

**ANALYSIS OF THE IMPACT OF DEMOGRAPHIC AND ECONOMIC
FACTORS ON INTERNET SERVICES SATISFACTION LEVELS IN
WINDHOEK, NAMIBIA**

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ABSTRACT

The study focused on analysing geospatial internet customer satisfaction levels, using the Geographic Information System (GIS) technology. The aim of the study was to investigate how demographic and economic factors influence satisfaction levels. The study followed a quantitative design and employed the systematic sampling method to select a sample of 248 potential internet users. A structured self-administered questionnaire was used to collect data from selected samples. The statistical and spatial analyses were conducted in such a way that results were comparable between areas from low, to high income levels. Low income suburbs were represented by Greenwell Matongo Ext 1 (informal settlement) and Grysblock Ext 1 (formal settlement). Moreover, middle to high income areas were represented by Pioneers Park Ext 1 (formal settlement).

The study findings revealed that internet users in low income areas especially in the informal settlement experienced high level of dissatisfaction with internet services compared to the middle to high income area. Moreover, males in the middle to high income area made up the majority of internet users. Within the lower income areas, use of the internet was predominantly by users who were less than 30 years old whilst in the middle to high income area, people who were aged between 31 and 40 years used the internet more than people aged less than 30 years. The majority of internet users earned a gross monthly income of less than N\$ 5000 (US\$ 1 = N\$ 11.6) and had a secondary school level education.

Satisfaction levels noted differ noticeably across the various demographics. The lowest satisfaction scores were dominated by female internet users who completed grade 12. The highest satisfaction scores were mostly reported by male internet users who had a tertiary education at diploma or degree levels. The lowest satisfaction scores were dominated by internet users earning less than N\$ 5000 and were residing in low income areas. The highest satisfaction scores were mostly articulated by internet users residing in the middle to high income area. There is need for Telecommunication Companies in Namibia to introduce more fixed post-paid internet services especially in low income areas of Windhoek and other areas of Namibia. Fixed post-paid internet services were discovered to be associated with higher internet satisfaction levels compared to mobile prepaid internet services. Additionally, the Communications Regulatory Authority of Namibia (CRAN) need to consider introducing an application which assists users to monitor and report poor customer service.

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LIST OF ACRONYMS

| | |
|--------|---|
| ACMA | Australian Communications and Media Authority |
| ACSI | American Customer Satisfaction Index |
| CRAN | Communications Regulatory Authority of Namibia |
| FTTx | Fibre to the Home or Office |
| GDP | Growth Domestic Product |
| GIS | Geographic Information System |
| HSBB | High Speed Broadband |
| IDRC | International Development Research Centre |
| ITU | International Telecommunication Union |
| Kbps | Kilobits per second |
| Mbps | Megabits per second |
| MTC | Mobile Telecommunication Company |
| NSA | Namibia Statistic Agency |
| OxIS | Oxford Internet Surveys |
| SPSS | Statistical Package for the Social Sciences |
| TN | Telecom Namibia |
| TNM | Telecom Namibia Mobile |
| TRAI | Telecom Regulatory Authority of India |
| UASP | Universal Access and Service Policy |
| UNESCO | United Nations Educational, Scientific and Cultural Organization (UNESCO) |
| WHO | World Health Organisation |

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DEDICATION

To knowledge creation

DECLARATIONS

I, Booyesen Sabehe Tubulingane, hereby declare that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree in any other institution of higher education.

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CHAPTER 1: INTRODUCTION

1.1 ORIENTATION OF STUDY

Internet users in European and Northern American countries in most cases are connected to high internet connection speeds than internet users in African and Southern American countries (Vox, 2014). Thus Internet users in European and Northern American countries are likely to have high internet satisfaction levels compared to internet users in African and Southern American countries. More than forty percent of the seven billion world population has internet access, of which 9.8% of the users are within Africa (Internet Live Stats, 2016). In addition to Internet Live Statistics (2016), 15.6% of the Namibian population has access to the internet. The internet is a very important service worldwide for business and entertainment purposes. Sixty-three percent of the Namibian population is employed; this reveals the high potential of customers for fixed and mobile internet services (Namibia Statistic Agency [NSA], 2011). Telecom Namibia (TN), Mobile Telecommunication Company (MTC) and Telecom Namibia Mobile (TNM) are the main internet service providers in Namibia (Communications Regulatory Authority of Namibia [CRAN], 2015).

CRAN requires telecommunication companies to provide data on internet users. The data provided by telecommunication companies is analysed by CRAN to produce national reports on the use of ICT. The Geographic Information System (GIS) is used to produce coverage maps displaying areas with access to internet services (CRAN, 2013). Even though the GIS technology has been used by companies such as CRAN, TN and

MTC, there is still a need to maximize the application of GIS. For instance GIS can be used to spatially analyse the impact of demographic and economic factors on internet satisfaction levels. According to Shu (2011), though GIS application in telecommunication is lagging behind, its application in other fields has developed rapidly.

1.2 STATEMENT OF THE PROBLEM

Internet speed connection has an influence on the take-up of internet services and influences satisfaction levels (Brown et al., 2009). High internet service satisfaction can result in the high usage of the service for both males and females. As discovered by Dalvit and Roux (2014), the internet service take-up and usage is not different between men and women. The internet service is very important to many people as internet is frequently used for communication and internet-banking services on a daily basis (Gyamfi et al., 2013; Raimond, 2001). This indicates that the internet service is increasingly influencing all aspects of the society; this is evident in communication and banking sectors where internet plays a crucial role (Bankole & Oludayo, 2012).

Currently, in Namibia, no studies have been conducted to analyse factors influencing the internet service take-up and satisfaction. Often companies launch internet services in densely populated areas, assuming high customer service take-up and hoping that customers will be highly satisfied. However, if services are introduced in areas with high poverty and low education levels, low service take-up and satisfaction is likely to be

experienced. Services in Namibia are launched without analysing demographic and economic factors influencing service take-up and satisfaction levels. This has brought about the need for this detailed study that applies statistical and spatial tools from SPSS and GIS to analyse internet satisfaction levels per low to high income geographic areas. The study finding will assist internet service providers in Namibia to understand the drivers for internet service satisfaction levels, thus improve their services.

1.3 RESEARCH OBJECTIVES

The main objective of this study is to examine the relationship between spatial, demographic and economic differences and internet service satisfaction levels in Windhoek suburbs. Specific objectives are listed below:

- To assess the relationship between age, gender and service take-up.
- To assess the relationship between education, income and service take-up.
- To map and analyse the satisfaction levels of internet users as per their age and gender (demographic characteristics).
- To map and examine the satisfaction levels of internet users as per their education and income levels (economic characteristics).
- To conduct a geospatial analysis of satisfaction levels of internet users as per the residential settlement and subscription type (prepaid and/or post-paid).

1.4 SIGNIFICANCE OF THE STUDY

There is a need to examine how the internet connectivity affects the city and recognise where the disparities exist (Greene & Pick, 2012). This research on the users of internet services supports the above objective in urban geography. The study assesses satisfaction levels across areas of low to high income and various education levels. The study can be used as a benchmark for similar studies in other cities or towns with similar characteristics.

There has been little research focusing on the exploration of the impact of economic and demographic factors on internet service satisfaction using GIS. Satisfaction levels of internet users are explored using GIS in order to associate it to geographic locations. Often, the GIS technology has been under-utilised in the area of analyses of service provisioning, for instance, GIS is widely used as a mapping tool to produce detailed map displays of population density distribution. GIS has not been used as much in assessing how the population views or feels towards specified services that are applicable to communities such as cell phone network services or even refuse removal services. Even though GIS has been under-utilised, the technology has proven to be a useful, analytical tool to generate models such as Digital Elevation Models (DEM). The results of the study will assist companies to make sound decisions when deploying internet services.

1.5 LIMITATIONS OF THE STUDY

The major limitation of the study is that, not all the suburbs in Windhoek are selected to participate due to lack of finances and limited time. As a result, to apply the findings to the entire Windhoek city will not be possible. The systematic sampling technique selected for this study was not fully adhered to. This is due to the challenge of unavailability of sampled primary target respondents (house owners). Unavailable sampled respondents were replaced with the next available respondents.

1.6 DELIMITATIONS OF THE STUDY

This study is limited to three selected suburbs, based on their income level as classified by the City of Windhoek Council. The study is limited to potential internet users, who are house owners or residents at standalone dwelling units in Pioneers Park Ext 1, Grysbloek Ext 1 and Greenwell Matongo Ext 1.

1.7 THE STRUCTURE OF THE STUDY

This study is organised as follows; chapter one explores the orientation of the study, defines the study objectives and problem statement. The significance, limitations and delimitations of the study are also discussed. Chapter two reviews published literature which has assisted to define variables used in this study. The literature further made it possible to compare results from similar studies and to discuss study results. Chapter three highlights the methodology of the study and reviews how the data was collected.

The GIS procedures and SPSS data analysis approaches are also reflected in chapter three. The results of the study are presented in chapter four, and discussed in chapter five. Finally, chapter six provides the conclusions and recommendations of the study.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter highlights the importance of internet services as catalysts for socio-economic development. The influence of age, gender, education and income on internet service take-up is shown within this chapter. In addition, past research on internet customer satisfaction levels in varying demographic and economic sections such as age, gender, education and income are provided. Studies which evaluate internet customer satisfaction levels are also covered. Lastly, this chapter provides literature on the application of GIS in mapping internet services around the world and within Namibia.

2.2 INTERNET AND SOCIO-ECONOMIC DEVELOPMENT

The internet offers a lot of potential and opportunities for sustainable development such as boosting household income levels. When people with low income levels participate in a transparent governance process, the growth of the internet will increase. The internet brings new social and economic opportunities to many people in the developing world (Qian, 2012). This is due to the positive relationship between economic development and the internet service. The World Bank reported that a 10% increase in broadband (internet) speed correlates to a 1.38% increase in Gross Domestic Product (GDP) (DALBERG, 2013). Beyond GDP growth, the internet also provides opportunities to users to pursue social and developmental objectives. Throughout the developing world,

the internet is connecting remote populations to markets to sell or buy products and services.

Ericsson and Little (2013) discovered that, doubling internet speeds for an economy can add 0.3 percent to GDP growth. The benefits of faster broadband include increased innovation and productivity in business. Furthermore, faster broadband can lead to better access to services and competitiveness in the labour market. For instance, gaining 4 Mbps of broadband can result in an increase of household income by USD 2,100 per year while connecting a 0.5 Mbps broadband can lead to an increase in household income by USD 800 per year (Ericsson & Little, 2013). The household members are able to establish businesses and sell their products and services online to enhance their income. Additionally, a higher speed also opens up possibilities for more advanced home-based businesses as a replacement, or complement to an ordinary job. Broadband speed enables people to be more informed, better educated, socially and culturally enriched (Ericsson & Little, 2013).

Therefore, the use of the internet is not only about its availability but also about the speeds that it operates at. Internet services have made it possible to perform work tasks online, for instance many companies allow their employees to work at home. The employees are able to access their work documents and submit their reports online. The internet is also a medium through which employees receive their salaries via internet banking transfers. Barbat et al. (2011), further emphasize the importance of internet

technology in terms of changing how people behave and getting things done at work and home. The internet is a tool which empowers people and organisations in almost every corner of the world.

The internet further strengthens the overall efficiency of service delivery in areas such as health and education (DALBERG, 2013). It is a tool utilised by many people to accelerate social and economic development in their areas. Internet services can improve the lives of people in developing and developed countries. For instance, the internet was used by the World Health Organisation (WHO) to communicate global disease outbreaks of Ebola and Zika virus (World Health Organisation [WHO], 2016).

In Namibia, the Universal Access and Service Policy (UASP) in electronic communications will ensure affordable access to internet services (Malumo, 2012). Moreover, the electronic communications sector is one of the key enablers of social-economic development for individuals, households and small firms. However, this objective requires universal access to a wide range of electronic communications networks and services. Affordable internet services and devices are required for UASP benefits to be realised (Malumo, 2012).

Internet service connectivity can lead to developmental outcomes such as better health care and improved educational performance. Moreover, costs have been reduced and there is improved efficiency in health care delivery where ICTs have been applied (Singh, 2013). Patients' records can also be stored and transmitted electronically so that

doctors can call upon specialist for their patients. Addition to Singh (2013), medical personnel can make use of telemedicine to save time and reduce cost e.g. there is no need to travel to collect patients' medical results. This indicates that, internet services can positively improve the education and health sectors of a country.

Businesses have new internet based tools to obtain and distribute information that was once difficult to find due to constraints such as time and long distances. For example, businesses have instant 'contact us' links on their websites where clients can instantly voice complaints or give suggestions for improved service delivery. Retail stores can now send invoices and/or receipts instantly to their customers email addresses and at the same time track returning customers, thus assess loyalty. Through the internet businesses can also advertise their products and services directly and indirectly to present and potential customers respectively through emails, website or social media advertising.

The internet enables agriculture firms to have access to market prices and weather information much easier than ever before. Predictions of weather patterns can be seen online through websites such as <http://www.met.ie/news/display.asp?ID=407> for Online Weather News. Additionally information of outbreaks of pests and communicable animal diseases is easily shared on internet platforms.

The internet is primarily, an improved platform for marketing and gives businesses better customer access. E-commerce in Sub-Saharan Africa is growing, for example,

Nigeria's Pagatech, integrates online and mobile web to deliver a suite of payment solutions for its customers (DALBERG, 2013). The First National Bank (FNB) in Namibia has e-wallet service which enables customers to transfer money from bank accounts to mobile phone numbers (First National Bank [FNB], 2015). Internet banking services have improved the lives of people, for instance, the need to physically go to the bank to deposit money has been minimised; internet banking has made it possible to easily transfer money from one bank account to another.

According to Anie (2011), there is a correlation between ICT implementation and GDP; ICT as an input and a catalyst has contributed positively to socio-economic development. ICT have social benefits such as easier and faster communications regardless of distance and time with friends and family, reduced inequalities of opportunities between rural and urban areas. Services such as video conferencing over the internet can be used to communicate between distant people in rural and urban areas (Singh, 2013). Moreover, internet services can be utilised for educational purposes by teachers and learners at schools. For example the introduction of internet services has made it possible to deliver educational programmes to some remote locations, given that the infrastructure for internet access is put into place. The internet has paved way for the introduction of distance learning, which can improve educational achievement in rural areas. Furthermore, the Namibian education system is one of the beneficiaries of internet services. Internet services make it possible for people in Namibia to have access to

education (online courses) offered locally and globally regardless of their physical location.

2.3 AGE, GENDER AND INTERNET SERVICE TAKE-UP

Worldwide, there is an increase in the use of internet, however, men outnumber women in using the internet (Finlay & Nordstrom, 2013). In addition to Finlay and Nordstrom (2013), women generally have less access to ICTs and use them sub-optimally. Moreover, this unequal access to ICTs, based on gender, increases as the technologies and services become more sophisticated and expensive. Women earn comparatively less than men and there is a negative correlation between using the internet and being female (Finlay & Nordstrom, 2013). Men outnumber women globally as internet usage rate between men and women is estimated at 200 million fewer women online. However, the women in the developed world outnumber men in terms of internet usage (International Telecommunication Union [ITU] & United Nation Educational Scientific Cultural Organisation [UNESCO], 2013). The difference in the use of the internet between men and women is a result of differing gender roles between men and women. There are cultural practices which disadvantages women especially in Africa and other developing continents.

According to Winker (2005), even though there is an increase in the number of female internet users globally, the gender gap in internet access has not been closed. Men use the internet more frequently and for longer periods of time than women. In contrast, a

finding from Smith and Zickuhr (2012) study identifies gender as a significantly less important explanation for the probability of internet usage than age. Nevertheless, the gender and age factors must not be underestimated; young males are likely heavy internet users than females due to differences in computer literacy levels and gender roles.

Deen-Swarray et al. (2012) argues that, there is limited access to the full range of ICTs by women in Africa and their constrained usage is mostly due to the high costs of services and devices. In Africa only few men and women own computers, and women are not equally able to access and use the internet compared to men. Additionally, the gender factor can make women less likely than men to have the necessary skills to use the internet (Amde et al., 2010).

A gender comparative study on internet usage among college students by Thanuskodi (2013) at the University of Nebraska – Lincoln (USA) revealed that, men and women have equal access to the internet. Gender differences were noticed in terms of usage patterns as the access was similar for both genders probably because both genders have high exposure to the technology. Additionally, a slight variation in the usage pattern at home between men and women due to the influence of gender roles was discovered (Thanuskodi, 2013). Contrary to Thanuskodi (2013)'s findings, Fallows (2005) exposed that, younger women are more likely than younger men to be online while older men are

more likely than older women to be online. In this case, the age group determines the dominate gender when it comes to internet usage.

Simuchimba (2011) and Chesters et al. (2013) discovered that, age has a major influence on the use of internet services, age and internet use is negatively associated to each other. For instance, people over the age of 65 years are much less likely to use the internet than young people. Furthermore, men show higher levels of computer use than women, and this gender gap increases with age (Chesters et al., 2013). Young adults are more likely than older adults to use major social media on internet services (Brenner & Duggan, 2013). Similarly, Barrantes et al. (2014) discovered that, adult women often see the internet as a foreign technology and assume that, only the young generations are capable of using the internet.

2.4 EDUCATION, INCOME AND INTERNET SERVICE TAKE-UP

Important factors such as income and education play major roles in explaining internet access and usage (Amde et al., 2010). This is a result of a positive relationship between internet usage, income and education variables. A clear indication that there is a high probability of individuals with high income and education levels to use the internet. According to Chesters et al. (2013), the levels of computer use increase as educational attainment increases, thus people who undertook some form of formal study have higher levels of computer and internet use. Finlay and Nordstrom (2013) discovered that,

internet access and usage can boost income and improve people's lifestyle in terms of access to information. When grassroots have access to information, they are likely to be empowered and able to participate in the development process of their communities.

Ahmad and Al-Zu'bi (2011) assert that, internet access and adoption rates vary significantly according education and income levels. Rural households are less likely to be connected to the internet than urban households with high income and education levels (Wihbey, 2013). According to Simuchimba (2011)'s findings, the majority of internet users had obtained higher qualifications levels; as a result, university graduates tend to be more ICT literate and early adopters to new technology. This finding highlights the importance of education level as a determinate of internet usage. The literacy gap is believed to be a contributing factor to internet use in the developing world, in sub-Saharan Africa, the adult literacy rates stands at 59% (Gillwald et al., 2012). Moreover, findings by ITU and UNESCO (2013) revealed that, the high education dropout rate in developing countries has contributed to hindering a high number of people from accessing internet services.

A report by Oxford Internet Surveys (OxIS) (2013) revealed that even though internet use continues to grow across all levels of income, more growth is in low-income households. The report further revealed that, the internet was used by 78% of the British population as of 2012, up from 73% in 2011. Deen-Swarray et al (2012) discovered that, in Africa, the emergence of mobile internet and the wider adoption of smart mobile

phones have increased internet usage to 15.5% in 2012 from less than 10% in 2008. Further to Deen-Swarray et al (2012), the adoption of internet use in Africa has been rather slow, mainly as a result of limited connectivity across many countries and due to very high costs of services where they are available.

Fuchs and Horak (2006) discovered that there is a relationship between the respondents' monthly income and education level. In addition to Fuchs and Horak (2006), a positive relationship between the respondents' monthly income and having internet access was also observed. This indicates that as income increases the chances to have internet access also increases. Education level is one of the key factors which enable people to be computer literate and be able to use the internet. According to Funda (2014), there is a relationship between the respondents' monthly income and the frequency of internet access. Furthermore, most of the general public who access the internet daily has an undergraduate degree, followed by those with a grade 12 school leaving certificate (Funda, 2014). Frequency of accessing the internet increases as the income level increases. Internet social divide is based on the income and education gap (Funda, 2014). For example, there are people who cannot afford computers and smartphones to access internet due to low income. Furthermore, some people are illiterate and unable to use either computers or smartphones to access internet.

There is no significant relationship between ICT investments and internet usage (Fuchs & Horak, 2006). This indicates that capital investment does not automatically bring

technology such as internet to the people. The income and education levels are still determinates for internet accessibility and usage. One of the main advantages of internet access is that, it provides information and services to the people. These services are otherwise unavailable to the general public with low socio-economic characteristics. Internet access must be accompanied by a goal designed to improve residents' livelihoods (International Development Research Centre [IDRC], 2014).

A study by IDRC (2014) revealed internet access as an effective contributor to economic and social development. Additionally, the full potential of internet services can be achieved by investing in human capital projects such as internet literacy programs. The internet can be a powerful tool to achieve many development goals, including poverty alleviation. Internet availability is associated with a rise in incomes and people with high level of income appear to benefit more than low income earners from internet adoption. However, when the income effect is controlled among those who use the internet, the differences in internet access due to income disparities is likely to disappear.

2.5 SATISFACTION LEVELS PER AGE AND GENDER

Ahmad and Al-Zu'bi (2011) discovered that, internet customer satisfaction level tends to vary per personal demographic characteristics such as age and gender. Females are more likely to be satisfied than males, while young people are more satisfied than the older people (Bhuiyan et al., 2015). Age affects internet user satisfaction, as the age increases, the satisfaction level decreases. In other words, when the age increases, the internet use

experience also increases while satisfaction decreases. For instance, people with many years of using very fast internet services are likely to be dissatisfied with slow internet services.

In contrast to the above finding, Cakir (2014) concluded that, internet satisfaction levels do not significantly differ in terms of age and computer literacy levels. It was found that neither gender nor age affected overall satisfaction level. The satisfaction level significantly differs in terms of internet experience. When the internet user has more years of internet experience, they feel more satisfied with their internet services. It was uncovered by Ceccucci et al. (2011) and Mattila (2005) that, customers share equal levels of satisfaction when using mobile internet services regardless of how many operators they are connected to. Furthermore mobile internet users appear to be more satisfied with mobile internet services than fixed-line internet users. A study by Hauge et al. (2010) contradicted the findings above for mobile and fixed internet satisfaction levels. Mobile internet users were identified to be slightly less satisfied than fixed-line internet users.

2.6 SATISFACTION LEVELS PER EDUCATION AND INCOME

Education level affects internet use in multiple ways, for instance highly educated people are more likely to be satisfied with the internet than less educated people (Ahmad & Al-Zu'bi, 2011). Junoh and Yaacob (2011) discovered that the price factor has no significant relationship with internet customer satisfaction levels. There are different

views on the factors influencing satisfaction levels, price and internet connection speed were identified by some researchers as influencing satisfaction level. However, in developed countries where internet services are easily affordable, the price might not negatively affect satisfaction level.

A study conducted by the Australian Communications and Media Authority (ACMA) (2010), revealed that, internet users with high income were more dissatisfied with their services than those of lower income. Moreover, high income internet users were highly dissatisfied due high subscription fees which they were paying for internet services. Furthermore, low data speeds are factors which cause the highest level of dissatisfaction among household consumers regardless of income levels. This indicates that, internet users with high income are likely to be dissatisfied and the internet connection speeds have an influence on customer satisfaction levels.

Looking at internet usage and satisfaction level, Seymour and Naidoo (2013) reached the following conclusion; users with higher usage of internet are more satisfied with internet services. How consumers make use of the internet directly impacts the nature and level of their perception regarding the technology. There is a significant relationship between a user's rate of use, which depends on affordability or income levels and satisfaction with the technology (Seymour & Naidoo, 2013). This shows that customers that are specialised and intense users of internet are more satisfied with the technology as they are likely to be connected to internet packages meeting their needs.

2.7 MEASURING INTERNET CUSTOMER SATISFACTION

Nearly three quarters of all households in the U.S.A. have internet connections (American Customer Satisfaction Index [ACSI], 2014). Additionally, many households have high speed internet services but experienced a decline of two percentages in household internet customer satisfaction level. The recorded decline was based on the score of sixty-three recorded in 2014 compared to sixty-five in 2013. The customer satisfaction declined as a result of the following factors; the number of internet users grew without upgrading bandwidth, which resulted in slow internet connection speeds. In addition, internet services were provided at higher subscription fees to customers.

A study by Gyamfi et al. (2013) investigated users' satisfaction level on the quality of the internet banking services in the Ghanaian banking industry. The research revealed that the higher income earners favoured the internet for their banking transactions. The results also highlighted differences of satisfaction levels among income groups. The lower income groups expressed dissatisfaction with internet banking.

In Namibia, a report on the level of satisfaction on services provided by MTC was conducted by Raimond (2001). Findings indicated that most of MTC clients were satisfied with the services they were receiving. The services were adequately meeting customers' communication needs. Even though this research applied purposive sampling, the study didn't take into account the impact of geographic location on

satisfaction levels. There were no statistical tests for correlation between variables conducted.

There are different telecommunication companies in Namibia providing mobile and fixed internet services. MTC and TNM offer 3G and 4G which are mobile voice and internet services while TN offers 'Speedlink', a fixed voice and internet service to customers (Buddle Comm, 2014). After providing services to customers, companies need to understand the perceptions of their customers and deliver satisfactory services in order to satisfy customers. According to Jakobs (2009), the state-owned telecommunication companies performed poorly in terms of service delivery. Waiting periods for service connections increased and the quality of those services were below standard. In addition, such corporations often required large subsidies from the state, thus putting pressure on national treasuries.

