication services may serve the useful purpose of creating awareness of the link between the use of technology and life outcomes.

6.3.4 Contextualising the role of mobile telecommunication network operators

The significance of a study such as this is that it allows mobile telecommunication network operators to have insight into user behaviour and preferences. Such insight makes it possible for network operators to formulate appropriate responses to user behaviour and preferences. In the case of students, mobile telecommunication network operators are able to gain insight into students' use of specific services for both academic and social activities. As mentioned earlier, mobile telecommunication network operators give support to users through customer care services which include on-line interactive product tutorial, software patch downloads and so on, (Oliveira, Roque, Sedillot, & Carrapatoso, 2001). The role of mobile telecommunication network operators should incorporate student-oriented outreach programmes at universities and other higher education institutions. Furthermore, mobile telecommunication services should also address students' academic needs such as the provision of mobile platforms for access to e-books and e-journals via mobile phones. In view of the potential benefits of these initiatives for both mobile telecommunication network operators and students, it is suggested that mobile

telecommunication network operators should explore ways of reaching out to students and determining how their services interface with students' academic and social endeavours.

6.3.5 Suggestion for further research

A major limitation to the study is the use of questionnaires which contain uncorroborated self-report responses. It is acknowledged that this constitute a limitation on the validity of research results that deal primarily with the perceptions of first-year IT students.

Furthermore, an obvious limitation in this research is its focus on first-year IT students at UKZN and LASU. This study's findings help to understand the orientations and attitudes of first-year IT students towards an aspect of technology acceptance and use. However, the behavioural patterns and nuances presented in this study may not necessarily apply to students in other disciplines and/or at higher levels of study. This calls for scholarly inquiry into the use of mobile telecommunication services by students who do not fall into the category covered by this study. Further research into students' use of mobile telecommunication services may offer different and potentially illuminating insights and lessons for mainstreaming ICTs in general into teaching and learning.

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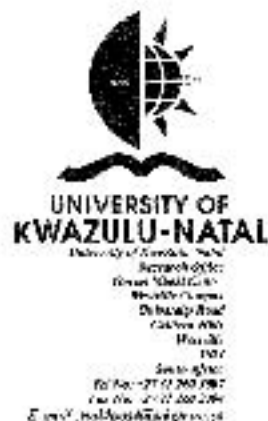
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APPENDIX

Ethical Clearance Letter



28 November 2010

Mr G. A. Abatan
School of Information Systems & Technology
WISNITHI CAMPUS

Dear Mr Abatan

PROTOCOL: Evaluating the Effectiveness of Mobile Telecommunication Services in Durban & Lagos

ETHICAL APPROVAL NUMBER: HSO/1200/2010 M: Faculty of Management Studies

In response to your application dated 10 November 2010, Student Number: 208529363 the Humanities & Social Sciences Ethics Committee has considered the abovementioned application and the protocol has been given **FULL APPROVAL**.

PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Steve Collings (Chair)
HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE

SC/su

cc: Prof. M. Mahana (Supervisor)
cc: Mrs. C. Hadden

Postal Address:

<input type="checkbox"/> Margate	<input type="checkbox"/> Pietermaritzburg	<input type="checkbox"/> Pietermaritzburg	<input type="checkbox"/> Pietermaritzburg
<input type="checkbox"/> Pietermaritzburg	<input type="checkbox"/> Pietermaritzburg	<input type="checkbox"/> Pietermaritzburg	<input type="checkbox"/> Pietermaritzburg

Questionnaire 1

(UKZN, DURBAN)

Topic: Evaluating the Effectiveness of Mobile Telecommunication Services in Durban & Lagos

MCom Research Project

School of Information Systems & Technology

Faculty of Management Studies

University of KwaZulu-Natal

Researcher: Omotayo Kayode Abatan (+27 84 428 3772)

Supervisor: Prof. Manoj Maharaj (+27 31 2608003)

Introduction

The purpose of this questionnaire is to gather information from you on your experiences and perceptions of mobile telecommunication services offered by your network operator. Its purpose is also to get information from you on your understanding the impact that mobile telecommunication services have on your academic endeavour and social life.

The information gathered from you will be used to provide a framework for articulating the behavioural patterns and responses of first-year IT students towards the quality of mobile telecommunication services.

In this questionnaire, the following keywords are used: Mobile network operator and mobile telecommunication services. As used in this research, each keyword can be briefly described as:

Mobile Network Operator: is a telephone company that provides services for mobile phone subscribers

Mobile Telecommunication Services: A range of services offered to end users in a mobile telecommunications environment by mobile network operators or service providers (such as Voice Call, Messaging, pay as you go and so on).