CRAN (2014) stipulates that, the quality of internet services can be measured in terms of download and upload speeds. As of 2014 TNM had the fastest download and upload speeds compared to MTC and TN. Download speed for TNM was 22,926 Kbps, which was about two times faster than MTC's download speed of 11,658 Kbps. TNM upload speed was 8,874 Kbps while MTC's upload speed was 7,256 Kbps; TNM upload speed was more than 1000 Kbps faster than MTC's upload speed. TN's download speed was 3,120 Kbps and upload speed was 1,753 Kbps. TN's download speed was more than three times slower compared to MTC's download speed. TNM download speed was

28,340 Kbps in 2013. The speed slowed down on average in 2014 due to a high number of new customers using TNM internet services.

CRAN (2015) concluded that, the average download and upload speeds for TN and MTC's was higher than those of the largest operators in neighbouring South Africa. TNM achieved the best performance in terms of download and upload speeds. This was likely due to the ratio of capacity to the very low number of subscribers on TNM's network. Speed versus consistency is a crucial issue for measuring bandwidth performance. An example of speed without consistency would be having a 4 Mbps internet speed service but only 2 Mbps speed is delivered to the customer.

2.8 APPLICATION OF GIS IN ICT SERVICES

According to van Loo (2014), telecommunications providers are affected by geographical factors more than many other types of businesses. They operate within service areas and the infrastructure that delivers services which are linked directly to the location of each customer. Companies segment the characteristics of customers geographically using GIS. This does not only enable them to market more effectively but also helps companies forecast the demand for services (van Loo, 2014). Moreover, targeting customers and predicting where and when growth will occur involves integrating corporate intelligence, economic and demographic data in a GIS system. Furthermore, when using the GIS system, countless location-based services such as tracking, location finding, and location-based advertising can be implemented (Alkhayar, Amro, & Shaiba, 2008).

According to a report by Telecom Namibia (TN) (2010), the GIS system at the company has grown to be a vital management decision-making tool. With the deployment of wireless systems for broadband services, the company uses GIS to create coverage maps. The technology allows TN to generate maps and integrate detailed market information to create a picture of business potential. These maps help analyse network coverage with more accuracy and efficiency. TN has applied GIS in network planning, but did not incorporate the GIS with customer satisfaction mapping.

2.9 MAPPING AND INTERNET SERVICES

Most European and Northern American countries have high average internet download connection speeds as highlighted in figure 2.1. The average internet download connection speeds in those countries are more than 20 Mbps. Africa and Southern America countries have very low average internet download connection speeds of just between less than 2.5 to 12.5 Mbps (Vox, 2014). The cost and connection speeds of the internet in developed and developing countries around the world was visualized by Frucci (2009) in figure 2.2. Developed countries had the highest internet connection speeds compared to developing countries. Japan had the highest internet connection speed in the world, followed by Korea and Finland. The average internet connection speed in Japan was 60 Mbps and people paid \$ 0.27 per 1 Mbps.

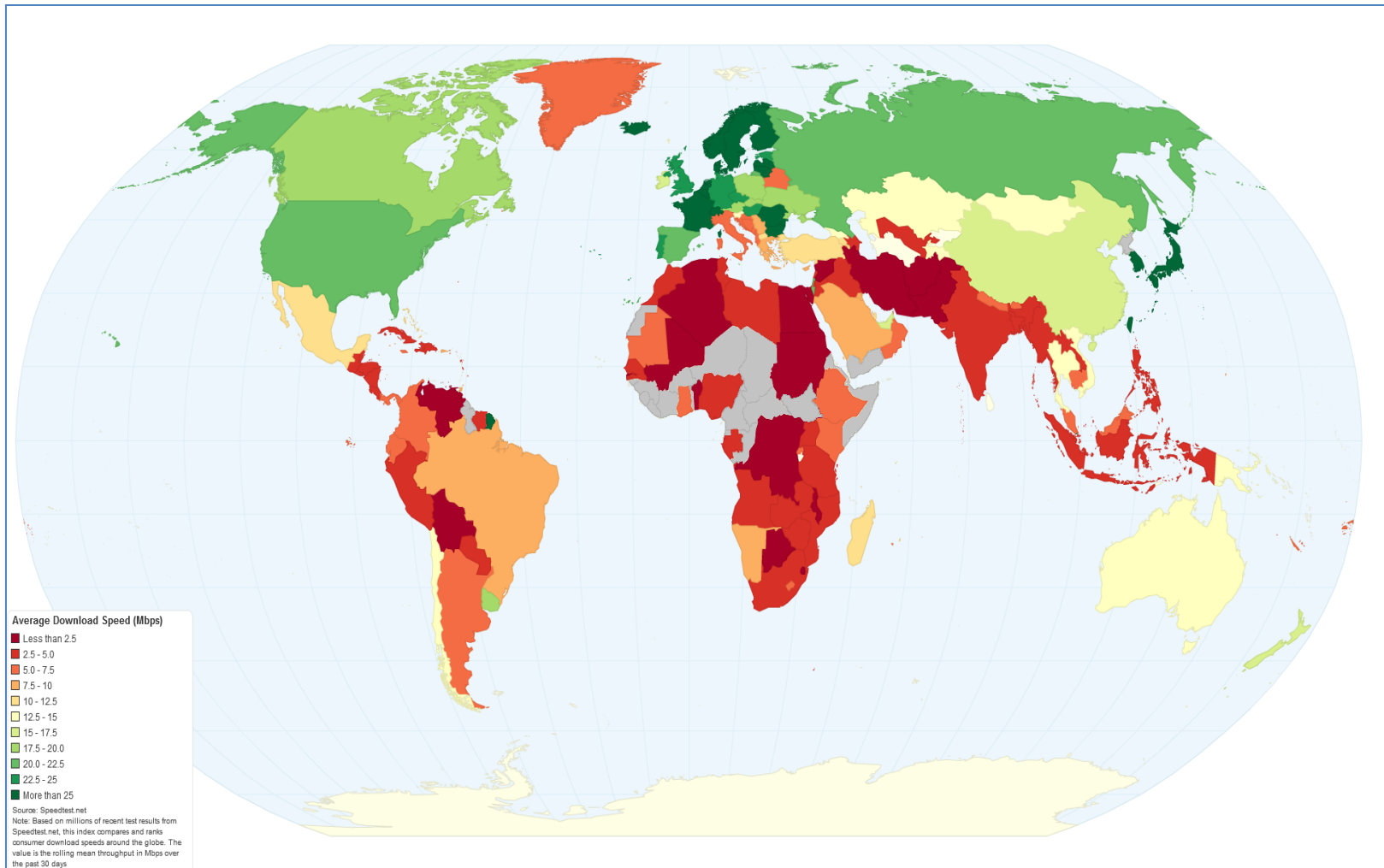


Figure 2.1: Average Download Speed Around the World

Source: Vox, 2014).

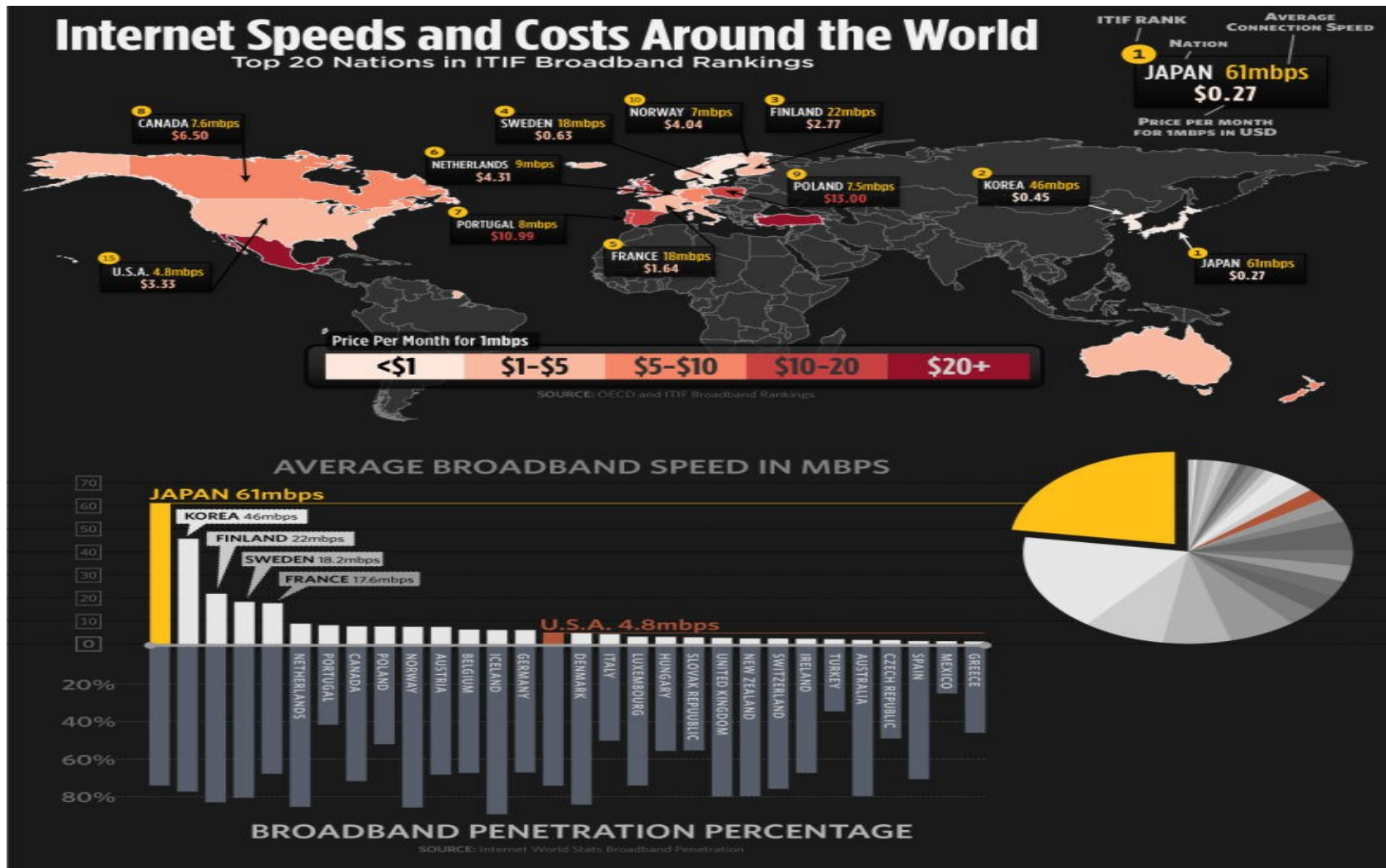


Figure 2.2: Internet Speed and Cost Around the World

(Source: Frucci, 2009)

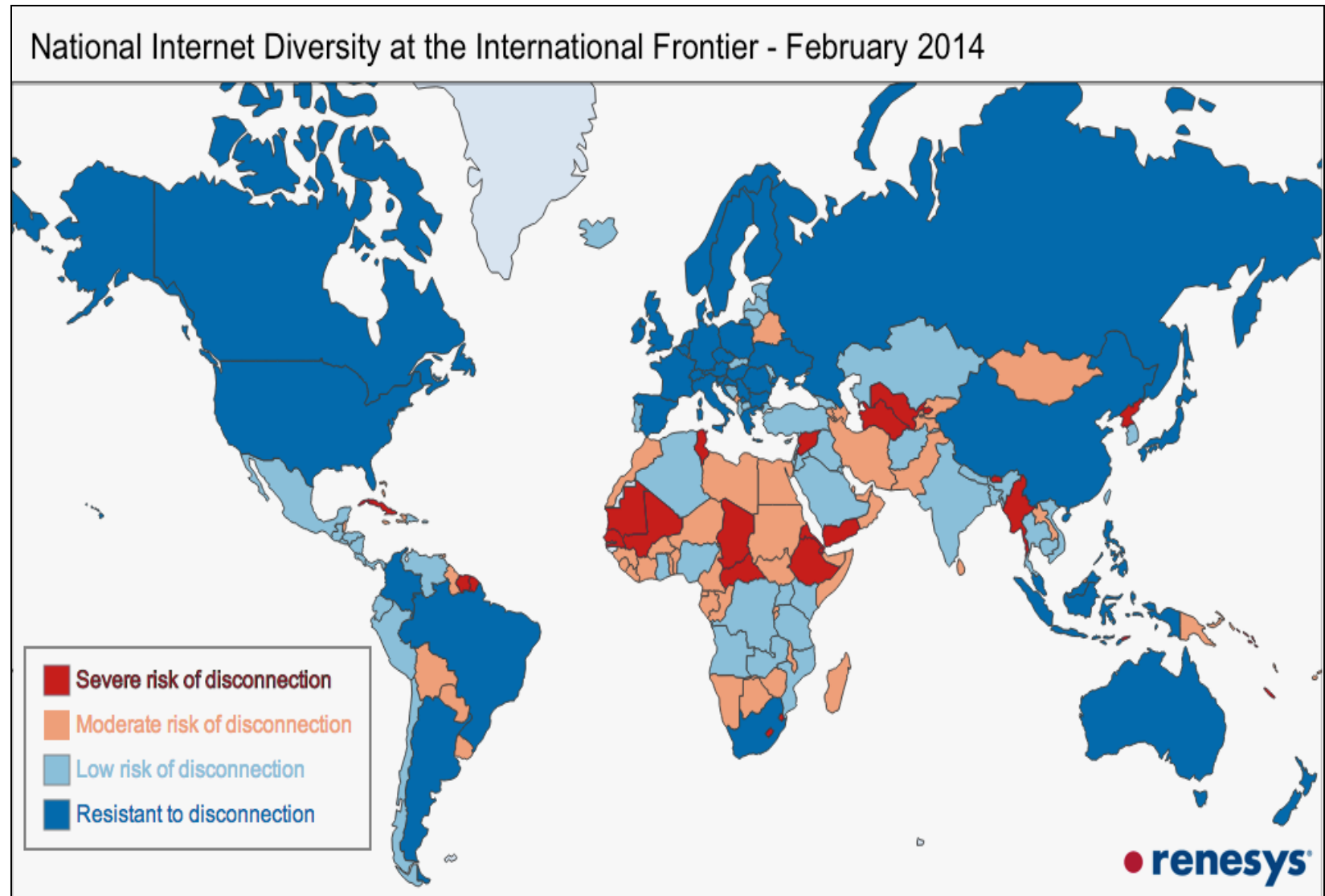


Figure 2.3: National Internet Diversity at the International Frontier

(Source: NIDIF, 2014)

A study by Fastmetrics (2016) discovered the occurrence of higher internet connection speeds in Asian countries. Internet connection speeds in those countries was much higher than the average global internet speed of 5.6 Mbps. According to Frucci (2009), South Korea was the country with the fastest internet connection speed of 21.1 Mbps. Japan and Hong Kong residents, on average, were connected to the internet speeds above 16 Mbps. The other region which was leading the way in faster internet was Scandinavia. Sweden, Norway, Finland and Denmark all had average internet speeds above 16 Mbps. The Netherlands, Switzerland and Latvia provided some of the fastest internet in the world. These countries actually ranked above Finland and Denmark when it came to internet connection speeds. Smith (2016) also discovered South Korea as a country with the highest internet connection speeds, followed by Ireland, Hong Kong, Sweden, Netherlands, Japan and Switzerland. The majority of the worst performing regions are Africa, the South Pacific, the Middle East and South America.

The Telecom Regulatory Authority of India (TRAI) has a smartphone application called MySpeed which assists users to monitor internet connection speed. MySpeed has ability to log and report connectivity issues, irrespective of the mobile or broadband service provider directly to TRAI. There is a lot of complaints of discrepancies between the speeds the operators claim and charge for, and the actual speeds that users get in real world usage. MySpeed is directly trying to tackle the issue of poor internet connection speeds as internet users are able to immediately report poor services to the regulator (Telecom Regulatory Authority of India [TRAI], 2016).

The likelihood of internet disconnections in most of the Southern African Development Community (SADC) countries is low to moderate risk as highlighted in figure 2.3 above. South Africa, USA, Russia and most of countries in Asia and Northern America are resistant to internet service disconnections (National Internet Diversity at the International Frontier [NIDIF], 2014).

2.10 MAPPING AND INTERNET SERVICES IN NAMIBIA

MTC has covered 95% of the Namibian population with voice and internet services since its inception in year 1995 (Mobile Telecommunication Company [MTC], 2016). Figure 2.4 indicates expected coverage for 2-watt handheld mobile phones. To have access to voice and internet services on MTC mobile network is only possible within the network coverage area.

TNM has not revealed the percentage of the Namibia population its mobile network covers with voice and internet services. TNM is still new to the Namibian market and was acquired by TN in year 2012 (TN, 2013). In year 2014, TNM extended its 3G+ and 4G (LTE) based mobile network to 10 major towns in Namibia (TN, 2014).

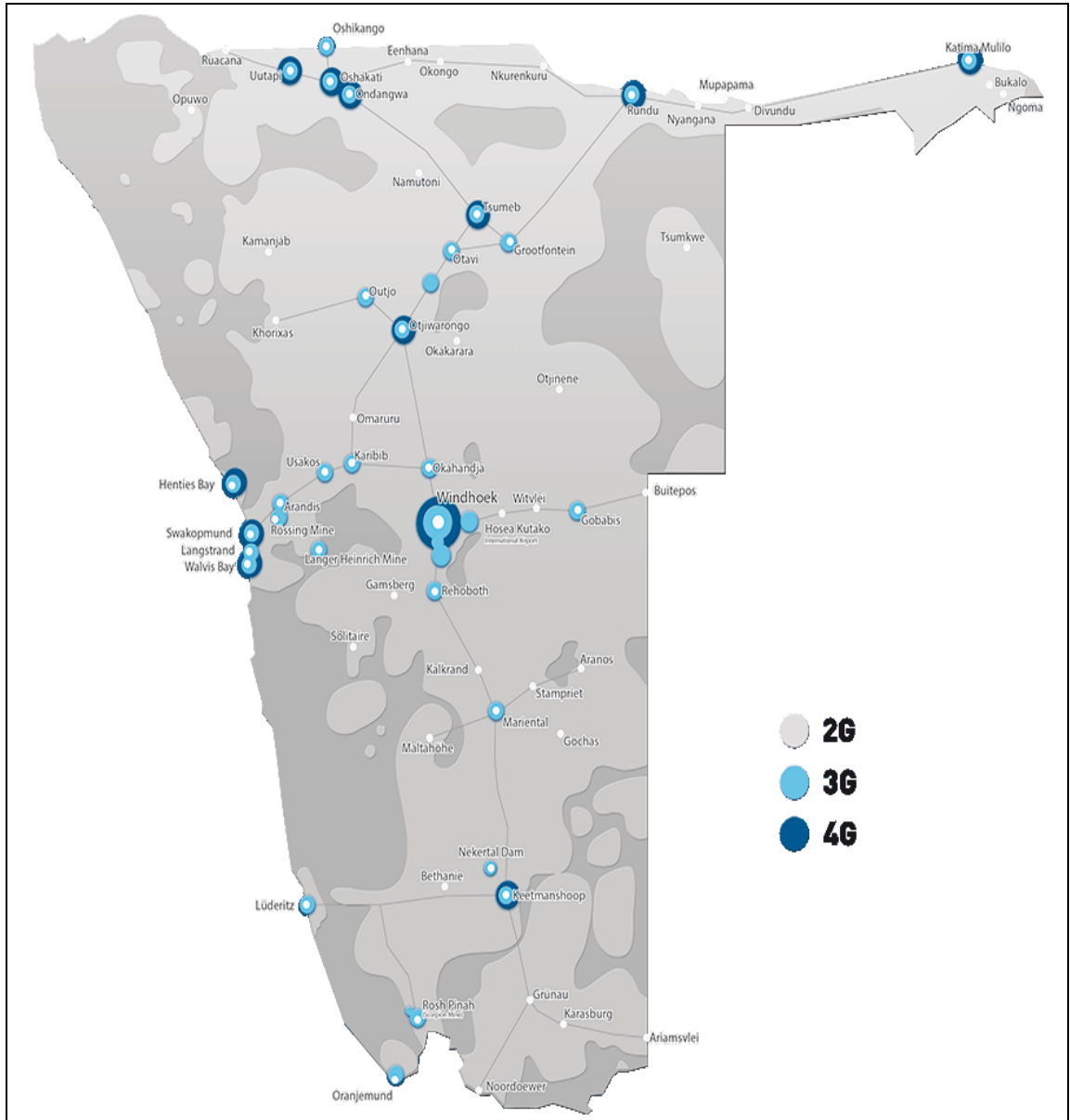


Figure 2.4: MTC Mobile Coverage

(Source: MTC, 2016)

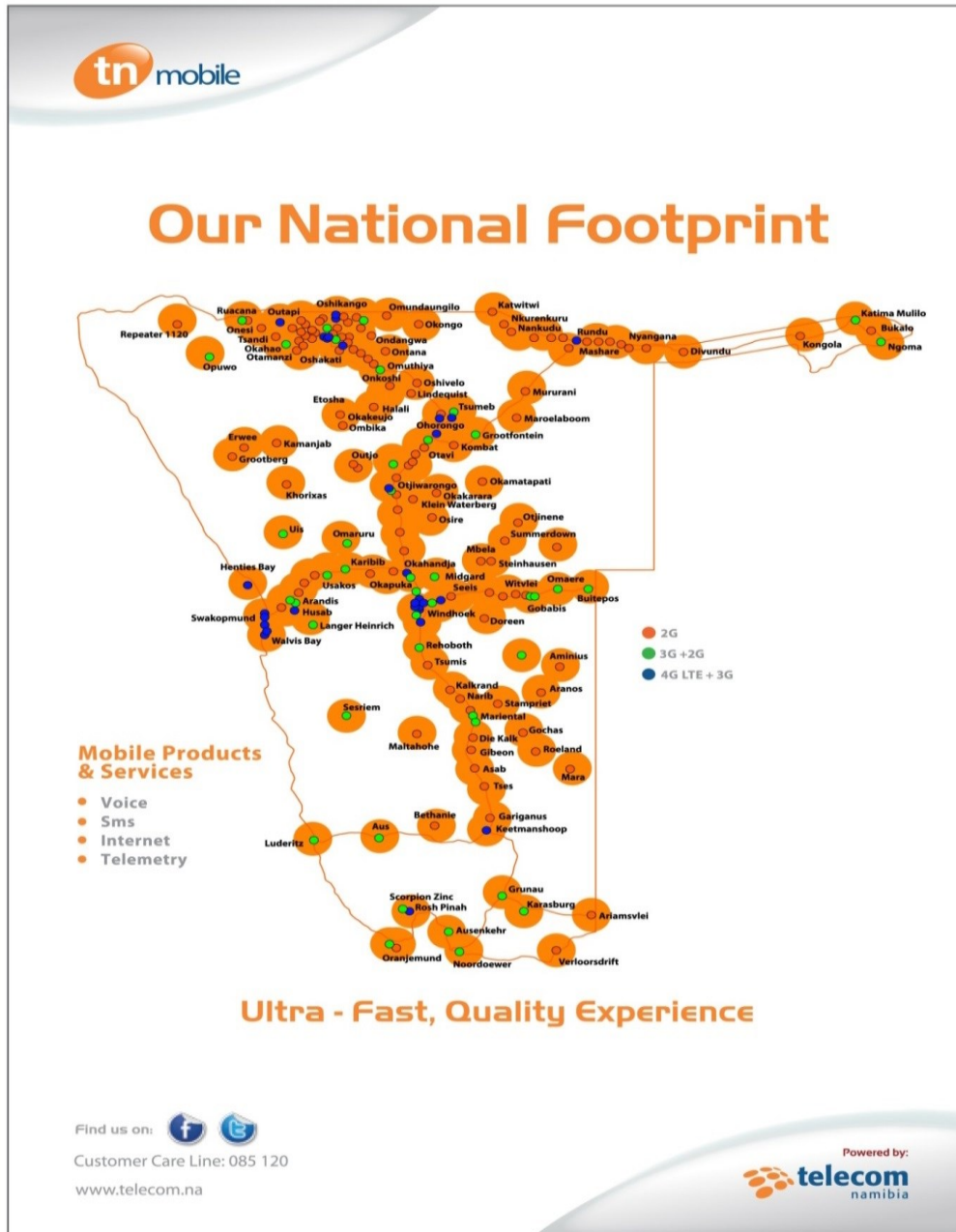


Figure 2.5: TN Mobile Coverage

(Source: TN, 2014)

SchoolNet Namibia is an ICT company developed in 2000 to provide ICT services to rural schools within Namibia. According to Buisson and Morris (2005), SchoolNet Namibia has achieved above expectation in just over five years in terms of connecting schools with internet services. SchoolNet's independent educational Internet Service Provider (ISP) initiative has successfully connected around 300 schools. Furthermore SchoolNet has connected numerous other educational clients, including libraries, teacher resource centres and non-government agencies, to the internet. The SchoolNet's ISP programme assisted to set up computer laboratories in schools and resource centres. Most of the internet connections were provided to schools in rural and disadvantaged areas where there were neither telephone lines nor connections to the power grid.

TN is the major fixed voice and internet service provider in Namibia and has approximately 12,000 km of fibre optic cable across the country. TN rolled out Multi Service Access Nodes (MSANs) to support fibre optic to the home capability in order to phase out the fixed line voice-only network. TN plans to continue using copper infrastructure in existing network areas and deploying fibre to the homes in new developments. Further to TN's initiatives, 72 MSAN nodes were deployed which resulted in increasing broadband port capacity. One of the MSAN nodes was installed at the Omeya Golf Estate during 2014. TN introduced a 120 Mbps High Speed Broadband (HSBB) internet access on Fibre to the Home (FTTH) for households in selected urban areas as a pilot (TN, 2014).

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter covers the methodological approaches which were adopted in the study. The study areas are presented, while the research design assisted to define the study population to be considered. Further analysis of the study population made it possible to define the study sample. The data collection approach is highlighted, including ethical permission which was obtained before data collection was conducted. Research instruments, procedures, data analysis and study research ethics are also explored in this chapter.

3.2 STUDY AREA

The research was carried out in Windhoek the capital city for the Republic of Namibia. Windhoek has about 23 suburbs as displayed in figure 3.1 below. The study areas are divided into formal and informal residential settlements. Formal settlements are represented by Pioneers Park Ext 1 (middle to high income area located in Pioneers Park suburb) and Grysblock Ext 1 (low income area located in Wanaheda suburb). Greenwell Matongo Ext 1 is a low income informal settlement located in Goreangab suburb. Study areas are selected in order to achieve the research objective of conducting analysis on satisfaction levels across areas of high to low income and education levels.

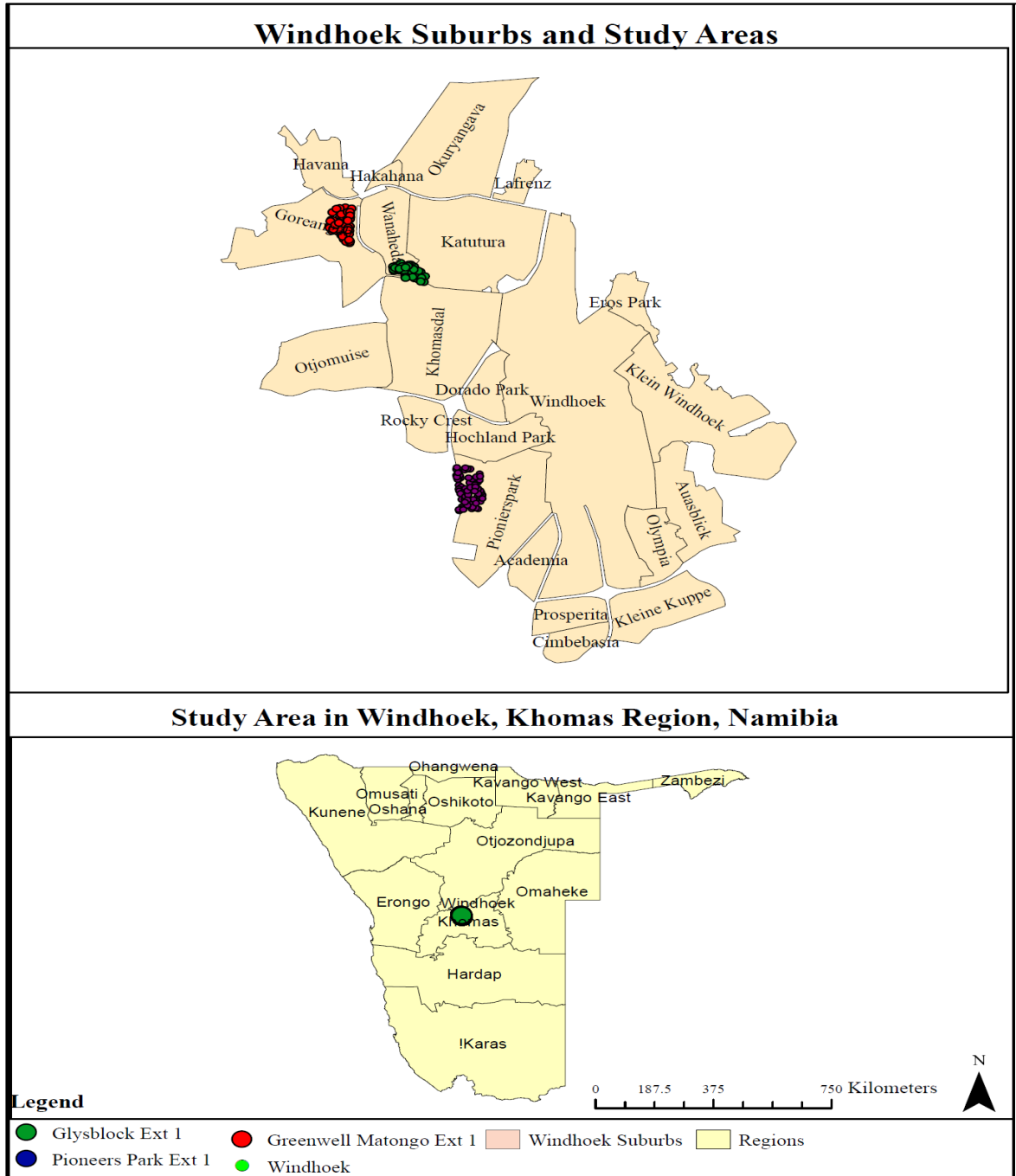


Figure 3.1: Study area

3.3 RESEARCH DESIGN

The study employed a survey research methodology, which is a quantitative method where the researcher posed predetermined questions to a sample of individuals residing in study areas. The research was descriptive in nature as the findings were used to assess and describe internet satisfaction levels from areas of low to high income levels. Survey research methodology made it possible to select a sample using probability technique so that data collected could be correlated between economic, demographic factors and internet service take-up and satisfaction using the Statistical Package for the Social Sciences (SPSS). Moreover, probability sampling method which in most cases is associated with survey methodology made it possible for survey results to be generalised to the entire study population. Primary target respondents were house owners, who were systematically selected to participate in the survey.

SPSS software's descriptive tool was used to produce cross tabulations and chi-square tests were conducted to determine the significance levels. Chi-square tests further assisted to determine the direction of the relationship of certain variables of interest.

ArcGIS map overlay technique was used to produce maps depicting the usage distribution patterns of internet services. Data collected from internet users was interpolated using ArcGIS tool "Inverse Distance Weighted (IDW)" and a geospatial analysis of satisfaction levels of internet users per residential settlement was concluded.

3.4 POPULATION AND SAMPLE SIZE

The population of the study consisted of 1914 standalone dwelling units (929 for Greenwell Matongo Ext 1, 508 for Pioneer Park Ext 1 and 477 for Grysblock Ext 1).

A formula to get a right representative sample size of the population was adopted from Smith (2013) below:

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

StdDev = Standard Deviation = 0.5, so as to be 94% confident in the research findings, the margin of error is 6% (0.06).

Sample size = $((1.88)^2 * 0.5(0.5)) / (0.06)^2$

$(3.5344 * .25) / 0.0036$

$0.8836 / 0.0036$

245.4444444

245 respondents were needed

According to Fluid Surveys (2014), calculating the right sample size is crucial to gaining accurate information. The survey's confidence level and margin of error almost solely depends on the number of responses you received. The sample size formula from Smith (2013) further assists to avoid under and over sampling the target population. Under sampling can lead to the production of poor survey results while over sampling tends to make survey undertaking too cost.

The following finite population correction formula adopted from Fluid Surveys (2014) was applied to get the true sample size. There is a difference between true sample size and sample size in that normal sample size is not perfectly aligned to the population size, while the true sample size takes into consideration the size of the population.

$$\text{True Sample} = (\text{Sample Size} * \text{Population}) / (\text{Sample Size} + \text{Population} - 1)$$

$$n = (n_0 * N) / (n_0 + N - 1).$$

Where n = sample size,

n_0 = is the sample size without considering the finite population correction factor

N = is the population.

$$\text{True sample size} = ((245 * 1914) / (245 + 1914 - 1)) = 217$$

The minimum required sample size was 217, but in order to counter the effects of none responses, the sample size was increased to 248 and the breakdown of the sample (evenly distributed) per residential area as follows:

Greenwell Matongo Ext 1 sample size = 87

Pioneer Park Ext 1 sample size = 81

Grysbloek Ext 1 sample size = 80

In order to assess the accuracy of the interpolation analysis, 15 (6% of the 248 sample size) additional dwelling units were randomly selected (5 for each residential settlement). The validation sample size was selected based on the recommendations of Walfish (2017) stipulating that a validation sample size need to be between 3 and 5% of the study sample size.

Results from the 15 completed questionnaires were used to validate the interpolation analysis. A sample size of 263 (including 15 sample size for validation) potential users of internet services was employed in the study.

3.5 SAMPLING PROCEDURE

Eighty-one out of 508 dwelling units (standalone houses) in Pioneer Park Ext 1 were systematically sampled. This sampling technic assisted to easily achieve a good coverage of the study area. Sampling started by selecting one dwelling unit randomly between 1 and 6 and then every 6th (sampling interval = $508/81 = 6.3$) dwelling units from the randomly selected dwelling unit. The same sampling procedure was applied to the respective other areas. Seventeen percent (80 dwellings) from Grysblock Ext 1 (with estimated 477 dwelling units) were selected, from one randomly selected dwelling unit between 1 and 6 and subsequently every 6th (sampling interval = $477/80 = 5.9$) dwelling units were sampled. Eighty-seven out of 929 dwelling units in Greenwell Matongo Ext 1 were selected, from a randomly selected dwelling unit between 1 and 11 and thereafter every 11th dwelling (sampling interval = $929/87 = 10.6$).

3.6 RESEARCH INSTRUMENT AND DATA COLLECTION

A self-administered structured survey questionnaire was used to collect data from potential users of internet services. The self-administered structured questionnaire was conducted in individual setting where it was presented physically in person to

respondents; the questionnaire was collected by the researcher on agreed dates with the respondents.

The following key Likert scale questions were adopted in the questionnaire to assess customer internet satisfaction levels, full list of questions can be found in Appendix A:

- ✓ **Key Question 1:** Internet connection speed is? **Reply options were,** Very fast; Fast; Medium; Slow; Very Slow
- ✓ **Key Question 2:** Your internet connection (uptime) is? **Reply options were,** On all the time; On most of the time; Medium; Off most of the time; Off all the time
- ✓ **Key Question 3:** Internet download speed is? **Reply options were,** Very fast; Fast; Medium; Slow; Very Slow
- ✓ **Key Question 4:** Internet upload speed is? **Reply options were,** Very fast; Fast; Medium; Slow; Very Slow

During data collection, completed questionnaires were checked for errors while still at the respondent's residences in order to identify inconsistent or missing data. This verification process assisted in avoiding second visits to the respondents' houses. Collected information using questionnaires were entered in SPSS for further data cleaning exercise.

A Global Positioning System (GPS) device was used to collect GPS points for all the sampled dwelling units in the study areas. The GPS coordinates were captured at the gates or dwelling unit entrances of the potential internet users.

3.7 PROCEDURE AND DATA ANALYSIS

The SPSS data file was arranged in a way where columns displayed variables such as education and income levels, while the row portrayed each individual case of the potential internet user. Frequency tables were produced in order to identify outliers and inconsistent data in the survey dataset. Missing values were mostly discovered on variables (e.g. income level) which were deemed to be too confidential by respondents.

The satisfaction score variable was created from the collected data specific to internet speed connection, internet download/upload speed and internet uptime variables. Very slow category was assigned 0 score, slow category was assigned 25, medium was assigned 50, fast was assigned 75 while very fast was assigned 100 satisfaction score. The internet uptime variable had the following categories, off all the time, which was assigned 0, off most of the time was assigned 25, medium was assigned 50, on most of the time was assigned 75 while on all the time was assigned 100 satisfaction score. The average score from the four variables (internet speed connection, internet uptime, download and upload speed) defined the satisfaction score for each internet user.

Data analysis was carried out using SPSS tools such as chi-square test and cross tabulation; cross tabulation of variables was performed. For instance, satisfaction level per age and gender was assessed. Cross tabulation helped to understand how different variables are related to each other. The influence of income and education level on internet satisfaction levels was also derived from cross tabulation results. Most of the study variables were categorical which required the application of the Pearson's chi-square test in SPSS to determine if there is association between different categorical variables. Pearson's chi-square test was also applied to evaluate how likely it is that the observed relationships are due or not due to chance. For instance, Pearson's chi-square test was completed in order to determine if the influence of age on internet take-up is due to chance or not. This assisted to accept or reject defined study hypothesis.

Overall SPSS's cross tabulation and chi-square test was used to test if there are significant relationships between demographic and economic variables and internet satisfaction level. Moreover, SPSS descriptive tool was also used to calculate the satisfaction level (mean score from satisfaction with internet connection speed, uptime, upload and download speeds) for each individual internet user.

Information collected from the survey was entered in Microsoft Excel and imported in ArcGIS 10.3 software. GPS coordinates were verified in ArcGIS software by overlaying them on Google street maps to ensure that the points were accurately captured.

Responses from each potential internet users were attached to the specific GPS coordinate of the dwelling unit.

ArcGIS spatial analysis involved interpolation of the collected information to support a geospatial analysis of satisfaction levels of internet users. The internet satisfaction score was the main variable which was employed during the IDW interpolation procedure. The interpolation of satisfaction scores was per the other variables of interest such as age, gender, education and income. Maps were created for each residential area in order to conduct a satisfaction level comparative analysis between areas with low income to the areas with high income levels. The IDW interpolation method was selected because the characteristics of the surface of the study areas were assumed to be driven by local internet satisfaction level variation. IDW worked best because sample points were evenly distributed throughout each study area and they were also not clustered.

The geospatial analysis of satisfaction levels of internet users were produced by engaging the following procedures:

- The Arc Toolbox from ArcGIS 10.3 menu was selected, and then the IDW interpolation method was specified. Under the input point features, Grysblock Ext 1, Pioneers Park Ext 1 and Greenwell Matongo Ext 1 survey point datasets were selected.
- The IDW interpolation was then conducted separate for each suburb's GPS point coordinates.

- Under z value field, satisfaction score variable was selected. The power value and the number of points under variable, search radius were left at default as these were optional fields.
- Finally, the number of satisfaction classes (interpolation categories) was specified to 10 classes as to make the data manageable.

3.8 RESEARCH ETHICS

An Ethical clearance certificate from UNAM (University of Namibia) School of Postgraduate granted permission to the researcher to conduct the study. This document defined parameters under which the study would be carried out without causing any harm to the study subjects. The participation in the survey was voluntary and sampled potential respondents had the right to refuse to complete the questionnaires. The information that was collected from potential internet users was kept confidential. Research results were produced at aggregated level to maintain respondent confidentiality. No names of the respondents were recorded on the questionnaires, but code names were created to identify the respondents. Practical research ethical issues were as follows;

- Internet users with very poor and faulty internet services expected the researcher to report such problems to their service providers. This was not part of the researcher's work but was accommodated during data collection process. The

researcher conveyed all faults to their service providers who promised to contact affected internet users to resolve service faults.

- GPS coordinates were captured at the entrances/gates of the dwelling units of the respondents before the questionnaire was administered. This is due the fact that some respondents were not comfortable for the researcher to take GPS readings close to their houses.

CHAPTER 4: RESULTS

4.1 INTRODUCTION

This chapter focuses on the findings of the study. The overall research results from all the study areas and each suburb are summarised. The results of the research arranged per study objective are provided in this chapter. SPSS survey results will be explored and spatial analysis findings from ArcGIS will be presented.

4.2 SURVEY RESULTS

House Ownership

The majority of the 248 respondents in all suburbs are house owners while in Grysblock Ext 1, 53.8% of the respondents own houses and 72.8% of the respondents in Pioneers Park Ext 1 also are the house owners. While only 43.7% of the respondents in Greenwell Matongo Ext 1 are the house owners. There are more tenants in Greenwell Matongo Ext 1 compared to Pioneers Park Ext 1 and Grysblock Ext 1. The distribution of tenants is as follows;

- 26.4% in Greenwell Matongo Ext 1
- 20.0% in Grysblock Ext 1
- 7.4% rents houses in Pioneers Park Ext 1.

The percentages of respondents who do not own houses but reside at their family houses are only 19.8% in Pioneers Park Ext 1 unlike in Greenwell Matongo Ext 1 which is at 29.9%. Grysblock Ext 1 has 26.2% of respondents residing in family houses.

When testing for a relationship between house ownership and suburb; we need to define the null hypothesis which states that there is no relationship between house ownership and suburb. However, the alternative hypothesis states that there is a relationship between house ownership and suburb.

The chi-square test results which are highlighted in table 4.1 reflect that there is a significant relationship between house ownership and suburb. This is based on the p (Probability-value) (Asymp. Sig. (2-sided)) of 0.002 (0.2%), which is less than 6% ($p < 0.06$) when using 94% confidence interval. Based on this result, the alternative hypothesis is accepted, meaning there is a significant relationship between house ownership and suburb. The null hypothesis is rejected based on the fact that, potential internet users who reside in a high income suburb (e.g. Pioneers Park Ext 1) are more likely to be house owners. Residents of a low income suburb (e.g. Greenwell Matongo Ext 1) are less likely to be house owners.

TABLE 4.1: CHI-SQUARE TEST FOR THE DISTRIBUTION OF HOUSE OWNERSHIP PER SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 16.795 ^a | 4 | .002 |
| N of Valid Cases | 248 | | |

Gender of Respondents

Out of all male respondents from all study areas, Pioneers Park Ext 1 have the highest percentage of male respondents at 40.0%; Greenwell Matongo Ext 1 have 31.2% while Grysbloek Ext 1, have the lowest percentage of males at 28.8%. Greenwell Matongo Ext 1 have the highest percentage of female respondents at 39.0%; Grysbloek Ext 1 reports 35.8%, while only 25.2% of females are from Pioneers Park Ext 1.

Findings of the chi-square test in table 4.2 highlight a significant relationship between gender and suburb as $p < 0.06$ as per Pearson chi-square test results in table 4.2. We can conclude that high income areas are likely to be associated with a high percentage of males than females.

TABLE 4.2: CHI SQUARE TEST FOR GENDER AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------------------|----|-----------------------|
| Pearson Chi-Square | 6.172 ^a | 2 | .046 |
| N of Valid Cases | 248 | | |

Generally, there are more males with internet connections at 53% (100) compared to females. Pioneer Park Ext 1 have 62% (48) male internet users. In contrast, Greenwell Matongo Ext 1 and Grysblock Ext 1 have more female than male internet users at 60% (30) and 53% (29) females respectively. Greenwell Matongo Ext 1 and Grysblock Ext 1 each have 1 respondent who refused to provide whether he/she have access to internet. Pioneer Park Ext 1 have 4 refusals that have internet connections. A total of fifty-three of respondents don't have internet services at home nor on their mobile phones.

Age Group of Respondents

Greenwell Matongo Ext 1 have the highest percentage of respondents aged less than 30 years at 47.6%. Pioneers Park Ext 1 have the lowest at 23.3% while Grysblock Ext 1 have second highest at 29.1%. Greenwell Matongo Ext 1 have the highest percentage of respondents aged between 31 and 40 years at 40.0%. Pioneers Park Ext 1 have the second highest at 30.6% while only 29.4 are from Grysblock Ext 1. Grysblock Ext 1 have the highest percentage of respondents aged between 41 and 50 years old at 48.5%. Pioneers Park Ext 1 have the second highest at 39.4% while Greenwell Matongo Ext 1 reports only 12.1%. Grysblock Ext 1 and Pioneers Park Ext 1 both have 50% of the respondents aged 60 years.

Based on the findings in table 4.3, when using 94% confidence interval, the alternative hypothesis is accepted meaning there is a significant relationship between age group and suburb as $p < 0.06$.

TABLE 4.3: CHI SQUARE TEST FOR AGE GROUP AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|---------------------|----|-----------------------|
| Pearson Chi-Square | 25.982 ^a | 8 | .001 |
| N of Valid Cases | 239 | | |

The highest percentage of internet users are young people, who are mostly aged less than 30 years. The contrary is only observed in Pioneer Park Ext 1 (the middle to high income area), where most of the internet users are aged between 31 to 40 years old. Overall, 48% (91) of the internet users are aged less than 30 years, 33% (62) are aged from 31 to 40 years. 13% (24) are aged from 41 to 50 years, 6% (12) are aged 51 to 60 years and none of the internet users are aged above 60 years old.

Monthly Growth Income

Greenwell Matongo Ext 1 have the highest percentage of respondents with a monthly income of less than N\$ 5000 at 55.9% (132). Grysblock Ext 1 have the second highest at 27.9% (66) while Pioneers Park Ext 1 have only 16.2% (36). Grysblock Ext 1 have the highest percentage of respondents with monthly income of between N\$ 5000 and N\$ 10000 at 61.2%. Greenwell Matongo Ext 1 have the second highest at 30.6% while Pioneers Park Ext 1 have only 8.2%. Grysblock Ext 1 have the highest percentage of respondents with a monthly income from N\$ 11000 to N\$ 20000 at 45.5%. Pioneers Park Ext 1 have the second highest at 30.3%, while Greenwell Matongo Ext 1 have

24.2%. Pioneers Park Ext 1 have the highest percentage of respondents with monthly income of between N\$ 21000 and N\$ 30000 at 82.1%. Grysblock Ext 1 have the second highest at 10.7% while Greenwell Matongo Ext 1 have only 7.2%. Pioneers Park Ext 1 is the only suburb with respondents earning a monthly income above N\$ 30000.

Findings of the chi-square test in table 4.4 indicate a significant relationship between growth monthly income and suburb as $p < 0.06$ when using 94% confidence interval.

TABLE 4.4: CHI-SQUARE TEST FOR MONTHLY GROSS INCOME AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|---------|----|-----------------------|
| Pearson Chi-Square | 113.532 | 8 | .000 |
| N of Valid Cases | 236 | | |

Sixty-four percent (71) of the respondents with less than N\$ 5000 monthly income have internet connections. 79.2% (38) of respondents with between N\$ 5000 and N\$ 10000 monthly income are connected to the internet. 87.9% (29) of respondents with between N\$ 11000 and N\$ 20000 monthly income have internet connections. 92.9% (26) of respondents with between N\$ 21000 and N\$ 30000 monthly income are connected to the internet. All 16 respondents with monthly incomes above N\$ 30000 have internet connections. Twelve respondents refused to provide their monthly income, of which 10 have internet connections at home or on their smart phones.

Greenwell Matongo Ext 1 have 53.2% (33) internet users earning less than N\$ 5000 monthly income, and 64.5% (20) are from Grysblock Ext 1 while all 18 respondents in Pioneer Park Ext 1 are connected to the internet. The respondents with internet connections falling within the monthly income of between N\$ 5000 and N\$ 10000 are as follows;

- 75% (3) in Pioneer Park Ext 1,
- 73.3% (22) in Grysblock Ext 1
- 92.9% (13) in Greenwell Matongo Ext 1

Grysblock Ext 1 have 73.3% (11) of the respondents connected to the internet who earn a monthly income of between N\$ 11000 and N\$ 20000. All respondents with a monthly income of between N\$ 11000 and N\$ 20000 have internet connections in Pioneer Park Ext 1 and Greenwell Matongo Ext 1. The respondents with internet connections and a monthly income of between N\$ 21000 and N\$ 30000 are as follows;

- 95.7% (22) in Pioneer Park Ext 1
- 66.7% (2) in Grysblock Ext 1
- 100% (2) in Greenwell Matongo Ext 1.

All 15 respondents from Pioneer Park Ext 1 with a monthly income above N\$ 30000 have internet connections. 11 respondents from Pioneer Park Ext 1 refused to provide their monthly growth income, of which 10 have internet connections.

Education Level of Respondents

Greenwell Matongo Ext 1 have the highest percentage of respondents who completed only primary education (Grade 7) at 54.1%. Grysblock Ext 1 have the second highest at 43.8% while Pioneers Park Ext 1 have only 2.1%. Greenwell Matongo Ext 1 have the highest percentage of respondents who completed only secondary education (Grade 12) at 40.9%. Grysblock Ext 1 has the second highest at 33.0% while Pioneers Park Ext 1 has 26.1%. Greenwell Matongo Ext 1 have the highest percentage of respondents who only completed a tertiary certificate at 54.2%. Pioneers Park Ext 1 have the second highest at 25.0% while Grysblock Ext 1 have 20.8% of respondents who completed a tertiary certificate. Pioneers Park Ext 1 have the highest percentage of respondents who completed only tertiary diploma at 41.2%. Grysblock Ext 1 has the second highest at 38.2% while in Greenwell Matongo Ext 1 is at 20.6%. Pioneers Park Ext 1 have the highest percentage of respondents who completed tertiary degree at 63.6%. Grysblock Ext 1 has the second highest at 25.0% and Greenwell Matongo Ext 1 has the lowest percentage of 11.4%.

Findings of the chi-square test in table 4.5 indicate that, there is a significant relationship between education level and suburb, this occurrence is significant when using 94% confidence interval as $p < 0.06$.

TABLE 4.5: CHI-SQUARE TEST FOR EDUCATION LEVEL AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 51.296 | 8 | .000 |
| N of Valid Cases | 238 | | |

In summary, 31.9% (15) of the respondents who completed only primary education have internet connections. 76.1% (67) of the respondents who completed only secondary education are connected to internet services. 91.7% (22) of the respondents who completed only a tertiary certificate have internet connections. 97.1% (33) of the respondents who completed only a tertiary diploma have internet connections. All of the 44 of the respondents who completed a tertiary degree are connected to the internet. Eleven respondents did not specify their educational achievements of which 8 of them have internet connections.

Based on table 4.6 below, Greenwell Matongo Ext 1 have 58.3% (21) of the respondents with secondary education connected to the internet. The respondents in Grysblock Ext 1 who completed tertiary certificates and tertiary degrees are all connected to the internet. The respondents in Pioneer Park Ext 1 who completed primary and secondary education, tertiary diplomas and tertiary degrees in Pioneer Park Ext 1 are all connected to the internet.