- *Please sign the letter of informed consent, giving me permission to use your response for this research project.*
- *Please rate the statements in each section by placing a check in the appropriate box.*
- *The questionnaire should take about 20mins.*

Your response to this questionnaire will be treated with confidentiality.

Section A: Background

This section of the questionnaire refers to your background information. The information will allow me compare groups of respondents. Once again, I assure you that your response will remain confidential.

1. Gender?

Male Female

2. Age?

Less than 18 years old 19 – 24 25 – 29

30 – 34 Other (please specify) _____

3. Race?

African Coloured Indian

White Another group (please specify): _____ I do not wish to answer

Section B: Mobile Network Operator

4. Your mobile telecommunication network operator?

Cell C MTN

Virgin Mobile Vodacom

5. How long have you been using this network?

Less than 6 months More than 6 months but less than 1 year

More than 1 year but less than 2 years More than 2 years but less than 3 years

More than 3 years but less than 4 years More than 4 years but less than 5 years

More than 5 years

Section C: Mobile Telecommunication Services

6. Which of these services do you use on your network?

Conference Call Data Services GPS (Global Positioning Systems)

International Roaming MMS (Multimedia Messaging Services)

SMS (Short Messages services) Voice Call

7. How would you rate the services on your mobile telecommunication network?

Services	Very poor	Poor	Average	Good	Very Good
Conference Call					
Data Services					
GPS					
International Roaming					
MMS					
SMS					
Voice Call					

8. In your view, how significant are the following factors in determining the quality of mobile telecommunication services?

Factors	Of no significance	Of little significance	Of some significance	Significant	Very significant
Cost/Billing Services					
Customer Care Services					
Network Availability					
Network Stability					
User Satisfaction					
Voice Clarity					

9. What challenges do you experience in your use of the services identified in Q7 above?

- Call drop Delayed SMS delivery Delayed MMS delivery
 Poor voice quality Low data speed Unstable network
 Other (please specify) _____

10. How would you rate the overall service provision based on your experience and ratings in Q7 above?

- Very Poor Poor Average
 Good Very Good

11. How would you describe the quality of service by your network operator?

- Not Satisfactory Somewhat Satisfactory Very Satisfactory

12. How do you deal with unsatisfactory service by your network operator?

- Ignore the problem Complain to friends and others Call customer care
 Other (please specify) _____

13. How often do you report complaints to your mobile telecommunication network operator?
- Never Rarely Occasionally
 Frequently Very Frequently

14. How would you rate the response of your network operator to your complaints/queries?
- Not Promptly or Satisfactory Not Promptly but Satisfactory
 Promptly but not Satisfactory Promptly and Satisfactory

15. How did/would you respond to ***persistent*** poor quality service by your network operator?
- Ignore the problem Complain to friends and others
 Call customer care Switch to another network operator

16. How often do you use mobile telecommunications for your academic works?
- Never Rarely Once in two weeks
 Every week Everyday

17. Which of these academic activities do you use mobile telecommunications for?
- Research Assignments Information Sharing
 Group projects Test & Exam preparation Other, please specify _____

18. Do mobile telecommunications interfere with your lectures?
- Yes, it distracts me Yes, it distracts other students
 Yes, it distracts the lecturer No

19. Do mobile telecommunications interfere with your studying?
- Yes, it distracts me Yes, it distracts other students No

20. Questions on mobile phone academic activities (User mode)

	Switch it off	Leave it on ringing mode	Leave it on in silent mode	I do not take my phone with me
20.1 What do you do to your mobile phone during lectures?				
20.2 What do you do to your mobile phone during tutorials?				
20.3 What do you do to your phone during practical?				
20.4 What do you do to your mobile phone while studying?				

21. Questions on mobile phone academic activities (Ringing mode)

	Answer the call	Reject the call	Step out to answer the call	I do not take my phone with me
21.1 What would you do if your phone rang during a lecture?				
21.2 What would you do if your phone rang during a tutorial?				
21.3 What would you do if your phone rang during a practical?				
21.4 What would you do if your phone rang during a study session?				

22. Questions on mobile phone academic activities (Text message mode)

	Read the message immediately	Read the message later
22.1 What would you do if you received a text message during a lecture?		
22.2 What would you do if you received a text message during a tutorial?		
22.3 What would you do if you received a text message during a practical?		
22.4 What would you do if you received a text message during a study session?		