TABLE 4.6: INTERNET CONNECTION PER SUBURB AND EDUCATION LEVEL

| Suburb Name | Education Level | Have internet connection | Total |
|--------------------------------|------------------------|---------------------------------|--------------|
| Greenwell Matongo Ext 1 | Primary | 10 | 25 |
| | Secondary | 21 | 36 |
| | Tertiary Certificate | 13 | 13 |
| | Tertiary Diploma | 7 | 7 |
| | Tertiary Degree | 5 | 5 |
| Grysbloek Ext 1 | Primary | 4 | 21 |
| | Secondary | 23 | 29 |
| | Tertiary Certificate | 5 | 5 |
| | Tertiary Diploma | 12 | 13 |
| | Tertiary Degree | 11 | 11 |
| Pioneer Park Ext 1 | Primary | 1 | 1 |
| | Secondary | 23 | 23 |
| | Tertiary Certificate | 0 | 0 |
| | Tertiary Diploma | 14 | 14 |
| | Tertiary Degree | 28 | 28 |

Eleven respondents in Pioneer Park Ext 1 didn't specify their educational achievements and 8 of them have internet connections.

Type of Internet Service

Greenwell Matongo Ext 1 have the highest percentage of respondents who use 3G internet services at 37.5%. Grysblock Ext 1 have the second highest at 35.7% and Pioneers Park Ext 1 is at 26.8%. Pioneers Park Ext 1 have the highest percentage of respondents who use 4G internet services at 52.2%. Greenwell Matongo Ext 1 have the second highest at 34.8% while Grysblock Ext 1 is at only 13.0%. Pioneers Park Ext 1 have the highest percentage of respondents who use Fixed Broadband (FBB) internet services at 64.0%. Grysblock Ext 1 have the second highest at 24.0% while Greenwell Matongo Ext 1 reports only 12.0% FBB internet users.

Findings of the chi-square test in table 4.7 below, indicates that there is a significant relationship between internet service type and suburb as $p < 0.06$.

TABLE 4.7: CHI-SQUARE TEST FOR INTERNET SERVICE TYPE AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 24.599 | 4 | 0.000 |
| N of Valid Cases | 185 | | |

Speed of Internet Connection

Pioneers Park Ext 1 have 51.5% of internet users who rated the speed of internet connection “very fast”. Greenwell Matongo Ext 1 have 33.3%, while only 15.2% of the internet users rated internet speed “very fast” in Grysblock Ext 1. Pioneers Park Ext 1 have the highest percentage of internet users who rated the speed of internet “fast” at 54.0%. Grysblock Ext 1 have the second highest at 32.0%, while only 14.0% of the internet users rated “fast” in Greenwell Matongo Ext 1. Greenwell Matongo Ext 1 have the highest percentage of internet users who rated the speed of internet connection “medium” at 53.3%. Grysblock Ext 1 have the second highest at 26.7%, while only 20.0% of the internet users rated “medium” in Pioneers Park Ext 1. Grysblock Ext 1 have the highest percentage of internet users who rated the speed of internet “slow” at 40.0%. Pioneers Park Ext 1 have the second highest at 36.7% and 23.3% of the internet users rated “slow” in Greenwell Matongo Ext 1. Greenwell Matongo Ext 1 have the highest percentage of internet users who rated the speed of internet connection “very slow” at 40.4%. Grysblock Ext 1 have the second highest at 31.6% and 28.0% of the internet users rated “very slow” in Pioneers Park Ext 1.

Findings of the chi-square test in table 4.8 indicate that, there is a significant relationship between speed of internet connection and suburb, this occurrence is significant when using 94% confidence interval as $p < 0.06$.

TABLE 4.8: CHI-SQUARE TEST FOR SPEED OF INTERNET CONNECTION AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 20.279 | 8 | .009 |
| N of Valid Cases | 185 | | |

Internet Connection Uptime

Pioneers Park Ext 1 have the highest percentage (60.9%) of internet users who indicated that, their internet services are on “all the time”. Grysblock Ext 1 have the second highest at 26.1%, while only 13.0% of the internet users are from Greenwell Matongo Ext 1. Pioneers Park Ext 1 have the highest percentage of internet users with internet services switched “on most of the time” at 66.7%. Grysblock Ext 1 have the second highest at 20.0%, while only 13.3% of the internet users from Greenwell Matongo Ext 1 have internet connection “on most of the time”. All of the respondents who indicated “medium” in terms of their internet uptime experience are from Grysblock Ext 1. Greenwell Matongo Ext 1 have the highest percentage of internet users who indicated that their internet connection was “off most of the time” at 50.6%. Grysblock Ext 1 have 35.3%, while only 14.1% of the internet users are from Pioneers Park Ext 1.

Findings of the chi-square test in table 4.9 indicate that there is a significant relationship between internet connection uptime and suburb, this occurrence is significant when using 94% confidence interval as $p < 0.06$.

TABLE 4.9: CHI-SQUARE TEST FOR INTERNET CONNECTION UPTIME AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 52.794 | 6 | .000 |
| N of Valid Cases | 185 | | |

Speed of Internet Upload

Pioneers Park Ext 1 have the highest percentage of internet users who rated the speed of internet upload “very fast” at 54.9%. Greenwell Matongo Ext 1 have the second highest at 29.0%, while only 16.1% are from Grysblock Ext 1. Pioneers Park Ext 1 have the highest percentage of internet users who rated the speed of internet upload “fast” at 54.0%. Grysblock Ext 1 have 28.0% while Greenwell Matongo Ext 1 reports only 18.0% of respondents with “fast” internet upload speed. Greenwell Matongo Ext 1 have the highest percentage of internet users who rated the speed of internet upload “medium” at 50.0%. Grysblock Ext 1 have 31.2%, while only 18.8% of the internet users are from Pioneers Park Ext 1. Grysblock Ext 1 have the highest percentage of internet users who rated the speed of internet upload “slow” at 40.0%. Pioneers Park Ext 1 have 36.7%, while only 23.3% of the internet users are in Greenwell Matongo Ext 1. Greenwell Matongo Ext 1 have the highest percentage of internet users who rated the speed of internet upload “very slow” at 39.7%. Grysblock Ext 1 have 32.8%, while 27.5% of the internet users are from Pioneers Park Ext 1.

Findings of the chi-square test in table 4.10 indicate that there is a significant relationship between speed of internet upload and suburb as $p < 0.06$.

TABLE 4.10: CHI-SQUARE TEST FOR SPEED OF INTERNET UPLOAD AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 18.240 | 8 | .019 |
| N of Valid Cases | 185 | | |

Speed of Internet Download

Pioneers Park Ext 1 have the highest percentage of internet users who rated the speed of internet download “very fast” at 53.1%. Greenwell Matongo Ext 1 have 31.3%, while only 15.6% of the internet users are from Grysblock Ext 1. Pioneers Park Ext 1 have the highest percentage of internet users who rated the speed of internet download “fast” at 58.0%. Grysblock Ext 1 have 30.0%, while only 12.0% of the internet users are from Greenwell Matongo Ext 1. Greenwell Matongo Ext 1 have the highest percentage of internet users who rated the speed of internet download “medium” at 58.8%. Grysblock Ext 1 have the second highest at 23.5%, while only 17.7% of the internet users are from Pioneers Park Ext 1. Grysblock Ext 1 have the highest percentage of internet users who rated the speed of internet download “slow” at 44.8%. Pioneers Park Ext 1 have 31.1%, while 24.1% of the internet users are from Greenwell Matongo Ext 1. Greenwell Matongo Ext 1 have the highest percentage of internet users who rated the speed of

internet download “very slow” at 40.4%. Grysbloek Ext 1 have 31.6%, while 28.0% of the internet users are from Pioneers Park Ext 1.

Findings of the chi-square test in table 4.11 indicate that there is a significant relationship between speed of internet download and suburb as $p < 0.06$.

TABLE 4.11: CHI-SQUARE TEST FOR SPEED OF INTERNET DOWNLOAD AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 27.190 | 8 | .001 |
| N of Valid Cases | 185 | | |

Main Usage of Internet

Pioneers Park Ext 1 have the highest percentage of respondents using the internet for “Browsing for Information” at 48.2%. Both Grysbloek Ext 1 and Greenwell Matongo Ext 1 have 25.9% of people using the internet for “Browsing for Information”. Pioneers Park Ext 1 have the highest percentage of people using the internet for “Email” at 81.8%. Greenwell Matongo Ext 1 have 18.2%, while none of the respondents in Grysbloek Ext 1 use the internet for “Email”. Grysbloek Ext 1 have the highest percentage of respondents using the internet for “Research” at 45.7%. Greenwell Matongo Ext 1 have 30.4%, while only 23.9% of the respondents in Pioneers Park Ext 1 use the internet for “Research”.

Pioneers Park Ext 1 is the only suburb with respondents who use the internet for “Work purpose”. Greenwell Matongo Ext 1 have the highest percentage of people using the internet for “Social networking (Facebook, Twitter, WhatsApp)” at 46.6%. Both Grysblock Ext 1 and Pioneers Park Ext 1 have 26.7% of the respondents using the internet for social networking. Grysblock Ext 1 have the highest percentage of respondents using the internet for “Downloading music/videos” at 43.7%. Greenwell Matongo Ext 1 have 31.3%, while only 25.0% of the respondents in Pioneers Park Ext 1 use the internet for “Downloading music/videos”. Pioneers Park Ext 1 was discovered to be the only suburb with respondents using the internet for “Gaming”.

Findings of the chi-square test in table 4.12 indicate that, there is a significant relationship between main usage of the internet and suburb, this occurrence is significant when using 94% confidence interval as $p < 0.06$.

TABLE 4.12: CHI-SQUARE TEST FOR MAIN USAGE OF THE INTERNET AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 36.858 | 12 | .000 |
| N of Valid Cases | 184 | | |

Type of Internet Subscription

Greenwell Matongo Ext 1 have the highest percentage of respondents using “Prepaid” internet access at 42.2%. Grysblock Ext 1 have the second highest percentage at 35.8%, while only 22.0% of the respondents in Pioneers Park Ext 1 use “Prepaid” internet access. When it came to Post-paid internet access, Pioneers Park Ext 1 have the highest percentage of respondents using “Post-paid” internet access at 65.7%. Grysblock Ext 1 have the second highest percentage at 21.1%, while only 13.2% of the respondents in Greenwell Matongo Ext 1 use “Post-paid” internet access.

Findings of the chi-square test in table 4.13, indicates that the alternative hypothesis is accepted that, there is a significant relationship between type of internet subscription and suburb as $p < 0.06$.

TABLE 4.13: CHI-SQUARE TEST FOR TYPE OF INTERNET SUBSCRIPTION AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 37.193 | 2 | .000 |
| N of Valid Cases | 185 | | |

Internet Service Package

Greenwell Matongo Ext 1 have the highest percentage of respondents connected to 3G internet service at 37.5%. Grysblock Ext 1 have the second highest at 35.7%, while only 26.8% of the respondents are from Pioneers Park Ext 1. Pioneers Park Ext 1 have the highest percentage of respondents with 4G internet service at 52.2%. Greenwell Matongo Ext 1 have the second highest percentage at 34.8%, while only 13.0% of the respondents in Grysblock Ext 1 have 4G internet services. Pioneers Park Ext 1 have the highest percentage of respondents connected to 2 Mbps internet service at 93.3% while Grysblock Ext 1 have 6.7%. Pioneers Park Ext 1 have the highest percentage of respondents connected to 1 Mbps internet service at 54.5%. Grysblock Ext 1 have the second highest percentage at 27.3%, while only 18.2% of the respondents in Greenwell Matongo Ext 1 are connected to 1 Mbps internet services.

Findings of the chi-square test in table 4.14 informs that, the alternative hypothesis is accepted meaning, there is a significant relationship between internet service package and suburb, this occurrence is significant when using 94% confidence interval as $p < 0.06$.

TABLE 4.14: CHI-SQUARE TEST FOR SPEED OF INTERNET AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 37.357 | 8 | .000 |
| N of Valid Cases | 185 | | |

Monthly Expenditure (N\$) on Internet

Greenwell Matongo Ext 1 have the highest percentage at 53.3% of the respondents who spend less than N\$ 100 per month on internet services while Grysblock Ext 1 have 46.7%. Grysblock Ext 1 have the highest percentage at 42.3% of the respondents who spend between N\$ 100 and less than N\$ 250 on internet services. Greenwell Matongo Ext 1 have the second highest percentage at 39.4% while only 18.3% are from Pioneers Park Ext 1. Pioneers Park Ext 1 have the highest percentage at 44.1% of the respondents who spend between N\$ 250 and less than N\$ 500 per month on internet services. Greenwell Matongo Ext 1 have the second highest at 29.4%, while 26.5% of the respondents spend between N\$ 250 and less than N\$ 500 per month in Grysblock Ext 1. Pioneers Park Ext 1 have the highest percentage at 63.6% of the respondents who spend between N\$ 500 and less than N\$ 750 per month on internet services. Both Greenwell Matongo Ext 1 and Grysblock Ext 1 have 18.2% of the respondents who spend between N\$ 500 and less than N\$ 750 per month on internet services. Pioneers Park Ext 1 have the highest percentage at 94.1% of the respondents who spend between N\$ 750 and less than N\$ 1000 per month on internet services while Greenwell Matongo Ext 1 have 5.9%.

Findings of the chi-square test in table 4.15 indicate that the alternative hypothesis is accepted meaning there is a significant relationship between monthly expenditure on internet and suburb as $p < 0.06$.

TABLE 4.15: CHI-SQUARE TEST FOR MONTHLY EXPENDITURE ON INTERNET AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 55.607 | 8 | .000 |
| N of Valid Cases | 181 | | |

Technical Problems and Challenges Experienced

In terms of internet users who did not experience technical problems and challenges, Pioneers Park Ext 1 have the highest percentage at 42.9%; Greenwell Matongo Ext 1 have 35.7% while Grysbloek Ext 1 have only 21.4% of users without internet problems. The distribution of internet users with internet problems and challenges are as follows; Grysbloek Ext 1 have the highest percentage at 42.5%, Pioneers Park Ext 1 have 35.6% while only 21.9% are recorded in Greenwell Matongo Ext 1.

Findings of the chi-square test in table 4.16 informs to the acceptance the alternative hypothesis which states a significant relationship between technical problems, challenges experienced and suburb as $p < 0.06$.

TABLE 4.16: CHI-SQUARE TEST FOR TECHNICAL PROBLEMS OR CHALLENGES EXPERIENCED

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|-------|----|-----------------------|
| Pearson Chi-Square | 9.937 | 2 | .007 |
| N of Valid Cases | 185 | | |

Service Continuation

Greenwell Matongo Ext 1 have the highest percentage at 43.6% of the respondents who indicated that they will not continue with services they are receiving from their internet service providers. Grysblock Ext 1 have the second highest at 34.6%, while only 21.8% of the respondents in Pioneers Park Ext 1 plan to discontinue their internet services. Pioneers Park Ext 1 have the highest percentage at 53.3% of the respondents who indicated that they will continue with their internet services. Grysblock Ext 1 have the second highest percentage at 26.2%, while only 20.5% of the respondents in Greenwell Matongo Ext 1 will continue using their internet services.

Based on findings of the chi-square test in table 4.17 the alternative hypothesis is accepted, meaning there is a significant relationship between service continuation and suburb as $p < 0.06$.

TABLE 4.17: CHI-SQUARE TEST FOR INTERNET SERVICE CONTINUATION AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 20.161 | 2 | .000 |
| N of Valid Cases | 185 | | |

Satisfaction levels of internet users per age

The satisfaction scores per age group are highlighted in figure 4.1 below. The satisfaction score results reveal that, scores of 6, 25, 44, 69, 75, 81, 88 and 94 are dominated by internet users in the age group of 25 years. The satisfaction scores of 50, 56, 63 and 100 are dominated by internet users in the 35 years age group.

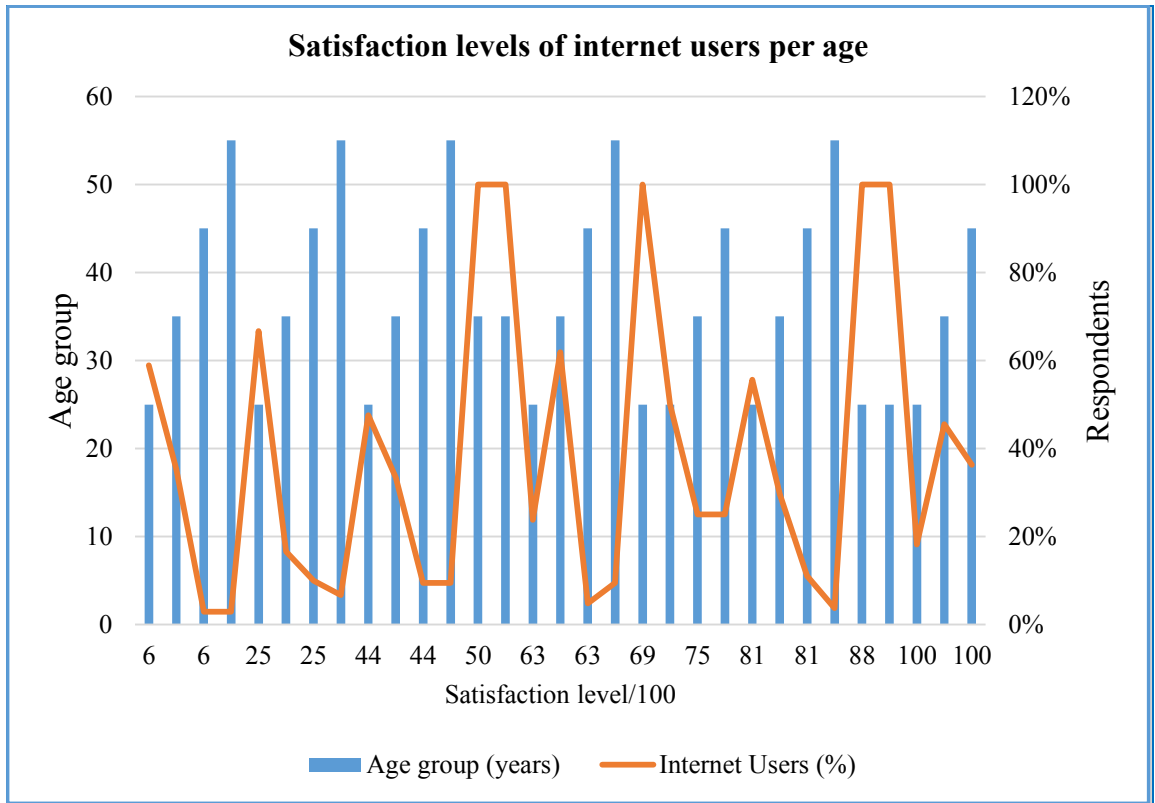


Figure 4.1: Satisfaction levels of internet users per age group

Based on findings of the chi-square test in table 4.18, the alternative hypothesis is accepted which states that; there is a significant relationship between satisfaction level and age when using 94% confidence interval as $p < 0.06$. Moreover, the Spearman correlation is 0.186 with $p < 0.06$, meaning there is a very weak positive relationship between satisfaction level and age. When age slightly increases, satisfaction level also slightly increases; the correlation results are highlighted in table 4.19 below.

TABLE 4.18: CHI-SQUARE TEST FOR SATISFACTION LEVEL AND AGE OF RESPONDENTS

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 56.660 | 39 | .033 |
| N of Valid Cases | 181 | | |

TABLE 4.19: CORRELATION TEST: SATISFACTION LEVEL AND AGE OF RESPONDENTS

| | Value | Asymp. Std. Error | Approx. T | Approx. Sig. |
|---|-------|----------------------|-----------|--------------|
| Interval by Interval Pearson's R | .150 | .071 | 2.030 | .044 |
| Ordinal by Ordinal Spearman Correlation | .186 | .072 | 2.531 | .012 |
| N of Valid Cases | 181 | | | |

Satisfaction levels of internet users per gender

The satisfaction score of 25 are dominated by male respondents, 56.7% of the respondents are males as presented in figure 4.2 below. The score of 38 is only recorded from male respondents while the score of 44 is dominated by males at 71.4%. The score of 75 is only recorded from females while the score of 81 is dominated by males at 55.2%. The score of 88 is only recorded from female respondents while the score of 94 is only recorded from male respondents.

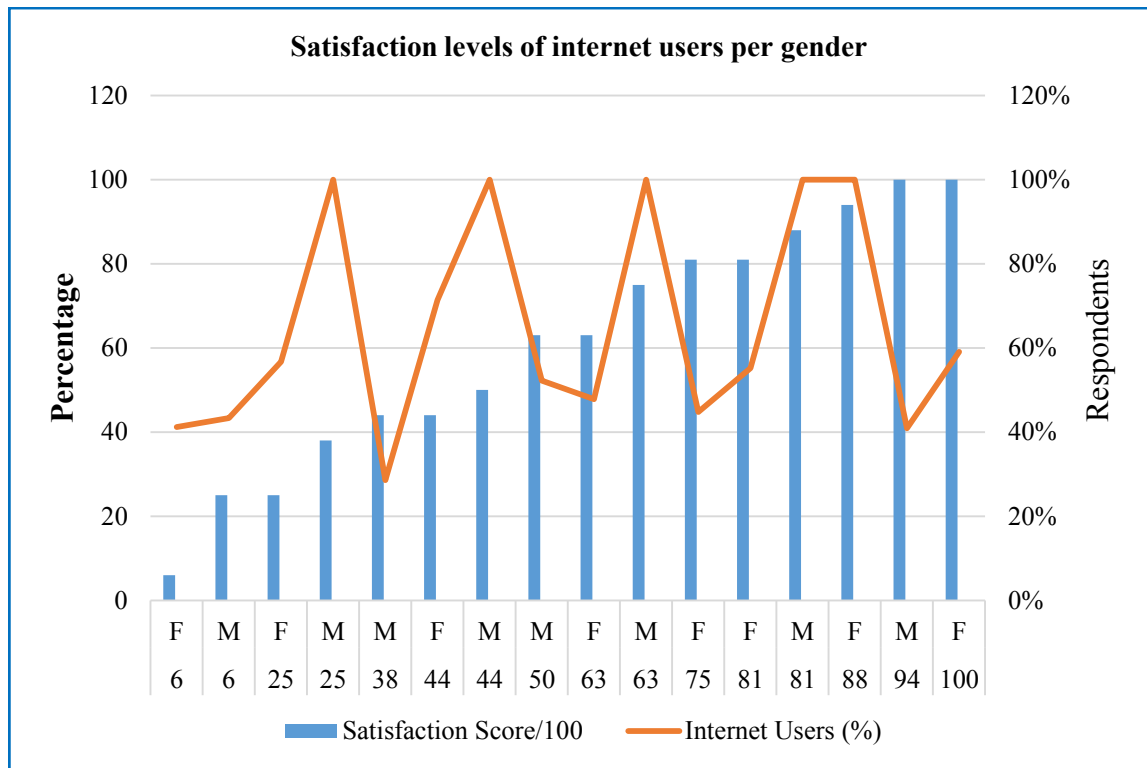


Figure 4.2: Satisfaction levels of internet users per gender

Findings of the chi-square test in table 4.20 inform us that, there is a significant relationship between satisfaction level and gender as $p < 0.06$.

TABLE 4.20: CHI-SQUARE TEST: SATISFACTION LEVEL AND GENDER

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 25.567 | 13 | .019 |
| N of Valid Cases | 185 | | |

Satisfaction levels of internet users per growth monthly income

The satisfaction scores are arranged per income level of internet users as presented in figure 4.3 below. It is observed that the lowest score of 6 is dominated by internet users who earn less than N\$ 5000 per month. The score of 50 is only recorded from internet users who earn between N\$ 5000 to N\$ 10000. The second highest satisfaction score of 94 is only reported by internet users who earn between N\$ 21000 and N\$ 30000. The highest satisfaction score of 100 is dominated by internet users who earn between N\$ 11000 and N\$ 20000 monthly income.

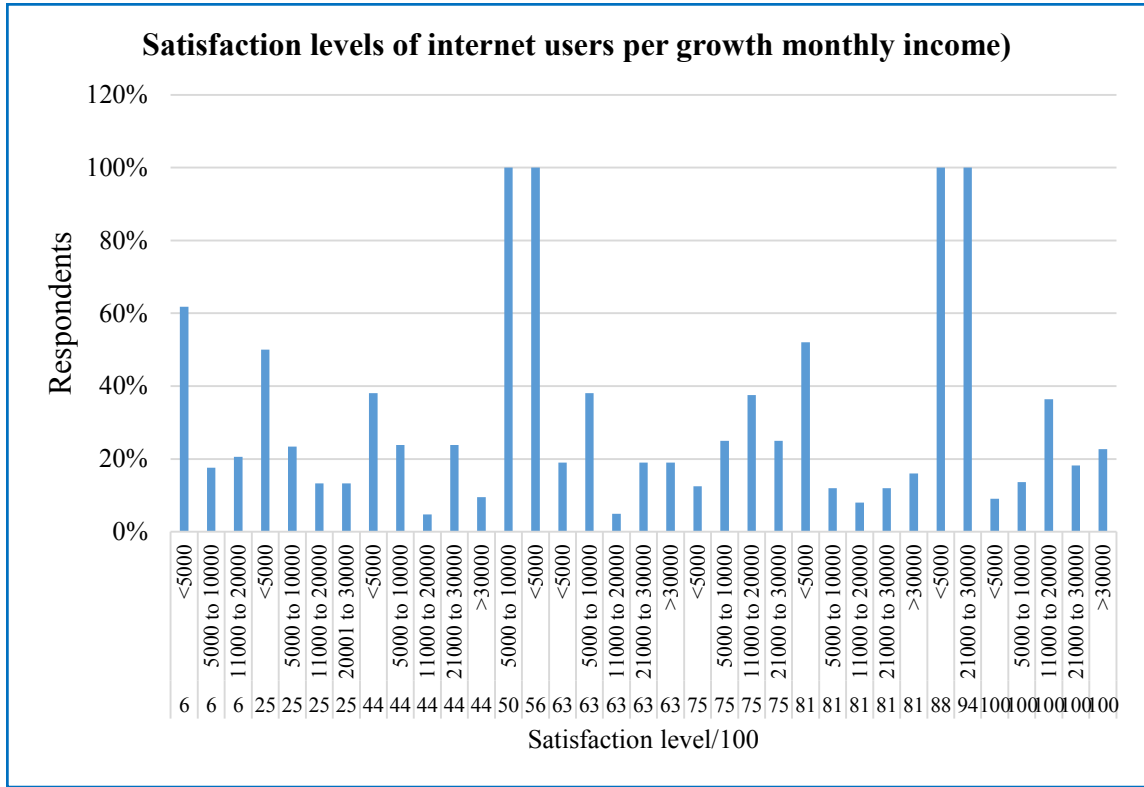


Figure 4.3: Satisfaction levels of internet users per growth monthly income

Findings of the chi-square test in table 4.21 inform us that there is a significant relationship between satisfaction level and income level when using 94% confidence interval as $p < 0.06$. The Spearman Correlation of 0.343 with $p < 0.06$ indicates a weak positive relationship between satisfaction level and income level. When income level increases, satisfaction level also increases; the correlation results between income level and satisfaction level are highlighted in table 4.22.

TABLE 4.21: CHI-SQUARE TEST: SATISFACTION LEVEL AND INCOME LEVEL OF RESPONDENTS

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 85.987 | 52 | .002 |
| N of Valid Cases | 179 | | |

TABLE 4.22: CORRELATION TEST: SATISFACTION LEVEL AND INCOME LEVEL OF RESPONDENTS

| | Value | Asymp. Std. Error | Approx. T | Approx. Sig. |
|---|-------|----------------------|-----------|--------------|
| Interval by Interval Pearson's R | .360 | .058 | 5.135 | .000 |
| Ordinal by Ordinal Spearman Correlation | .343 | .065 | 4.857 | .000 |
| N of Valid Cases | 179 | | | |

Satisfaction levels of internet users per education

The lowest satisfaction scores of 6, 25 and 50 are dominated by internet users with secondary school level of education as presented in figure 4.4 below. The scores of 69 and 94 are dominated by internet users with tertiary degrees while the highest score of 100 are dominated by internet users with tertiary diplomas.

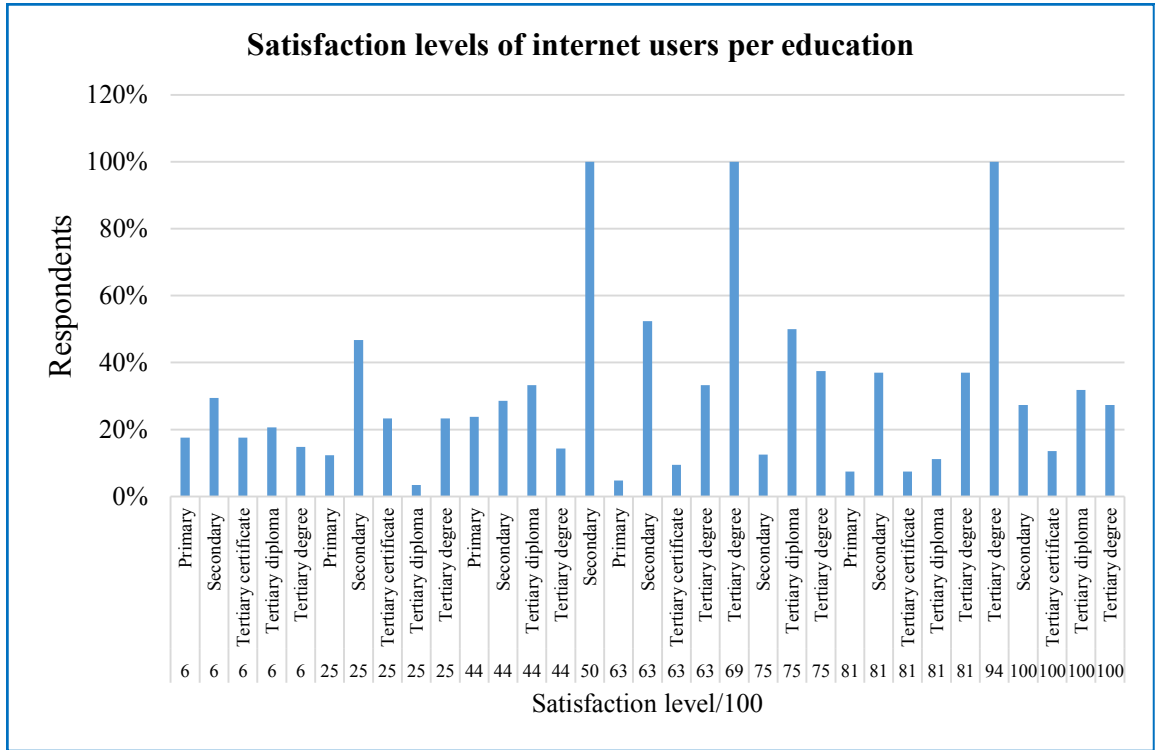


Figure 4.4: Satisfaction levels of internet users per education

Findings of the chi-square test in table 4.23 indicate that there is a significant relationship between satisfaction level and education level; this occurrence is significant when using 94% confidence interval as $p < 0.06$.

TABLE 4.23: CHI-SQUARE TEST: SATISFACTION LEVEL AND EDUCATION LEVEL

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 74.975 | 52 | .020 |
| N of Valid Cases | 181 | | |

Satisfaction levels per suburb

The lowest satisfaction score of 6 is dominated by internet users who reside in Greenwell Matongo Ext 1. The satisfaction score of 63 is dominated by internet users in Pioneer Park Ext 1. The second highest satisfaction score of 94 is only recorded from respondents who reside in Pioneer Park Ext 1. The highest satisfaction score of 100 is dominated by internet users who reside in Pioneer Park Ext 1 as presented in figure 4.5.

Findings of the chi-square test in table 4.24 inform us that there is a significant relationship between satisfaction level and suburb as $p < 0.06$.

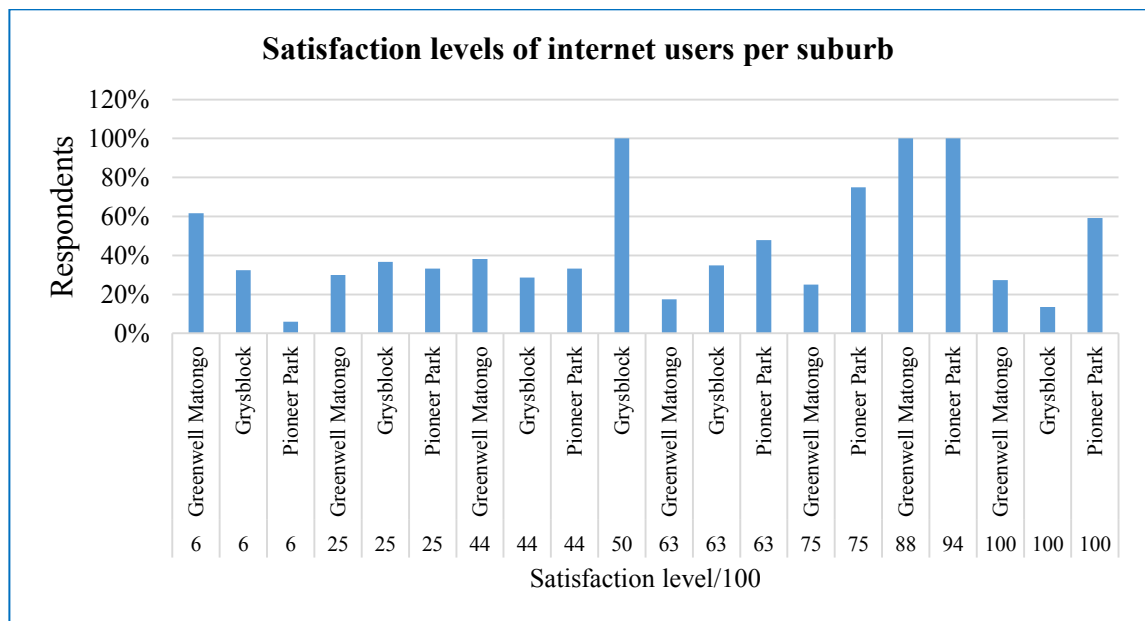


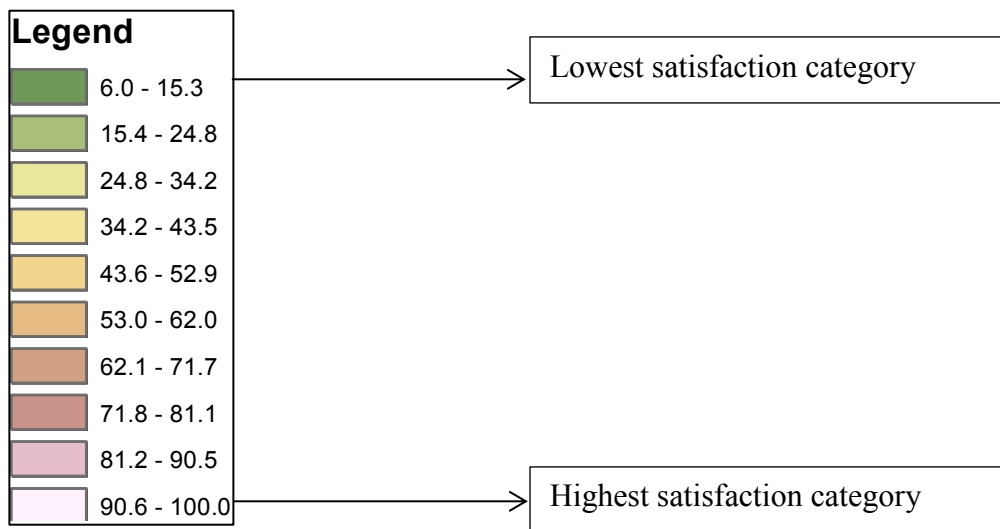
Figure 4.5: Satisfaction levels of internet users per suburb

TABLE 4.24: CHI-SQUARE TEST: SATISFACTION LEVEL AND SUBURB

| | Value | Df | Asymp. Sig. (2-sided) |
|--------------------|--------|----|-----------------------|
| Pearson Chi-Square | 56.834 | 26 | .000 |
| N of Valid Cases | 185 | | |

4.3. SPATIAL ANALYSIS

The internet satisfaction score variable was analysed using the IDW interpolation procedure. This geospatial analysis of internet user satisfaction levels per demographic and economic factors produced satisfaction maps per suburb. The map legends for all the suburb geospatial satisfaction maps are standardised and 10 categories are defined as displayed below. The scores range from the lowest category (6.0 to 15.3) to the highest satisfaction category (90.6 to 100). The score categories are aligned to the study's Likert scale based questions.



Geospatial analysis of satisfaction levels of internet users for Grysblock Ext 1

Gender

Male internet users are highly satisfied with their internet services than their female counterparts as reflected in figure 4.6 below. For instance, the highest satisfaction scores of between 90.6 and 100 are dominated by males compared to females. The lowest satisfaction scores of between 6.0 and 15.3 are dominated by female internet users. Internet users in the South West direction are less satisfied with their internet services, their scores are between 24.8 and 43.5.

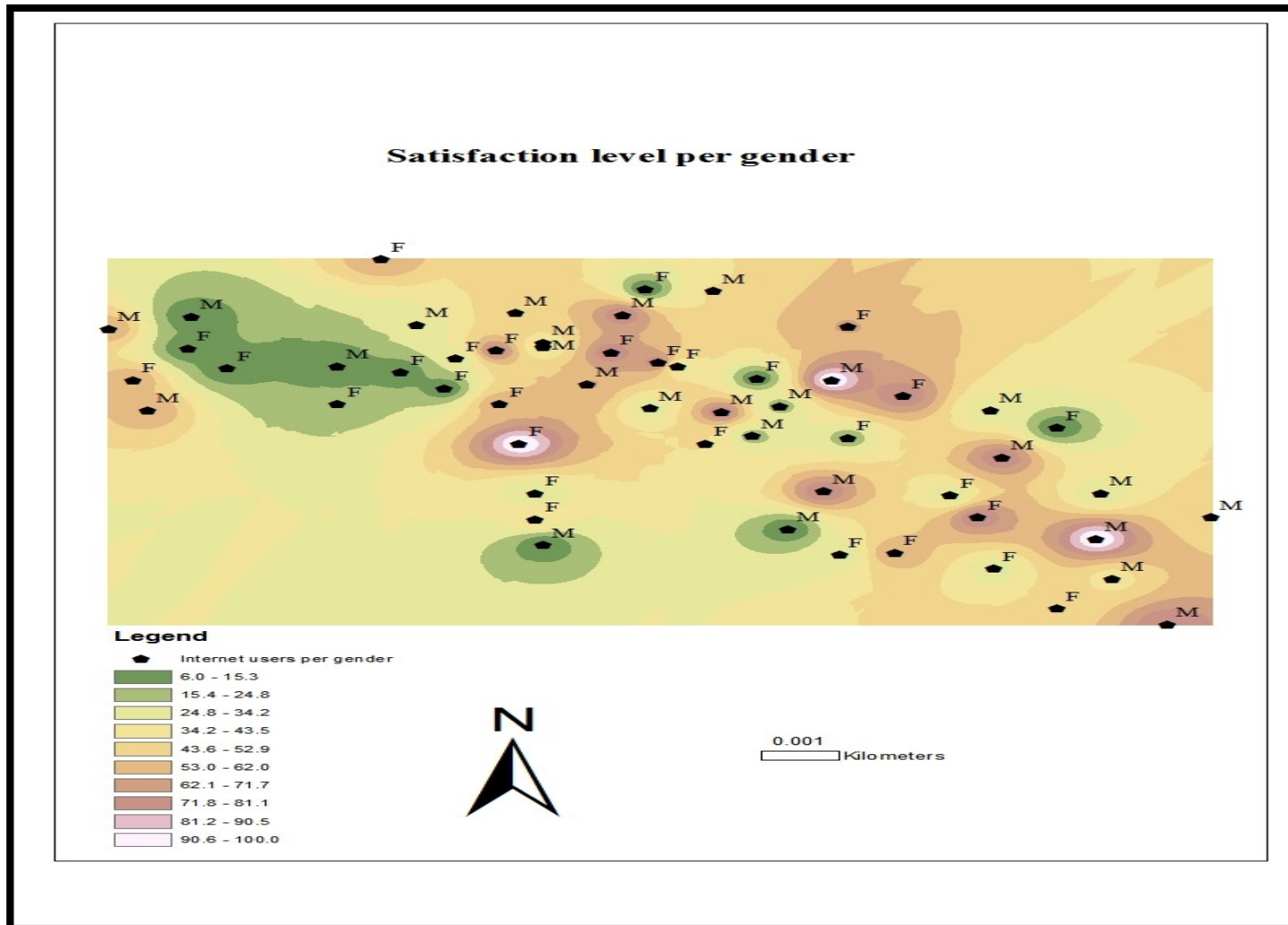


Figure 4.6: Satisfaction level per gender

Age

The highest satisfaction scores of between 90.6 and 100 are dominated by internet users aged between 41 and 50 years old based on results presented in figure 4.7 below. The lowest scores of between 6.0 and 15.3 are dominated by internet users aged less than 30 years old and between 31 and 40 years old.

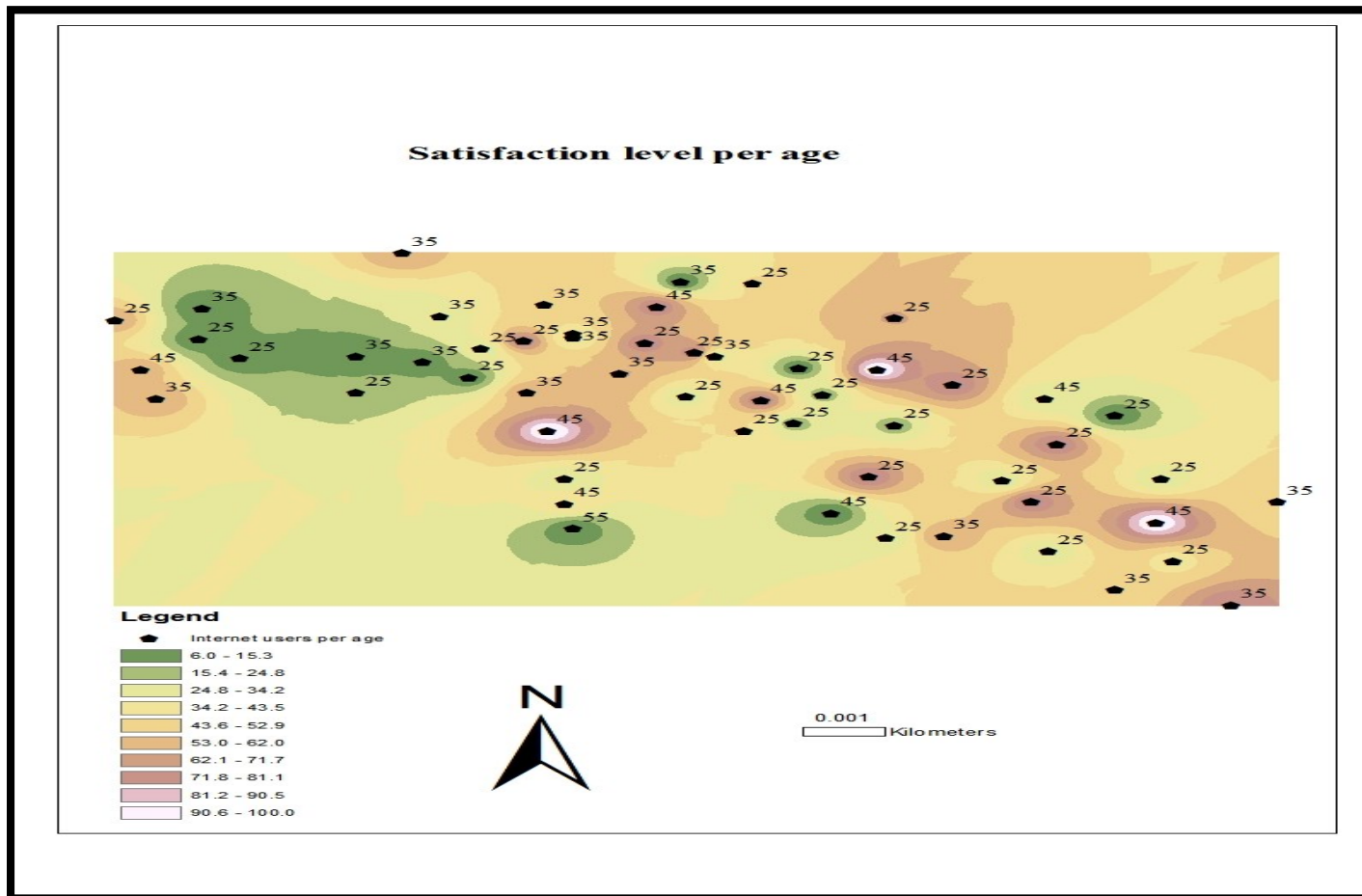


Figure 4.7: Satisfaction level per age

Income

The highest satisfaction scores of between 90.6 and 100 are mostly dominated by internet users who earn between N\$ 11000 and N\$ 20000 (15000) as illustrated in figure 4.8. The lowest satisfaction score of between 6.0 and 15.3 is fairly distributed among internet users who earn less than N\$ 5000, from N\$ 5000 to N\$ 10 000 (7500) and, between N\$ 11000 and N\$ 20000 (15000) respectively.

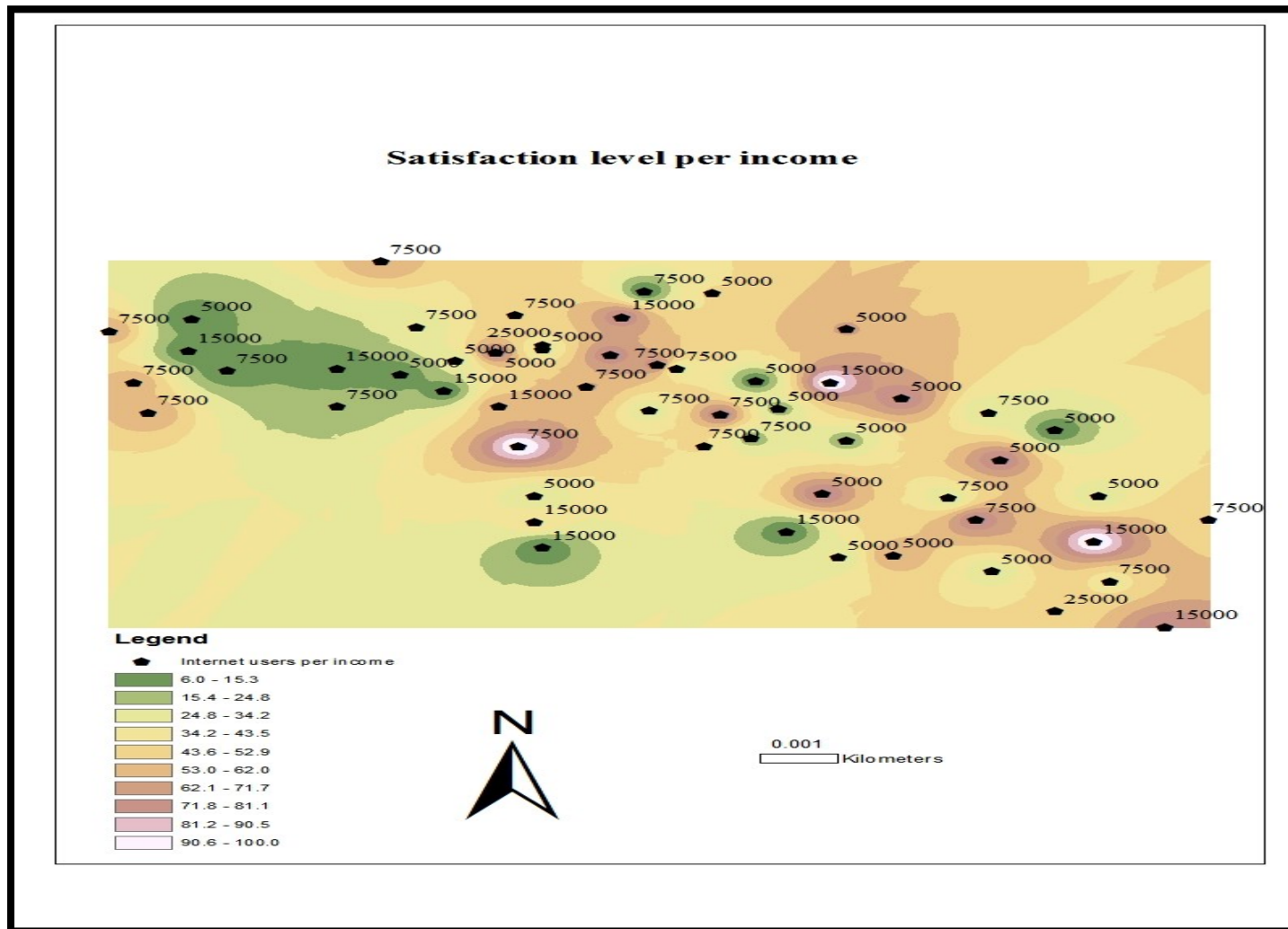


Figure 4.8: Satisfaction level per income

Education

The highest satisfaction scores of between 90.6 and 100 are dominated by internet users who only completed tertiary diplomas (CTDi) as showed in figure 4.9. The lowest satisfaction score of between 6.0 and 15.3 is fairly distributed among internet users who completed secondary education (CS), tertiary certificate (CTC) and degree (CTDe) respectively.