23. Would you consider mobile telecommunications necessary or critical for your academic activities?

- Not critical at all Somewhat critical Critical/very critical

24. How could (or have) mobile telecommunications enhance(d) your academic agendas?

- Finding new information Communicating with lecturers
 Communicating with tutors or mentors Registering for modules
 Borrowing books from the library Getting exam results

Other, please specify _____

25. How critical is the quality of mobile telecommunication services to academic excellence?

- Not critical at all Somewhat critical Critical/very critical

26. How could (or have) mobile telecommunications undermine(d) your academic pursuits?

- Time wasting Distractions
 Low level of concentration Laziness

Other, please specify _____

27. What effect does your use of mobile telecommunication services have on your academic endeavour?

- Overwhelmingly Negative Somewhat Negative I don't know
 Somewhat Positive Overwhelmingly Positive

28. How often do you use mobile telecommunications for social activities?

- Never Rarely Once in two weeks
 Every week Everyday

29. Which of these social activities do you use mobile telecommunications for?

- Social Networking Shopping keeping in touch with family
 Keeping in touch with friends Downloading (mp3s & videos)

Other, please specify _____

30. Questions on mobile phones and social life (User profile)

	Switch it off	Leave it on ringing mode	Leave it on in silent mode	I do not take my phone with me
30.1 What do you do to your phone during a family discussion?				
30.2 What do you do to your mobile phone during a religious service (or spiritual meditation)?				
30.3 What do you do to your mobile phone before or during a meeting with friends?				

31. Questions on mobile phones and social life (Ringing mode)

	Answer the call	Reject the call	Step out to answer the call	I do not take my phone with me
31.1 What would you do if your phone rang during a family discussion?				
31.2 What would you do if your phone rang during a religious service (or spiritual meditation)?				
31.3 What would you do if your phone rang during a meeting with friends?				

32. Questions on mobile phones and social life (Text message mode)

	Read the message immediately	Read the message later
32.1 What would you do if you received a text message during a family discussion?		
32.2 What would you do if you received a text message during a religious service (or spiritual meditation)?		
22.3 What would you do if you received a text message during a meeting with friends?		

33. Would you consider mobile telecommunications necessary or critical for your social activities?

- Not critical at all Somewhat critical Critical/very critical

34. How could (or have) mobile telecommunications enhance(d) your social activities?

- Making new friends communicating with old friends
 Strengthening family ties Satisfying personal needs

Other, please specify _____

35. How critical is the quality of mobile telecommunication services to fulfilling your social agendas?

- Not critical at all Somewhat critical
 Critical Very critical

36. How could (or have) mobile telecommunications undermine(d) your social life?

- Disruption of personal schedule Distractions
 Low level of concentration Low level of interpersonal contact
 Addiction Other, please specify _____

37. What effect does your use of mobile telecommunication services have on your social life?

- Overwhelmingly Negative Somewhat Negative
 I don't know Somewhat Positive
 Overwhelmingly Positive

Date: _____

Thank you for your time - it is highly appreciated!!!

Questionnaire 2

(LASU, LAGOS)

Topic: Evaluating the Effectiveness of Mobile Telecommunication Services in Durban & Lagos

MCom Research Project

School of Information Systems & Technology

Faculty of Management Studies

University of KwaZulu-Natal

Researcher: Omotayo Kayode Abatan (+27 84 428 3772)

Supervisor: Prof. Manoj Maharaj (+27 31 2608003)

Introduction

The purpose of this questionnaire is to gather information from you on your experiences and perceptions of mobile telecommunication services offered by your network operator. Its purpose is also to get information from you on your understanding the impact that mobile telecommunication services have on your academic endeavour and social life.

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- *Please rate the statements in each section by placing a check in the appropriate box.*
- *The questionnaire should take about 20mins.*

Your response to this questionnaire will be treated with confidentiality.

Section A: Background

This section of the questionnaire refers to your background information. The information will allow me compare groups of respondents. Once again, I assure you that your response will remain confidential.

1. Gender?

Male Female

2. Age?

Less than 18 years old 19 – 24 25 – 29

30 – 34 Other (please specify) _____

3. Citizen?

Nigerian Non-Nigerian I do not wish to answer

Section B: Mobile Network Operator

4. Your mobile telecommunication network operator?

Etisalat Glomobile MTN Zain/Airtel

5. How long have you been using this network?

Less than 6 months More than 6 months but less than 1 year

More than 1 year but less than 2 years More than 2 years but less than 3years

More than 3 years but less than 4 years More than 4 years but less than 5years

More than 5 years

Section C: Mobile Telecommunication Services

6. Which of these services do you use on your network?

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7. How would you rate the services on your mobile telecommunication network?

Services	Very poor	Poor	Average	Good	Very Good
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MMS					
SMS					
Voice Call					

8. In your view, how significant are the following factors in determining the quality of mobile telecommunication services?