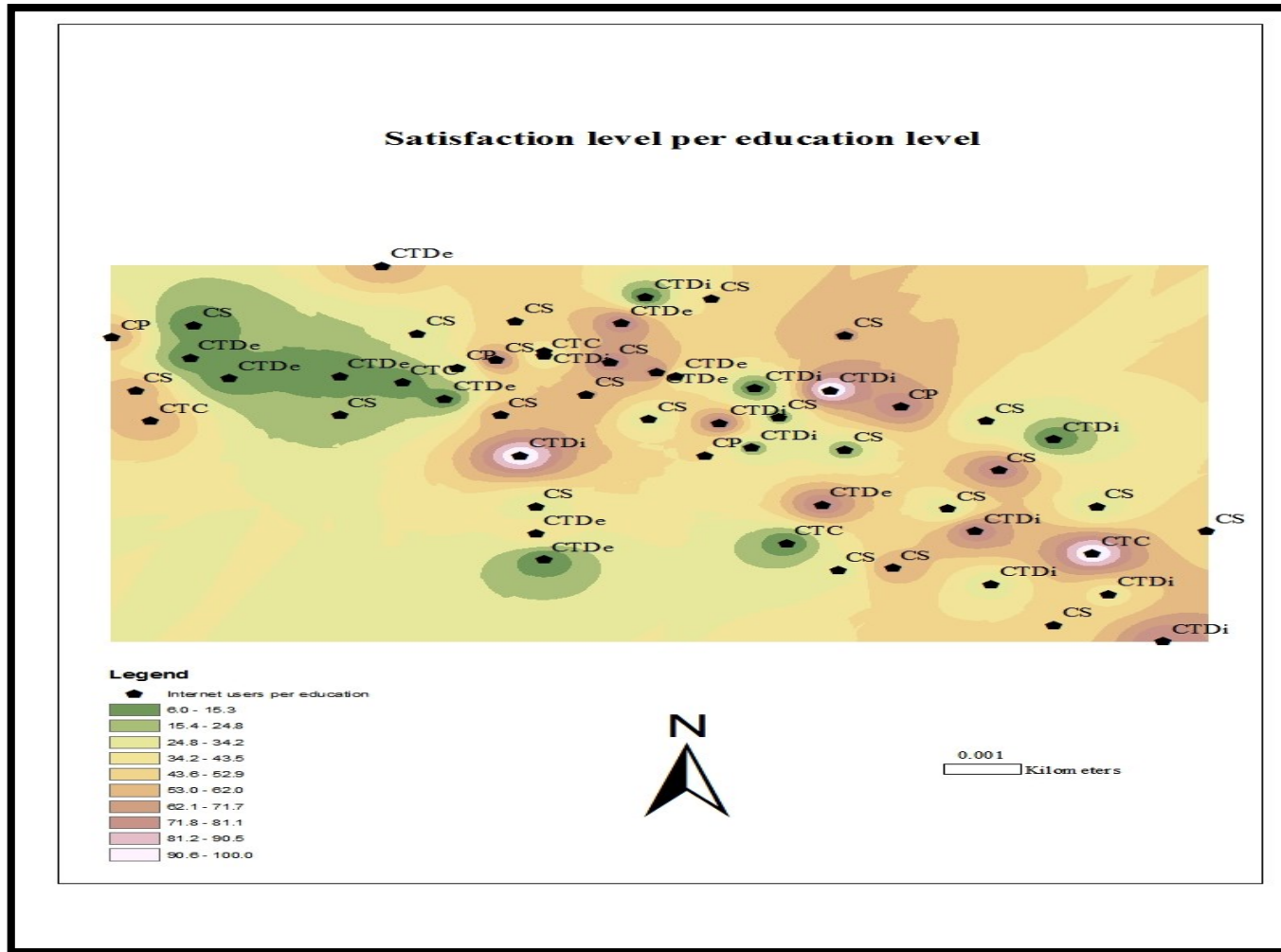


Figure 4.9: Satisfaction level per education

Internet Service Type

Fixed internet (FBB) users are highly satisfied with their internet services than most of the 3G users; the satisfaction scores for FBB are in most cases between 90.6 and 100 scores. Most of 3G internet users are at satisfaction scores of between 6.0 and 24.8, results are reflected in figure 4.10 below.

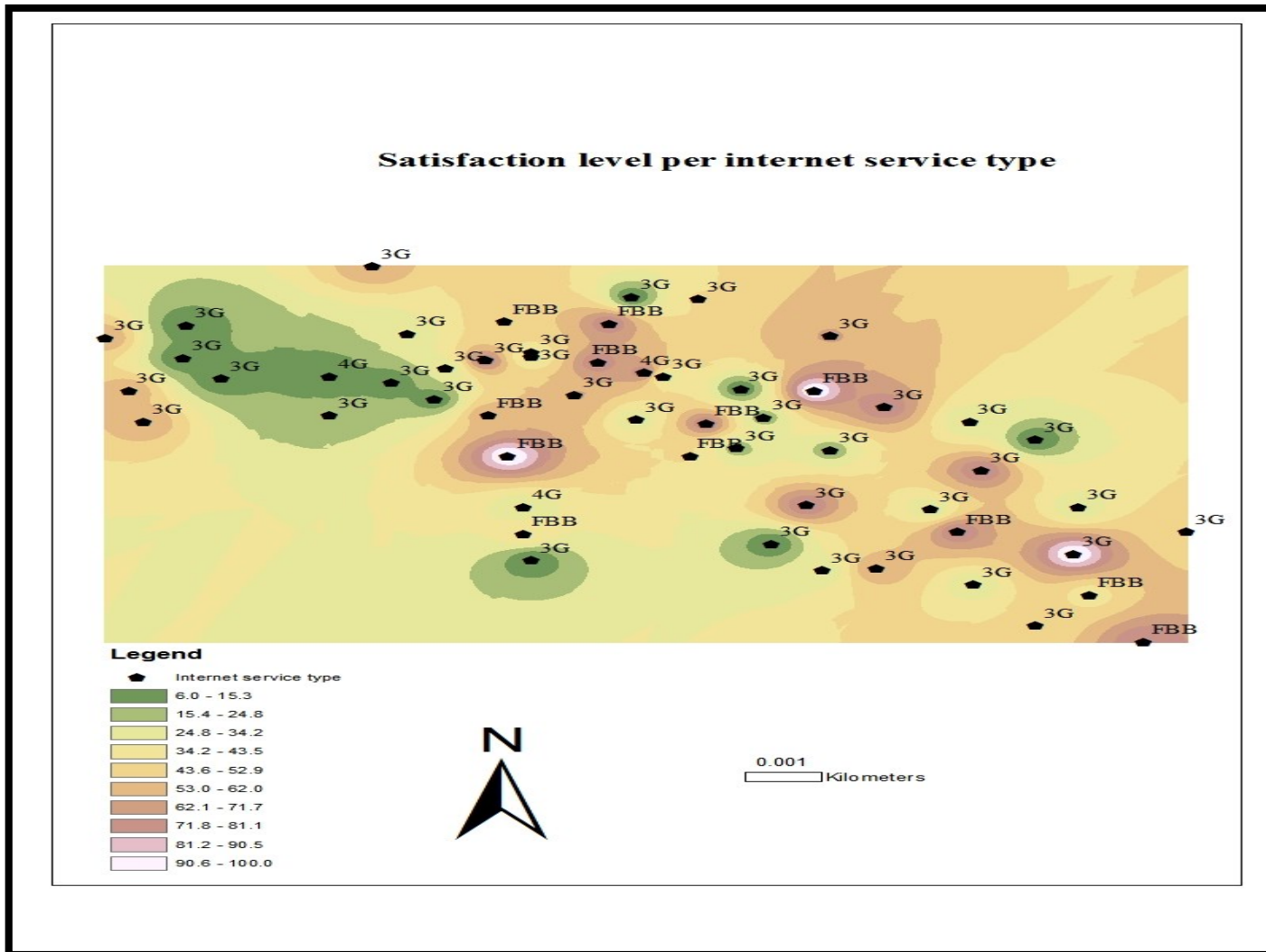


Figure 4.10: Satisfaction level per internet service type

Subscription Type

The majority of the internet users have prepaid (pre) subscriptions. However, it was evident that the post-paid (post) internet users are highly satisfied (between 90.6 and 100 score) with their internet services than prepaid internet users. Based on results in figure 4.11, most of prepaid subscribers dominate satisfaction scores of between 6.0 and 15.3.

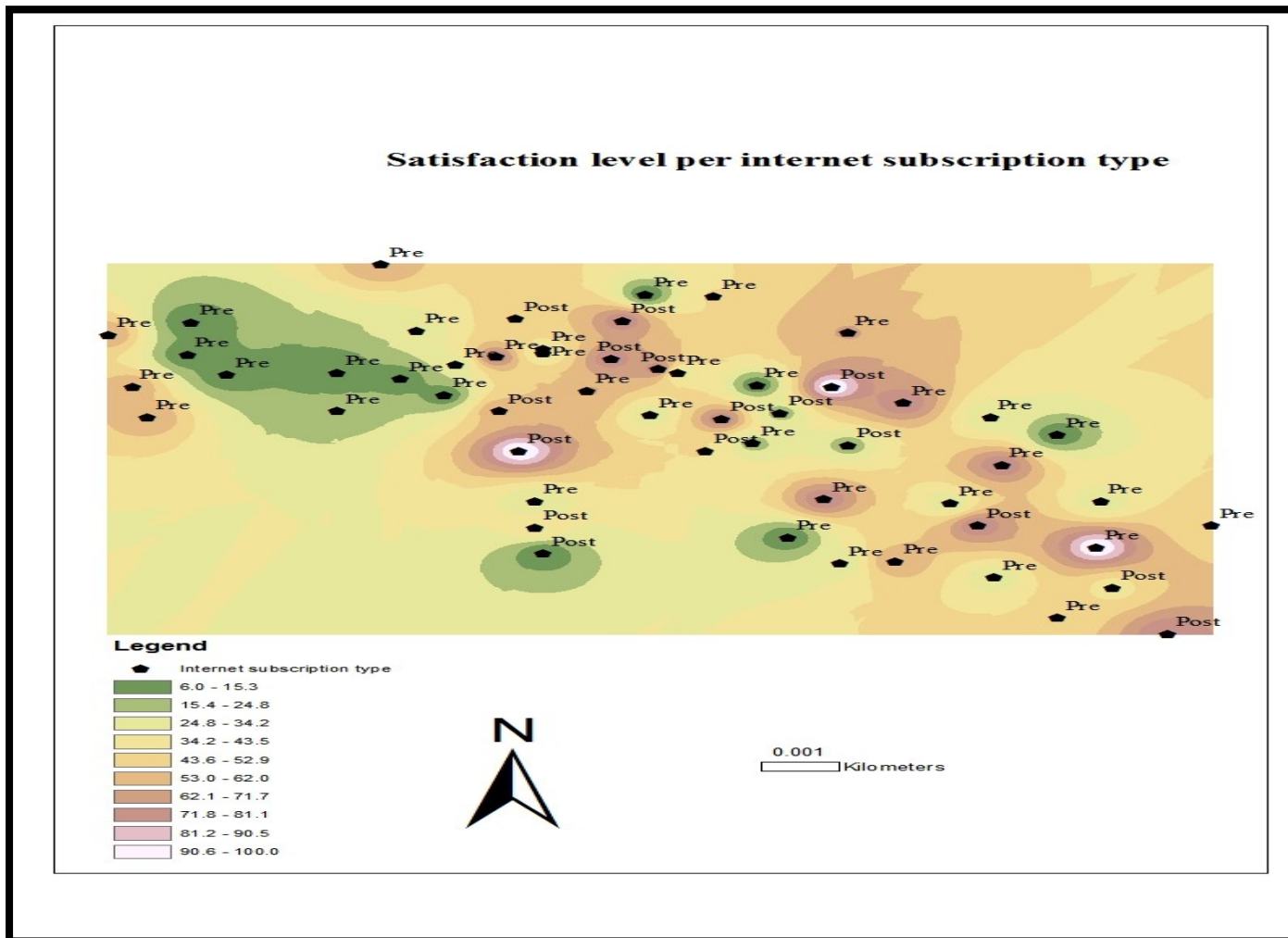


Figure 4.11: Satisfaction level per subscription type

Geospatial analysis of satisfaction levels of internet users for Greenwell Matongo

Ext1

Gender

The majority of male internet users are highly satisfied than their female counterparts as reflected in figure 4.27. The highest satisfaction scores of between 90.6 and 100 are mostly dominated by male internet users in Greenwell Matongo Ext 1. The lowest satisfaction scores of between 6.0 and 15.3 are slightly dominated by female internet users. The map displayed in figure 4.12 further indicates that, internet users in South East direction are average satisfied (43.6 to 52.9 score) with their internet services. Internet users in the South West direction are highly satisfied as most of their satisfaction scores were 71.8 to 81.1. Internet users in the North West direction are less satisfied with their internet services as their satisfaction scores range from 15.4 to 34.2.

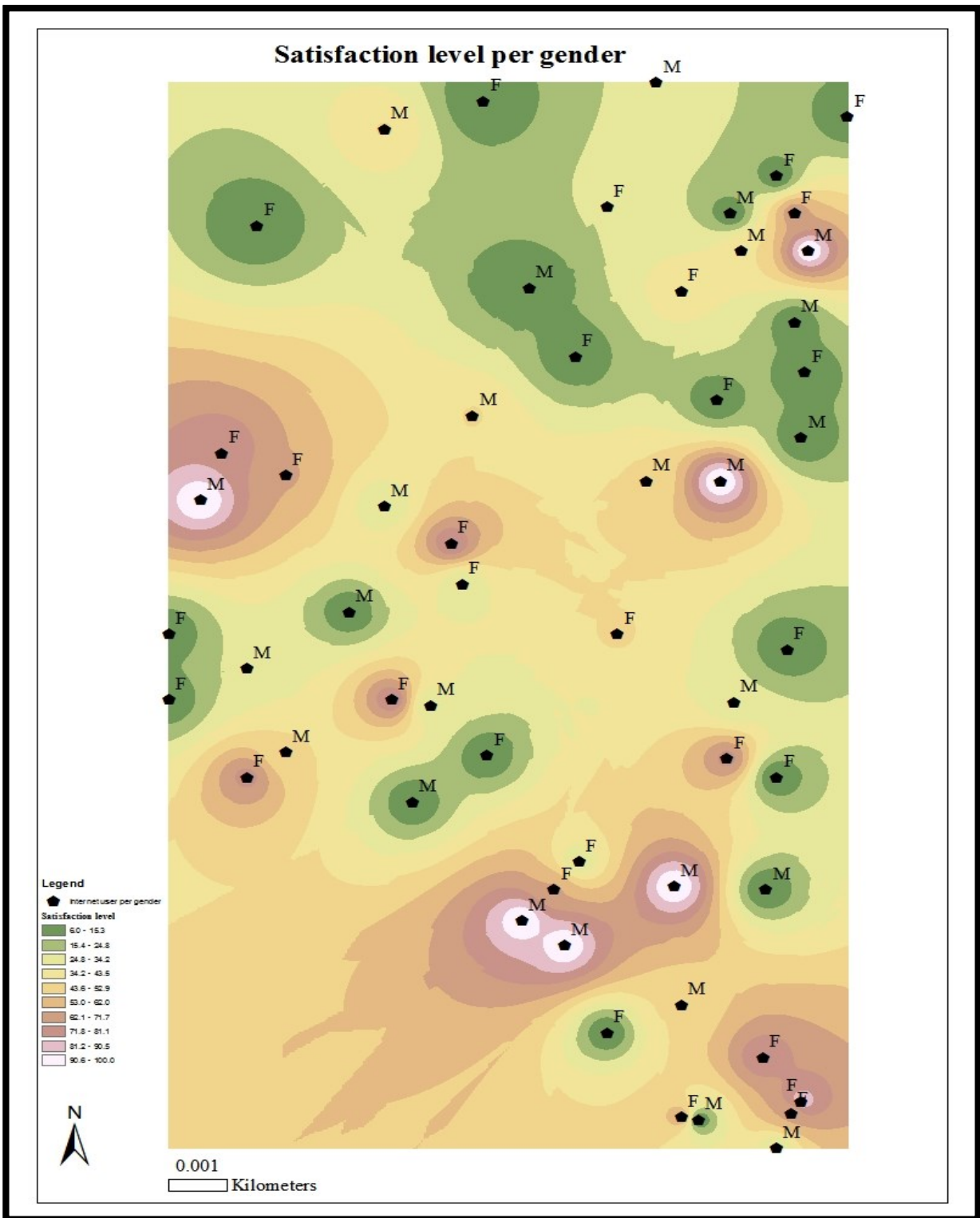


Figure 4.12: Satisfaction level per gender

Age

The majority of internet users who are aged 35 (31 to 40 years old) are more satisfied than those aged 25 (less than and 30 years old). Most of internet users aged 35 have satisfaction scores of between 90.6 and 100. The internet users who are aged 25 years old are less satisfied, their satisfaction scores are between 6.0 and 15.3 as reflected in figure 4.13. Internet users aged 45 (40 to 50 years old) are highly satisfied; their satisfaction scores are between 90.6 and 100.

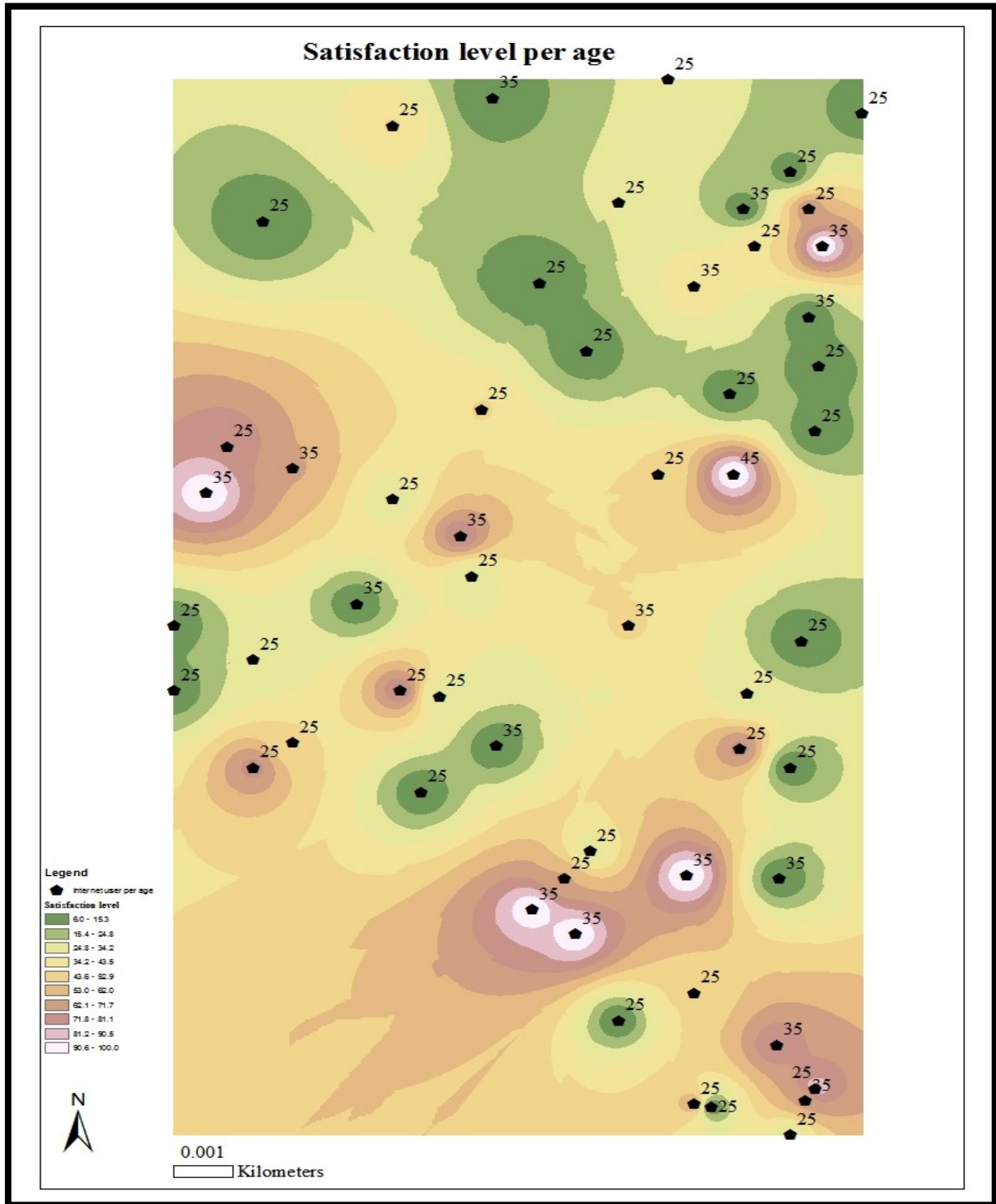


Figure 4.13: Satisfaction level per age

Income

Internet users who earn between N\$ 11000 and N\$ 20000 (15000) are more satisfied with the internet service (between 90.6 and 100 score) than internet users who earn less than N\$ 5000. The satisfaction scores for internet users who earn less than N\$ 5000 are between 6.0 and 15.3 as reflected in figure 4.14. Respondents who earn between N\$ 21000 and N\$ 30000 (25000) are highly satisfied; their satisfaction scores are between 71.8 and 81.1.

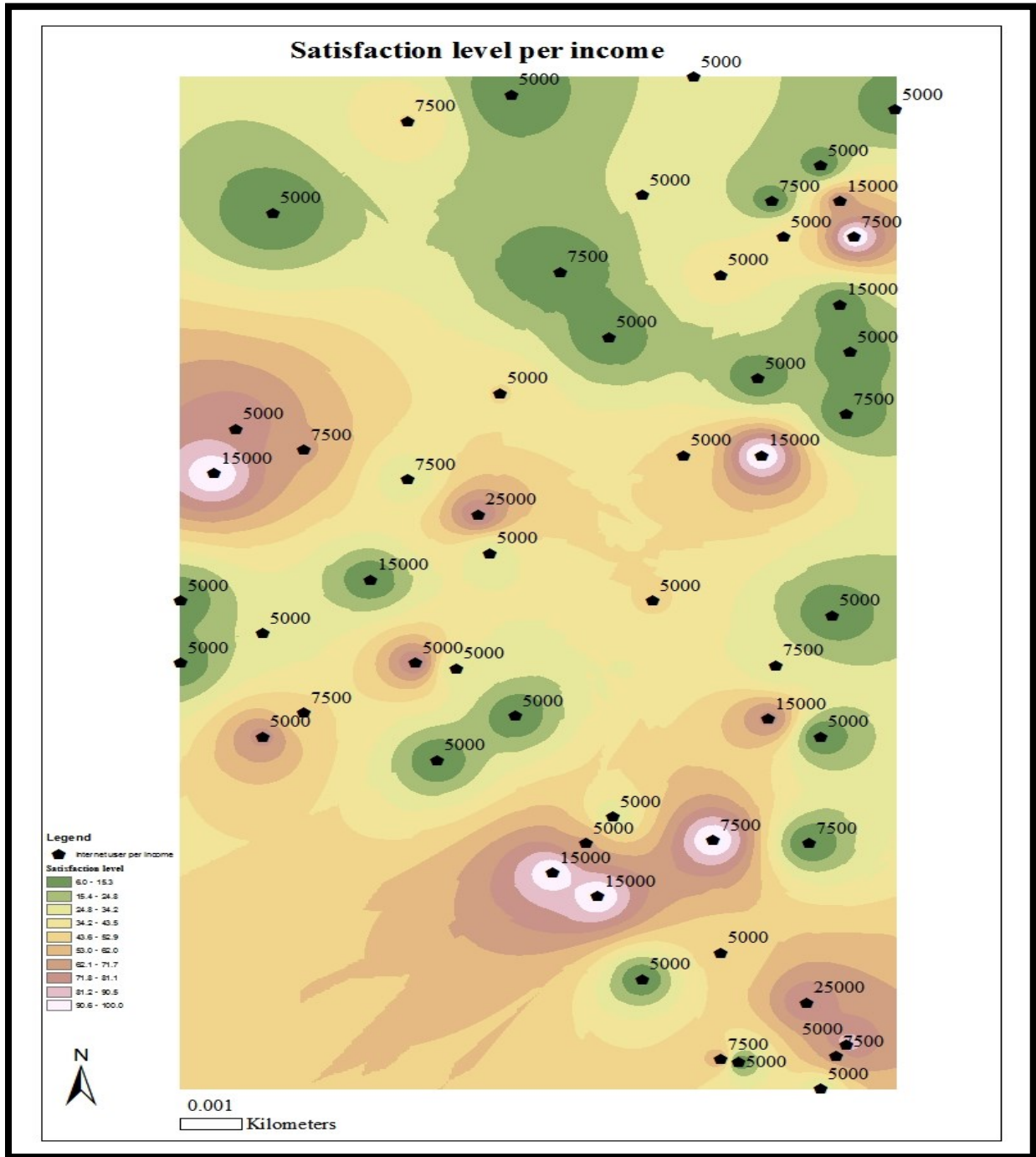


Figure 4.14: Satisfaction level per income

Education

The highest satisfaction scores of between 90.6 and 100 are mostly dominated by internet users who completed tertiary certificates (CTC) and diplomas (CTDi) as illustrated in figure 4.15. The lowest satisfaction score of between 6.0 and 15.3 is high among internet users who completed primary (CP) and secondary education (CS).

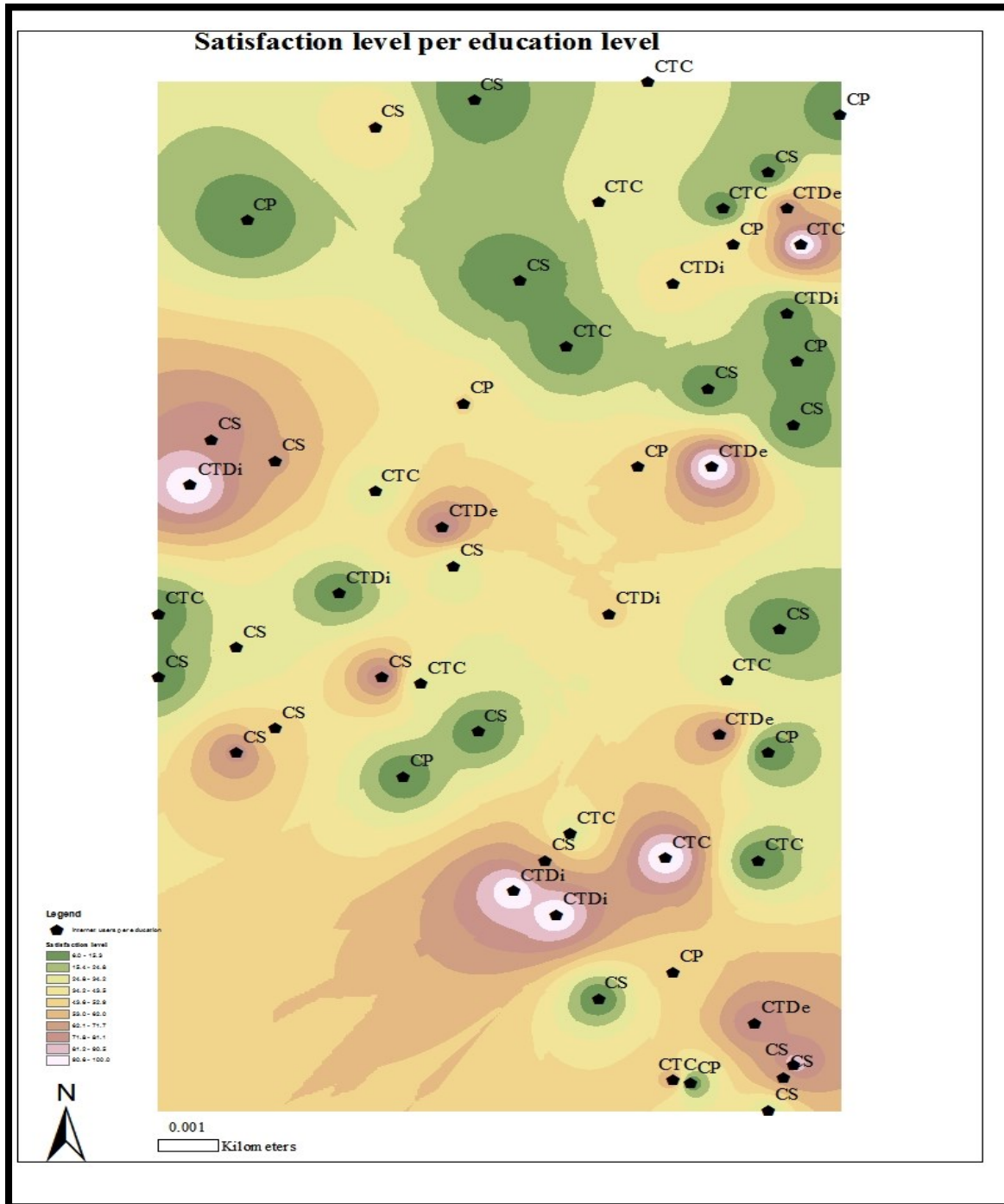


Figure 4.15: Satisfaction level per education

Subscription Type

Post-paid (post) internet users are more satisfied (between 90.6 and 100 score) with their internet services. Prepaid (pre) internet users are less satisfied and have satisfaction scores of between 6.0 and 15.3, results are reflected in figure 4.16.

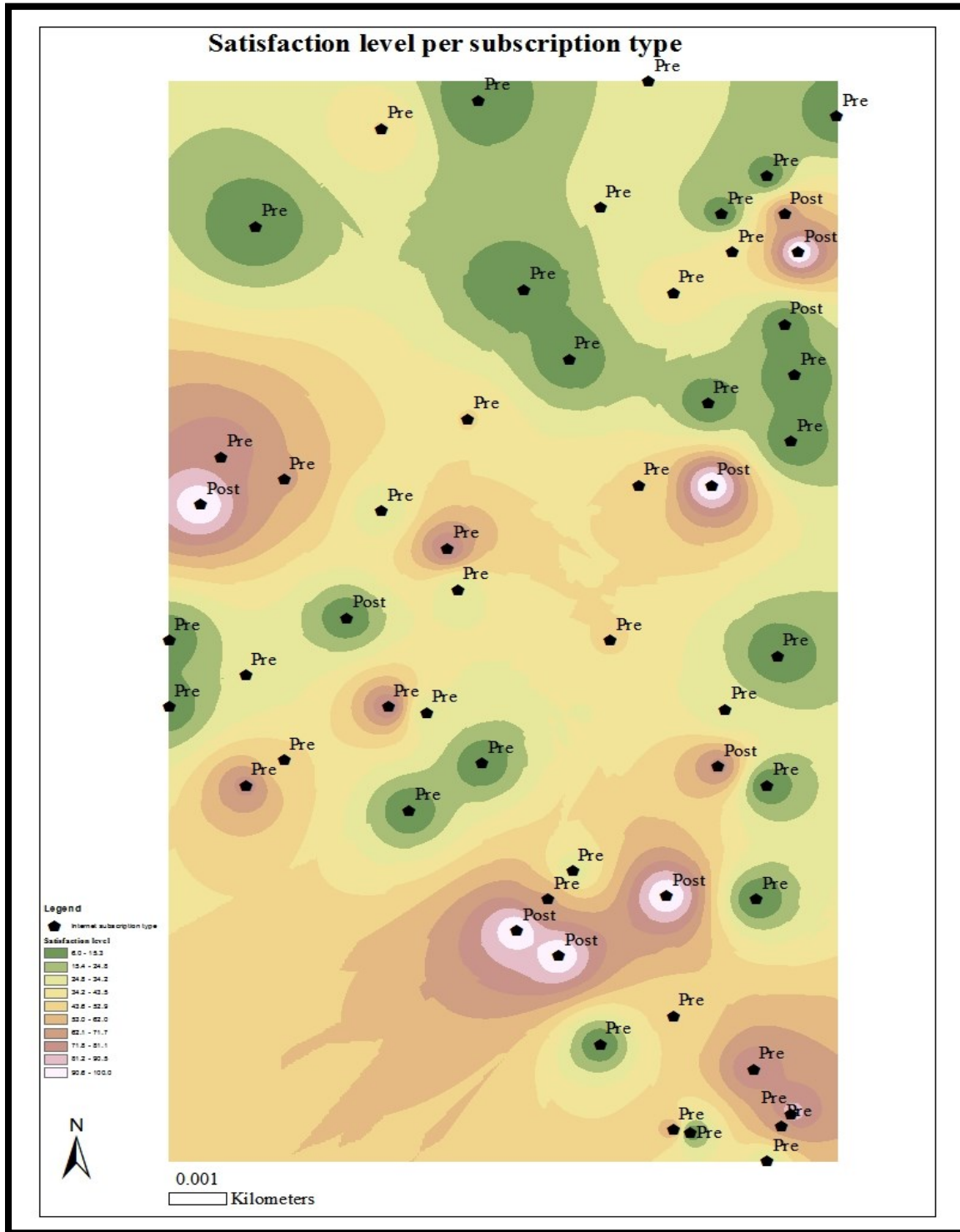


Figure 4.16: Satisfaction level per Subscription Type

Internet Service Type

Fixed broadband (internet) users are more satisfied (between 90.6 and 100 score) with their internet services. Mobile (3G and 4G) broadband (internet) users are less satisfied and their satisfaction scores are mostly between 6.0 and 15.3, results are reflected in figure 4.17.

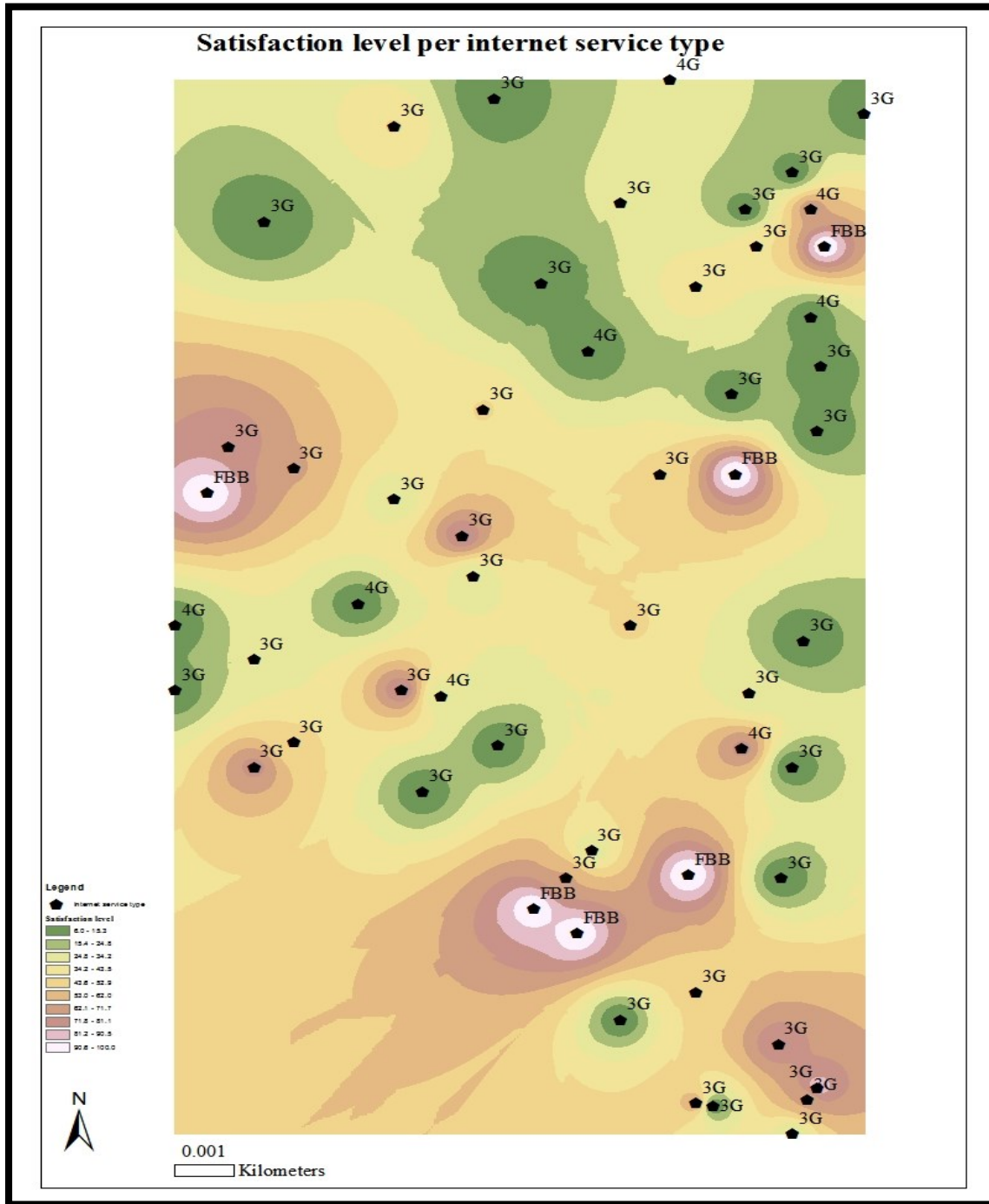


Figure 4.17: Satisfaction level per internet service type

Geospatial analysis of satisfaction levels of internet users for Pioneers Park Ext 1

Gender

Based on results presented in figure 4.18, female internet users are slightly more satisfied with their internet service than their male counterparts. The highest satisfaction scores of between 90.6 and 100 are slightly fairly distributed between males and females. The lowest satisfaction scores of between 6.0 and 15.3 are dominated by male internet users. Most of the internet users are satisfied with their internet services as they have between 62.1 to 100 satisfaction scores.

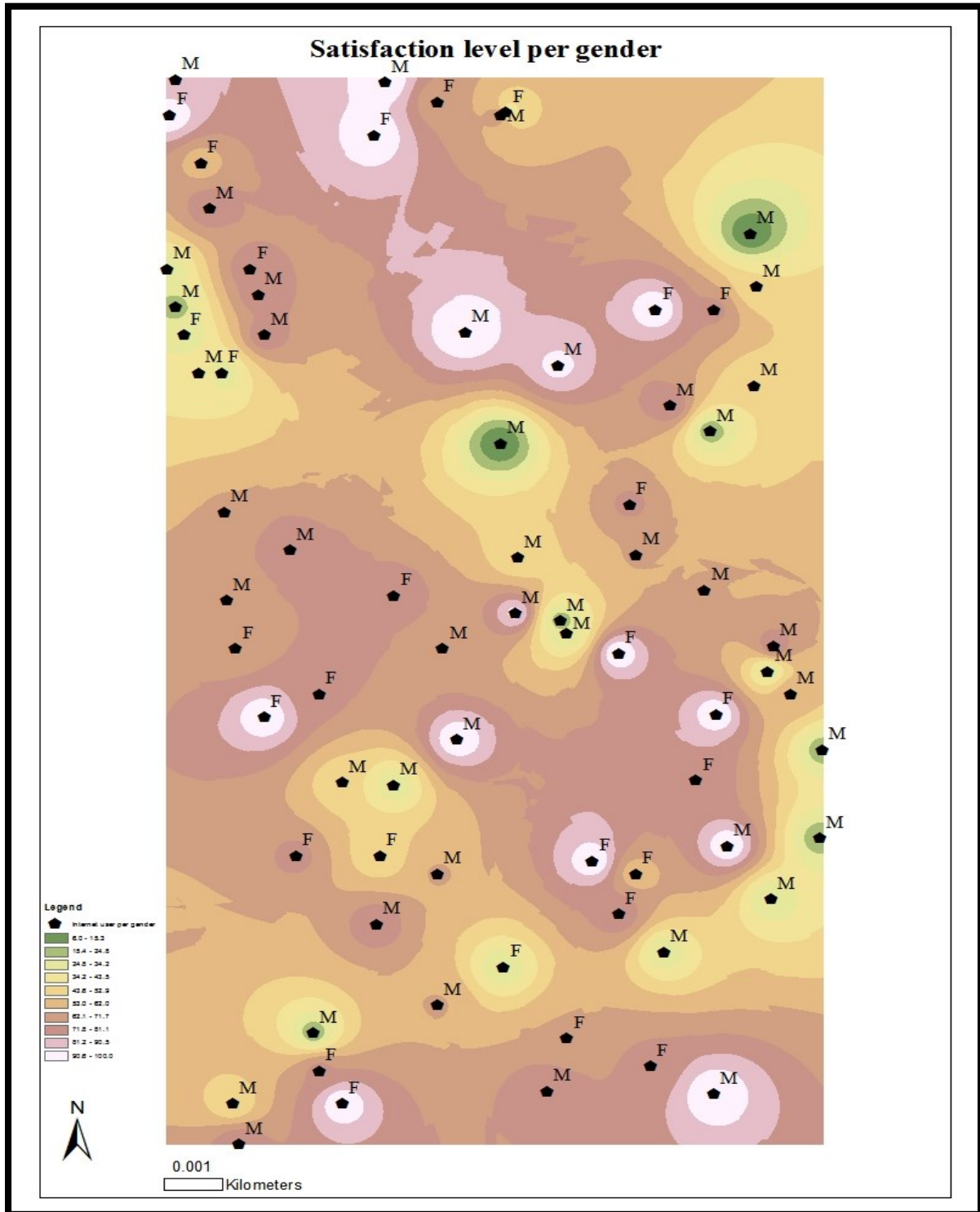


Figure 4.18: Satisfaction level per gender

Age

The highest satisfaction scores of between 90.6 and 100 are fairly distributed among internet users aged less than 30 years (25), between 31 and 40 years (35) and, between 41 and 50 years (45). The lowest satisfaction scores of between 6.0 and 15.3 are dominated by internet users aged 35 years old as presented in figure 4.19.

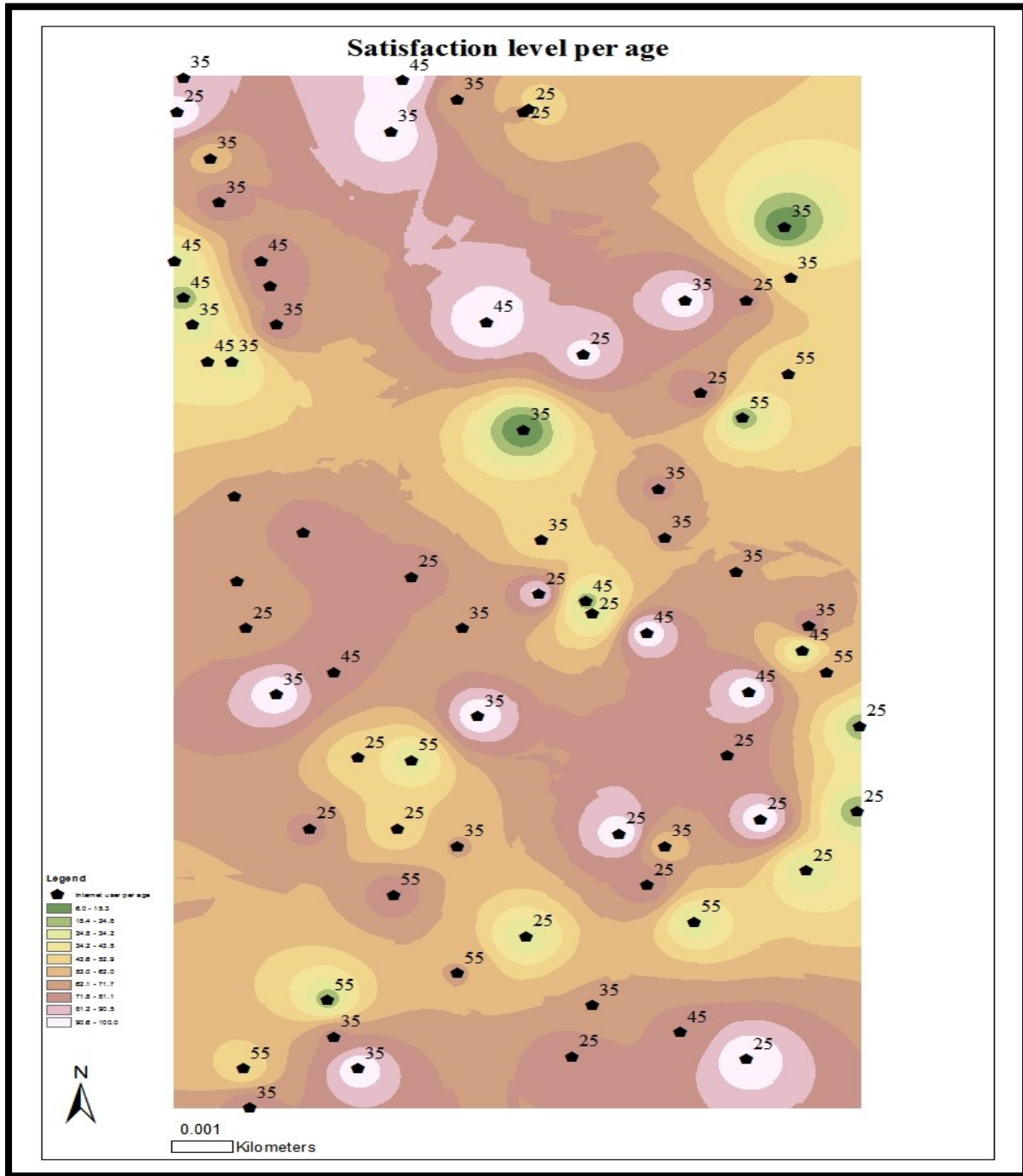


Figure 4.19: Satisfaction level per age

Income

The highest satisfaction scores of between 90.6 and 100 are dominated by internet users who earn between N\$ 21000 and N\$ 30000 (25000) and above N\$ 30000 (35000). The lowest satisfaction scores of between 6.0 and 15.3 are dominated by internet users who earn less than N\$ 5000 as presented in figure 4.20.

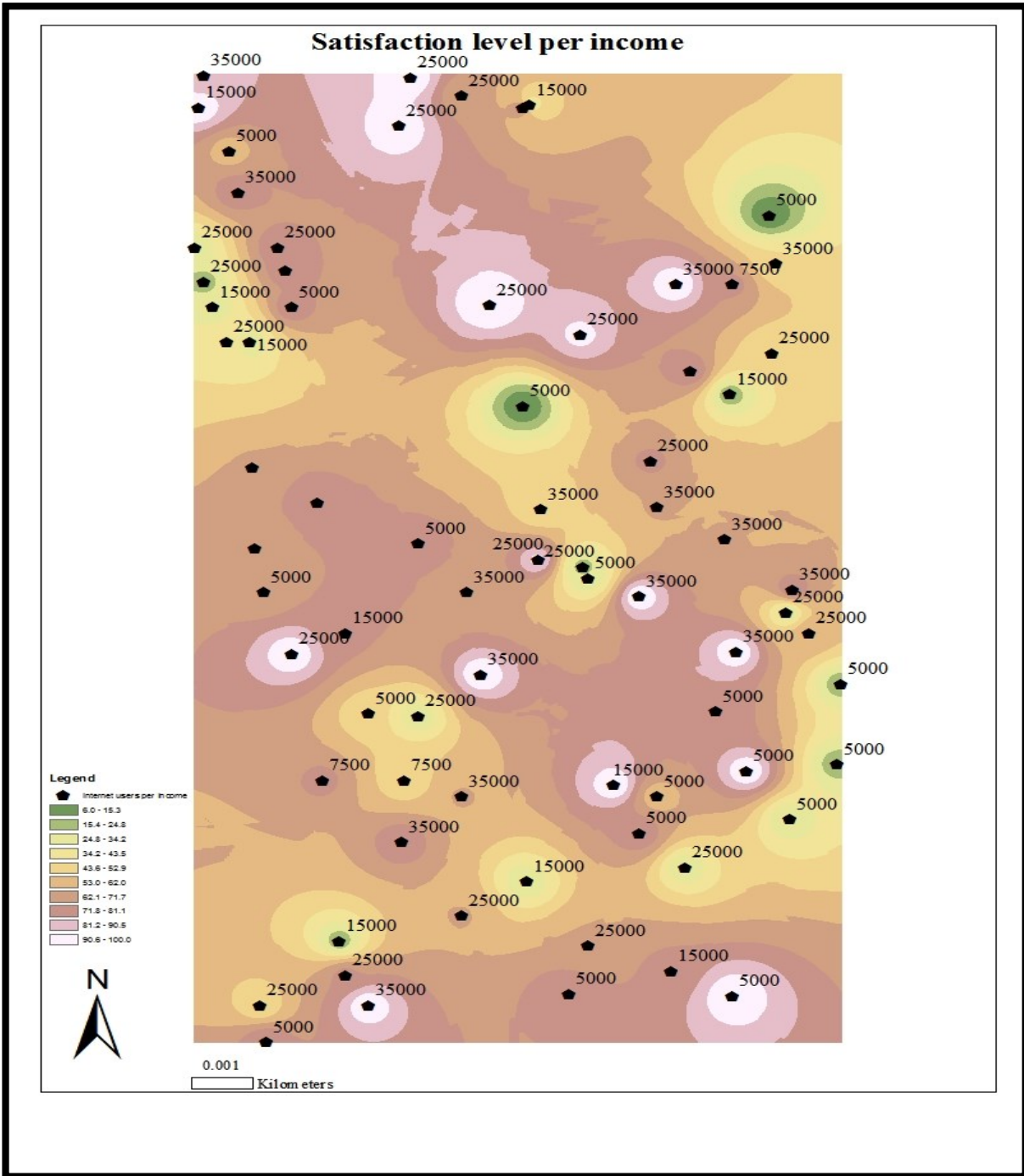


Figure 4.20: Satisfaction level per income

Education

The highest satisfaction scores of between 90.6 and 100 are dominated by internet users who completed tertiary degrees (CTDe) as displayed in figure 4.21. The lowest satisfaction score of between 6.0 and 15.3 is high among internet users who completed only secondary (CS) and tertiary diplomas (CTDi).