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Network Stability					
User Satisfaction					
Voice Clarity					

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- Call drop Delayed SMS delivery Delayed MMS delivery
 Poor voice quality Low data speed Unstable network

Other (please specify) _____

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- Ignore the problem Complain to friends and others Call customer care

Other (please specify) _____

13. How often do you report complaints to your mobile telecommunication network operator?
- Never Rarely Occasionally
 Frequently Very Frequently

14. How would you rate the response of your network operator to your complaints/queries?
- Not Promptly or Satisfactory Not Promptly but Satisfactory
 Promptly but not Satisfactory Promptly and Satisfactory

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- Yes, it distracts me Yes, it distracts other students No

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20.2 What do you do to your mobile phone during tutorials?				
20.3 What do you do to your phone during practical?				
20.4 What do you do to your mobile phone while studying?				

21. Questions on mobile phone academic activities (Ringing mode)

	Answer the call	Reject the call	Step out to answer the call	I do not take my phone with me
21.1 What would you do if your phone rang during a lecture?				
21.2 What would you do if your phone rang during a tutorial?				
21.3 What would you do if your phone rang during a practical?				
21.4 What would you do if your phone rang during a study session?				

22. Questions on mobile phone academic activities (Text message mode)

	Read the message immediately	Read the message later
22.1 What would you do if you received a text message during a lecture?		
22.2 What would you do if you received a text message during a tutorial?		
22.3 What would you do if you received a text message during a practical?		
22.4 What would you do if you received a text message during a study session?		

23. Would you consider mobile telecommunications necessary or critical for your academic activities?

- Not critical at all Somewhat critical Critical/very critical

24. How could (or have) mobile telecommunications enhance(d) your academic agendas?

- Finding new information Communicating with lecturers
 Communicating with tutors or mentors Registering for modules
 Borrowing books from the library Getting exam results

Other, please specify _____

25. How critical is the quality of mobile telecommunication services to academic excellence?

- Not critical at all Somewhat critical Critical/very critical

26. How could (or have) mobile telecommunications undermine(d) your academic pursuits?

- Time wasting Distractions
 Low level of concentration Laziness

Other, please specify _____

27. What effect does your use of mobile telecommunication services have on your academic endeavour?

- Overwhelmingly Negative Somewhat Negative I don't know
 Somewhat Positive Overwhelmingly Positive

28. How often do you use mobile telecommunications for social activities?

- Never Rarely Once in two weeks
 Every week Everyday

29. Which of these social activities do you use mobile telecommunications for?

- Social Networking Shopping keeping in touch with family
 Keeping in touch with friends Downloading (mp3s & videos)

Other, please specify _____

30. Questions on mobile phones and social life (User profile)

	Switch it off	Leave it on ringing mode	Leave it on in silent mode	I do not take my phone with me
30.1 What do you do to your phone during a family discussion?				
30.2 What do you do to your mobile phone during a religious service (or spiritual meditation)?				
30.3 What do you do to your mobile phone before or during a meeting with friends?				

31. Questions on mobile phones and social life (Ringing mode)

	Answer the call	Reject the call	Step out to answer the call	I do not take my phone with me
31. 1 What would you do if your phone rang during a family discussion?				
31.2 What would you do if your phone rang during a religious service (or spiritual meditation)?				
31.3 What would you do if your phone rang during a meeting with friends?				

32. Questions on mobile phones and social life (Text message mode)

	Read the message immediately	Read the message later
32.1 What would you do if you received a text message during a family discussion?		
32.2 What would you do if you received a text message during a religious service (or spiritual meditation)?		
22.3 What would you do if you received a text message during a meeting with friends?		

33. Would you consider mobile telecommunications necessary or critical for your social activities?

- Not critical at all Somewhat critical Critical/very critical

34. How could (or have) mobile telecommunications enhance(d) your social activities?

- Making new friends Communicating with old friends
 Strengthening family ties Satisfying personal needs

Other, please specify _____

35. How critical is the quality of mobile telecommunication services to fulfilling your social agendas?

- Not critical at all Somewhat critical
 Critical Very critical

36. How could (or have) mobile telecommunications undermine(d) your social life?

- Disruption of personal schedule Distractions
 Low level of concentration Low level of interpersonal contact
 Addiction Other, please specify _____

37. What effect does your use of mobile telecommunication services have on your social life?

- Overwhelmingly Negative Somewhat Negative
 I don't know Somewhat Positive
 Overwhelmingly Positive

Date: _____

Thank you for your time - it is highly appreciated!!!

Map Showing Countries of Study



Map of Africa showing the cities where the universities are located



Map of South Africa showing Durban (eThekweni)



Map of Nigeria showing Lagos (Eko)