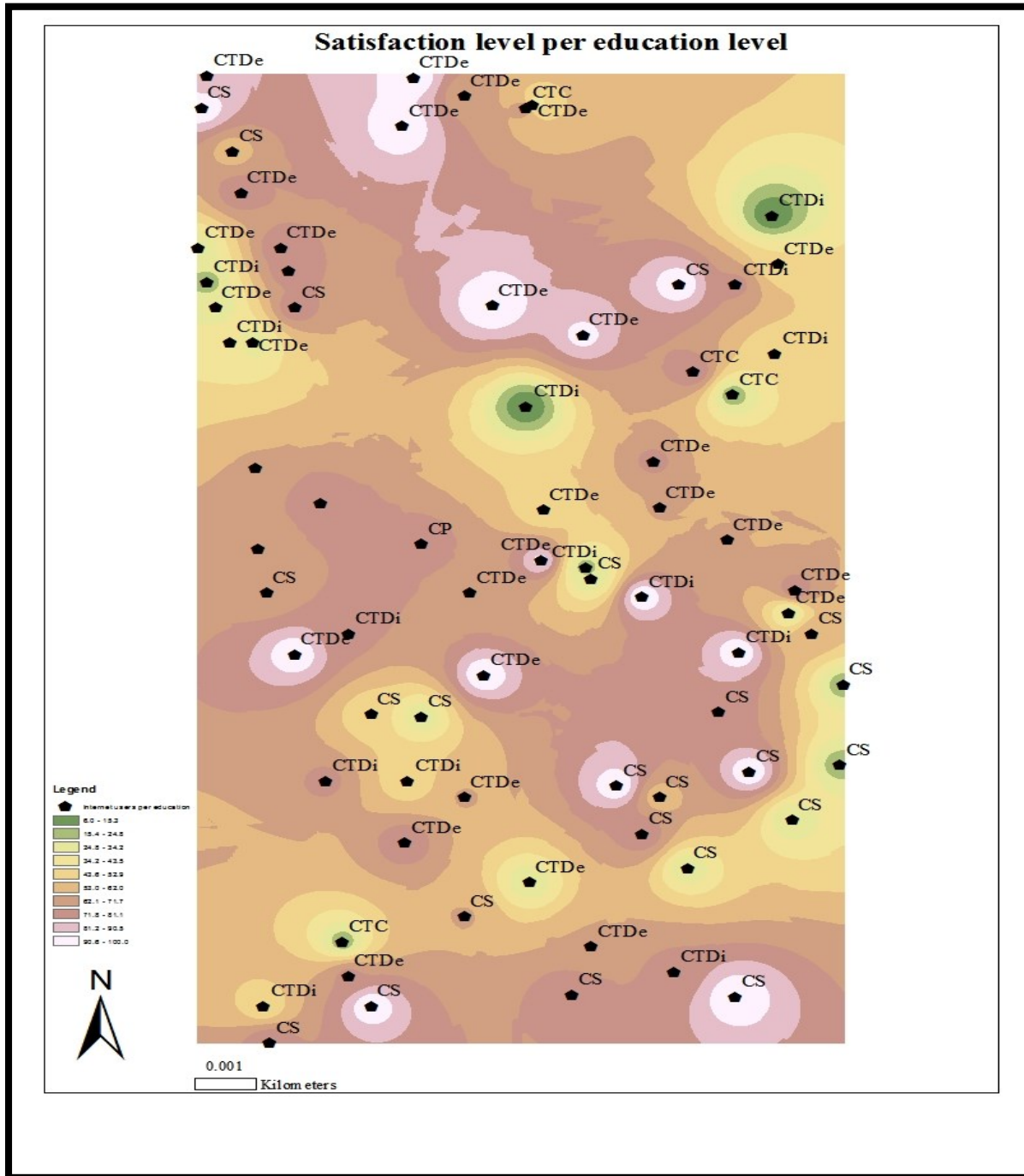


Figure 4.21: Satisfaction level per education

Internet Service Type

Fixed internet (FBB) and 4G users are more satisfied with their services than 3G users as most of them have between 90.6 and 100 satisfaction scores. Most of 3G internet users have satisfaction scores of between 6.0 and 15.3, results are reflected in figure 4.22.

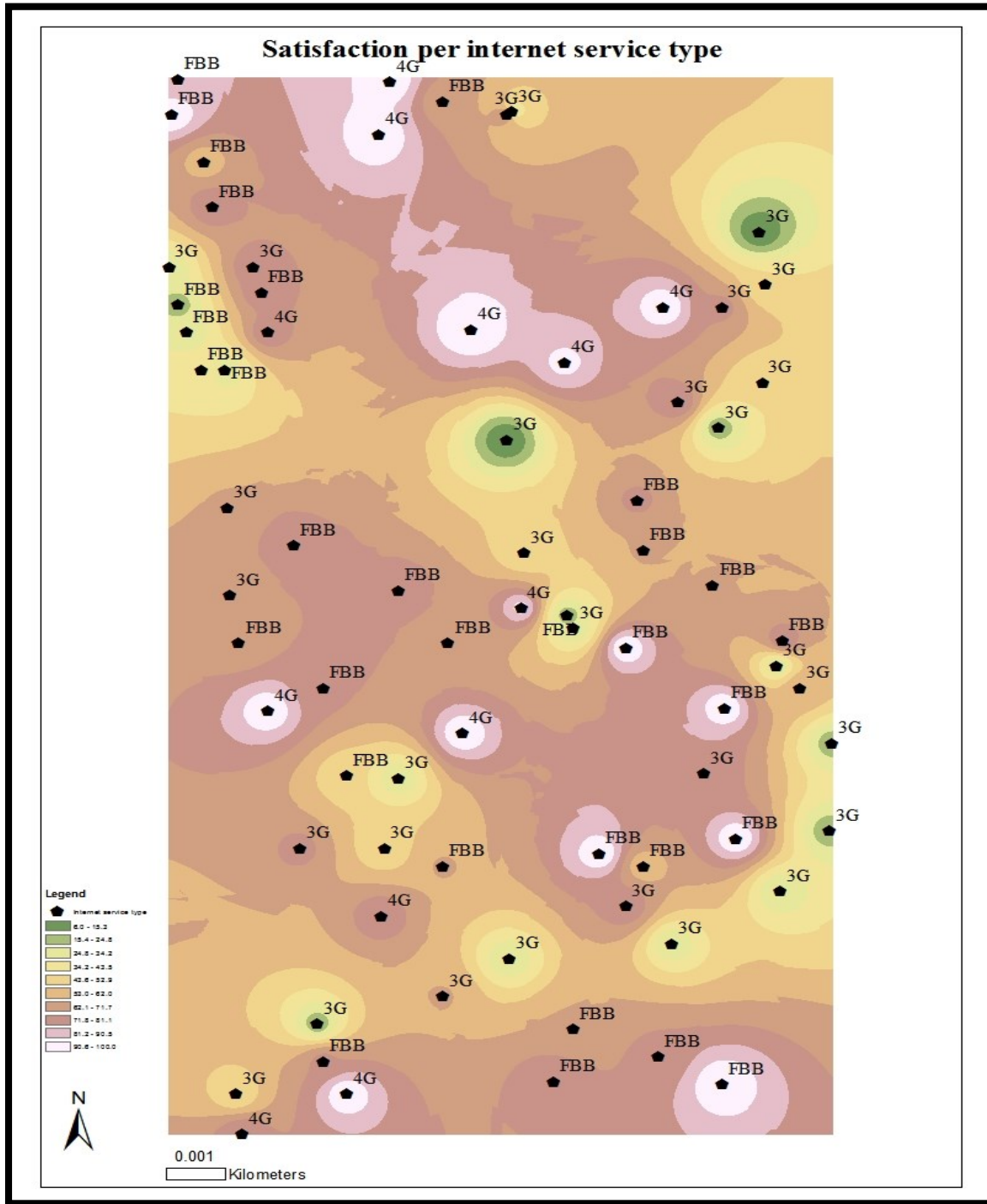


Figure 4.22: Satisfaction level per internet service type

Subscription Type

Post-paid (Post) internet users are more satisfied (between 90.6 and 100 score) with their internet services than Prepaid (Pre) subscribers. Prepaid internet users dominate satisfaction scores of between 6.0 and 15.3, results are reflected in figure 4.23.

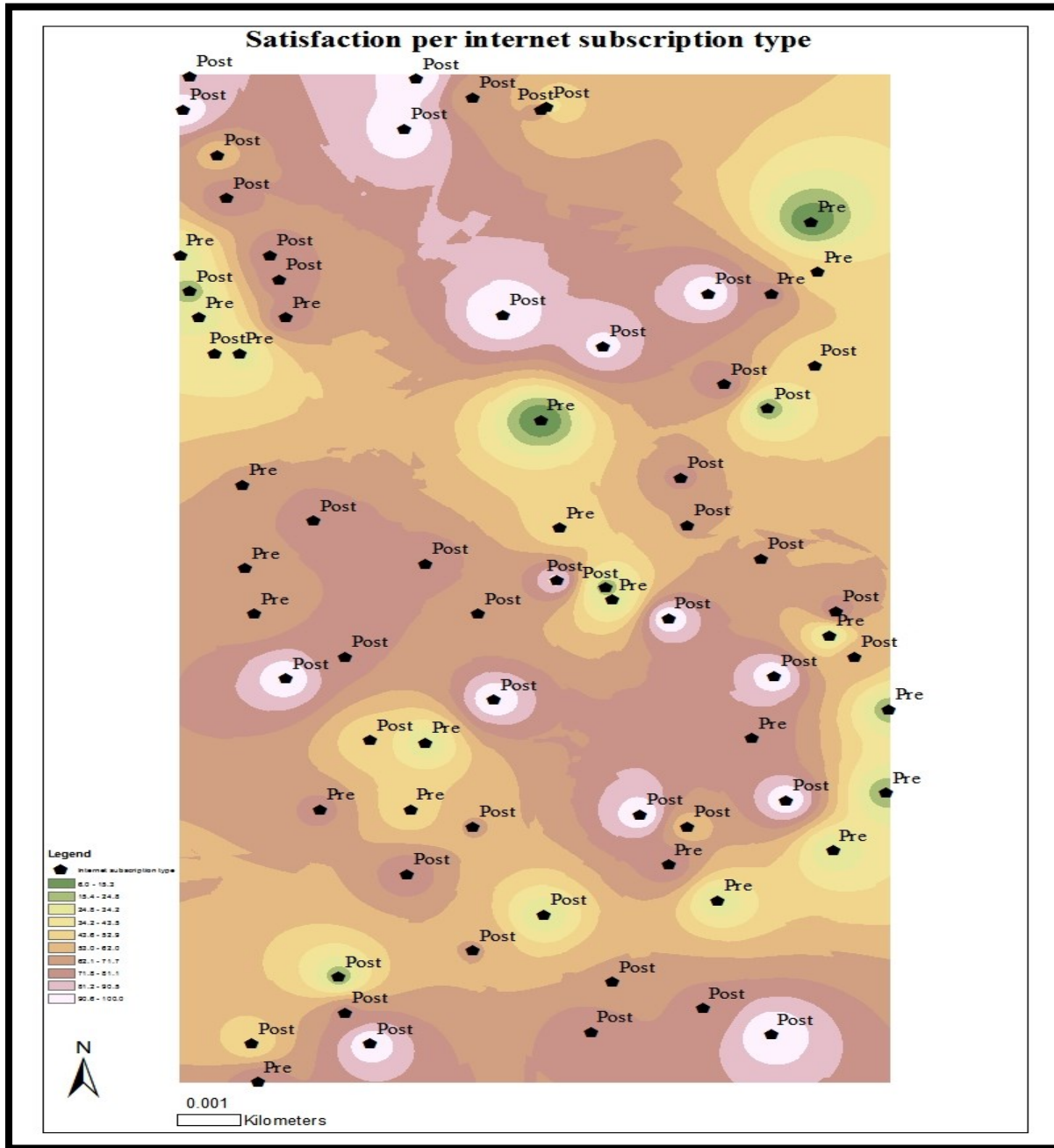


Figure 4.23: Satisfaction level per subscription type

4.4. STUDY VALIDATION

Greenwell Matongo Ext 1's validation results are based on 5 internet users who are randomly selected from the study area. The 5 internet users are gender characterised by 3 females and 2 males, 1 male and 1 female have no internet access. Additionally, all internet users have 3G internet service types and have satisfaction scores ranging from 6 and 62.

Grysblock Ext 1's validation results are based on 5 internet users who are randomly selected from the study area. The 5 internet users are gender characterised by 3 females and 2 males, 1 male and a single female have no internet access. Additionally, a single internet user have FBB (Fixed internet); while 2 internet users have 3G mobile internet service. The satisfaction scores of those internet users ranges from 6.0, 24.8 for 3G services and 81.1 for FBB services.

Pioneers Park Ext 1's validation results are based on 5 internet users who are randomly selected from the study area. The 5 internet users are gender characterised by 3 males and 2 females, 1 male had no internet access. Additionally, 2 internet users had FBB (Fixed internet), while 3G and 4G mobile internet services have a single user each. The satisfaction scores/level of those internet users ranges from 43.6 for 3G services and 100 for FBB services.

CHAPTER 5: DISCUSSION

5.1 INTRODUCTION

This chapter discusses the findings of the study. The research results from low income study areas are compared to each other. Furthermore findings from low income areas are compared with findings from the high income suburb. Quantitative survey results are discussed separately from ArcGIS spatial analysis findings. The study findings reveal that males are the majority when it comes to internet take-up and usage. Moreover, middle aged users (aged between 31 and 40 years old) are highly satisfied than any other age groups. Educational and income levels have a positive relationship with both take up and satisfaction level. Additionally, it must also be noted that internet users in the high income area are mostly middle aged people and are likely to be able to afford fixed post-paid internet packages than internet users in low income areas; as a result they are highly satisfied than their counterparts in low income areas.

5.2 AGE, GENDER AND SERVICE TAKE-UP

In comparison, there are more male than female internet users especially in the high income formal area (Pioneer Park Ext 1). However, the opposite is observed in formal (Gryblock Ext 1) and informal (Greenwell Matongo Ext 1) low income areas, where female internet users outnumber their male counterparts. This could be a result of more females than males having access to internet devices in low income areas. Furthermore, internet usage in low income areas is in line with ITU and UNESCO (2013) findings in

developed countries, where female internet users outnumbered their male counterparts. It must be noted that, gender is not the only factor which dictates internet usage; the age, education and income levels are also significant factors which determine internet usage globally, regionally and in Namibia. This is due to the fact that people need to have income to have access to internet services; furthermore one must be educated to know how to use the internet.

Aggregated results from all the study areas reflected that, young people use the internet more than older people. Fewer older people use internet especially in formal and informal low income areas. Both formal and informal low income areas have the highest number of young people using internet services compare to the high income area. In the high income area middle aged people (31 – 40 years) use the internet more than younger people aged less than 30 years old. This informs us that age is one of the drivers for internet usage, young people aged less than 30 years are likely to be connected to mobile internet services especially in low income areas. Moreover, fixed internet services are used mostly by middle aged people especially in high income area, this mainly due to the affordability factor.

5.3 EDUCATION, INCOME AND SERVICE TAKE-UP AND SATISFACTION

Overall, a high percentage of internet users earned less than N\$ 5000. This trend is more common within internet users in low income areas. The area with middle to high income, predominantly have internet users earning from N\$ 21000 to N\$ 30000. Income

levels are in line with the cost of housing in low and middle to high income area respectively. There is no major variation in the take-up and usage of internet between low and middle income area; indicating that internet is easily affordable to many people in both formal and informal areas regardless of their income levels. The variation was only observed at internet connection speeds and packages, with middle to high income area featuring good internet packages than low income formal and informal areas. The middle to high income area has more internet users who earned more than internet users in the low income areas. This result confirms Fuchs and Horak (2006) finding which identifies income as one of determinates for internet accessibility and usage. Based on the current study findings, there is a high chance to have internet access when residing in the middle to high income area as compared to low income areas.

People who completed only secondary education (Grade 12) are the majority internet users especially in low income areas. On the contrary, it was observed that in the suburb with middle to high income, majority of internet users have completed tertiary degrees. A high percentage of respondents from the middle to high income area are connected to the internet compared to respondents in low income areas. This finding certifies the following assumption; highly educated people have a high level of income which enables them to have access to the internet. The contrary can be associated with people with low level of income and education who in most cases are not connected to internet services.

The lowest satisfaction scores are dominated by internet users who completed only grade 12. The highest satisfaction scores are most reported by internet users who completed only a tertiary diploma or degree. This resulted into a relationship between satisfaction level and education level. Highly educated internet users are more satisfied than less educated internet users. This finding is supported by Ahmad and Al-Zu'bi, (2011) results on internet satisfaction level per educational attainment. The researchers also uncovered a positive association between satisfaction level and education level.

The lowest satisfaction scores are dominated by internet users who earn less than N\$ 5000 growth monthly income. The highest satisfaction scores are dominated by internet users who earn between N\$ 11000 and N\$ 30000 growth monthly income. Thus, a weak positive relationship between satisfaction level and income level is observed. When income level slightly increases, satisfaction level also slightly increases. It must be noted that, most of the high income internet users have fixed internet at home and are more satisfied with their internet services. A high percentage of low income internet users have mobile internet services and are less satisfied with internet services.

5.4 SATISFACTION LEVELS OF INTERNET USERS PER AGE AND GENDER

The lowest satisfaction scores are recorded from young internet users (aged less than 30 years old) compared to middle aged users (aged between 31 and 40 years old). As a result of this finding, a very weak positive relationship between satisfaction levels and age of internet users prevails. When age slightly increases, satisfaction levels also

slightly increase. This is a consequence of high usage of post-paid and fixed internet services by middle to high age groups; as discovered in this study that, fixed and post-paid services are associated with high satisfaction levels. Additionally, the middle to high age group can easily afford fast internet connections than younger people who are in most cases, on slow speed prepaid internet services. Middle to high age groups are likely to have more years of internet experience, this puts them in a better position to be able to select the best high speed internet packages for their use.

The lowest satisfaction scores are dominated by female internet users while the highest scores are dominated by male internet users. This finding revealed a relationship between satisfaction level and gender. Female internet users are less likely to be satisfied with their internet services compared to their male counterparts. This could be due to differences in internet perceptions, income levels and usage patterns between males and females.

5.5 SATISFACTION LEVELS OF INTERNET USERS PER SUBURB

A relationship between satisfaction level and suburb is revealed due to the following outcomes; the lowest satisfaction scores are dominated by internet users who resides in formal and informal low income areas (Greenwell Matongo Ext 1 and Grysblock Ext 1). The highest satisfaction scores are associated with internet users who reside in the middle to high income area (Pioneer Park Ext 1). Internet users who reside in the area with middle to high income levels are more satisfied with their internet services than

internet users who reside in low income areas. Internet users in the formal low income area have a high satisfaction with internet services compared to their counterparts in the informal low income area.

In Greenwell Matongo Ext 1 the majority of internet users are dissatisfied with their internet services. This is a result of high adoption of 3G internet speed services by most of the internet users in Greenwell Matongo Ext 1. There are very few internet users with fixed internet services who are highly satisfied than the majority mobile internet users.

The majority of internet users in Pioneers Park Ext 1 are satisfied with their internet services. Most of the internet users are connected to fixed internet services with 1 Mbps and 2 Mbps speeds. There are few internet users with 3G mobile internet services.

The majority of internet users in Grysblock Ext 1 are dissatisfied with their internet services. 3G internet services are commonly utilised by most of the internet users in this suburb. Similar to finding from Greenwell Matongo Ext 1, there are few internet users with fixed internet services who are highly satisfied than the majority mobile internet users.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

There are more males than females connected to the internet. This is based on the aggregated results from all the three study areas. The middle to high income area is associated with a high number of male internet users than low income areas. Low income areas are mostly associated with young internet users aged less than 30 years old, while the middle to high income area are mostly characterised by middle aged internet users aged between 31 and 40 years old. The majority of internet users earn less than N\$ 5000, especially in low income areas. As income and change in economic development occurs, an increase in consumption and satisfaction of internet services is likely to be experienced. Furthermore it must be noted that age and income are some of the prominent factors in determining internet usage and satisfaction. Most of the internet users completed only secondary education, particularly in low income areas. The majority of internet users who completed a tertiary degree are typically from the middle to high income area.

A very weak positive relationship between satisfaction level and age prevails. The lowest satisfaction scores are more dominated by female internet users while the highest satisfaction scores are dominated by males. A relationship is discovered between satisfaction level and education level, as the lowest satisfaction scores are dominated by internet users who completed grade 12. The highest satisfaction scores are mostly associated with internet users who completed tertiary diplomas or degrees. Gender and

education level are significant factor influencing internet take-up and satisfaction across low to high income areas. The lowest satisfaction scores are dominated by internet users who earn less than N\$ 5000 while the highest satisfaction scores are dominated by internet users who earned between N\$ 11000 and N\$ 30000.

A weak positive relationship between satisfaction level and income level is uncovered. The lowest satisfaction scores are dominated by internet users who reside in low income areas. The highest satisfaction scores are dominated by internet users who reside in the middle to high income area. Suburb location and characteristics influences internet take-up and satisfaction levels. There is a relationship between satisfaction level and suburb. There are very few internet users with fixed internet services who are more satisfied than the majority mobile internet users in low income areas. The majority of post-paid fixed and 4G internet users are more satisfied with their services in the middle to high income area. The study further concludes that, internet subscription type has an influence on internet service satisfaction level.

6.2 RECOMMEDATION

There is need for Telecommunication Companies in Namibia to introduce more fixed post-paid internet services especially in low income areas in Windhoek and other areas of Namibia to boost internet satisfaction levels. CRAN need to consider introducing an application which assists users to monitor internet connection speeds. This application needs to have capability to allow customers, at their homes or on their phones, to

monitor and report poor customer service directly to CRAN and to their respective internet service providers. This type of application already exists in India as TRAI has a smartphone application called “MySpeed” which assists internet users to monitor mobile and fixed internet connection speeds.

Application like “MySpeed” will assist internet service providers to actively monitor service provisioning as they will have access to information on where services need improvements. Internet service providers need to consider restructuring their marketing efforts to capture younger citizens who have low consumption of internet especially in high income areas. Furthermore, internet service providers need to design products that address age differences to increase uptake and consumption of internet services.

It's further recommended that ICT companies in Namibia need to get more involved with academic institutions in order to conduct detailed researches on the effect of the physical location on the quality of ICT services which are provisioned on wireless networks. ICT companies need to understand why mobile ICT services especially in low income areas are likely to be associated with high dissatisfaction levels so that they can improve their services. Detailed researches applying multivariate analysis need to be conducted in order to have a detailed understanding of the combined effect of education, income, gender and age variables on internet service satisfaction levels.

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APPENDIX A: QUESTIONNAIRE



Internet Service Satisfaction Level Questionnaire

Respondent tel nr:..... **Occupation:**.....

Physical address:..... **GPS reading:**.....

Suburb:..... **House owner:** **Renting:**

My name is Booyesen Tubulingane a student doing a Masters of Arts in Geography at UNAM. I am doing a research to determine the impact of demographic & economic factors on satisfaction level for internet services in Windhoek. Please answer the following questions as honestly as possible. Please answer questions individually and don't discuss them with other people.
Please note that your information will be kept confidential and only published on aggregated level.

Section A: Background Information of Respondent

For this section, please indicate with a tick/write in the appropriate box.

| Gender | Age | Monthly Growth Income(NS) | Education level | Internet service type (Mainly/frequently used) | ISP (Internet Service Provider) |
|---------------------------------|---|---|--|--|---|
| Male <input type="checkbox"/> | less than 30 years old <input type="checkbox"/> | Below 5000 <input type="checkbox"/> | Completed primary education (Grade 7) <input type="checkbox"/> | 3G <input type="checkbox"/> | MTC <input type="checkbox"/> |
| Female <input type="checkbox"/> | 31 – 40 years old <input type="checkbox"/> | 5000 to 10 000 <input type="checkbox"/> | Completed secondary education(Grade 12) <input type="checkbox"/> | 4G <input type="checkbox"/> | TN <input type="checkbox"/> |
| | 41 – 50 years old <input type="checkbox"/> | 10 001 to 20 000 <input type="checkbox"/> | Completed tertiary certificate <input type="checkbox"/> | FBB (Fixed internet) <input type="checkbox"/> | TN Mobile <input type="checkbox"/> |
| | 51 – 60 years old <input type="checkbox"/> | 20 001 to 30 000 <input type="checkbox"/> | Completed tertiary diploma <input type="checkbox"/> | Other Specify... <input type="checkbox"/> | Other Specify..... <input type="checkbox"/> |
| | Above 60 years old <input type="checkbox"/> | Above 30 000 <input type="checkbox"/> | Completed tertiary Degree <input type="checkbox"/> | Other Specify... <input type="checkbox"/> | <input type="checkbox"/> |
| | Other Specify..... <input type="checkbox"/> | Other Specify..... <input type="checkbox"/> | Other Specify..... <input type="checkbox"/> | | |

Section B: Service Quality Dimensions:

Kindly rate how satisfied are you with each of the following statements by ticking in the appropriate boxes. Rating scale are as follows 1 = Very slow/off all the time, 2 = Slow/Off most of the time, 3 = Medium, 4 = Fast/On most of the time, 5= Very Fast/On all the time.

B.1. Internet connection speed is...?

Very fast

Fast

Medium

Slow

Very slow

B.2. Internet connection (uptime) is?

On all the time

On most of the time

Medium

Off most of the time

Off all the time

B.3. Internet upload speed is...?

Very fast
Fast
Medium
Slow
Very slow

B.4. Internet download speed is...?

Very fast
Fast
Medium
Slow
Very slow

Section C: Service Usage, Technical Performance:

C.1. How do you rank the main usage of your data/internet as per the below usage purpose categories?
Raking scale are as follows 1 = Very low usage, 2 = Low usage, 3 Medium, 4 = High usage, 5 = Very high usage

| Purpose | Rank |
|---|------|
| Browsing for information | |
| Email | |
| Research purposes | |
| Social networking (e.g. Facebook, Twitter.....) | |
| VoIP (e.g. Skype.....) | |
| Work purposes | |
| Other specify..... | |

C.2. What is your internet subscription type

- a) Prepaid b) Postpaid

C.3. What is your internet connection speed?

- a) 512kbps b) 1Meg c) Other Specify

C.3. How much do you spend (monthly) on internet services?

- a) Less than N\$ 100 b) N\$ 100 to <N\$ 250 c) N\$ 250 to <500
 d) N\$ 500 to <N\$ 750 e) N\$ 750 to <N\$ 1000 f) MorethanN\$1000

C.4. Did you experience any technical problems or challenges on your internet service?

- a) Yes b) No

C.4.1 If yes: explain what type of problems or challenges did you experience?

.....

C5. Are you likely going to continue to use the service in the next 12 months?

a) Yes b) No

C.5.1 Reason(s)

.....

Section D: Comments & Suggestions:

D. Do you have any questions, suggestions or comments which you would like to share with me?

.....

Thank you very much for your time, your participation is highly appreciated