Consumer Sophistication in Technology Adoption: A Socio-Demographic Analysis

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TABLE OF CONTENTS

LIST OF ACRONYMS/ABBREVIATIONS

AARP	American Association of Retired Persons
ANC	African National Congress
ANOVA	Analysis of Variance
BAC	Botswana Accountancy College
BIUST	Botswana International University of Science and Technology
BOCODOL	Botswana College of Distance and Open Learning
BOCRA	Botswana Communications Regulatory Authority
BoFinet	Botswana Fibre Networks
BTA	Botswana Telecommunications Authority
BTC	Botswana Telecommunications Corporation
CFA	Circuit Facility Assignment
CODESA	Convention for a Democratic South Africa
GNI	Gross National Income
GPMCS	Group Policy Management Consoles
GSM	Global System for Mobile Communication
HIES	Household Income and Economic Surveys
ICT	Information and Communications Technology
IDT	Integrated Device Technology
IMEI	International Mobile Station Equipment Identity
IMF	International Monetary Fund
IP vigilance	Intellectual Property Vigilance
IPS	Industrial Policy Studies (Korea)
ITU	International Telecommunications Union
JETRO	Japan External Trade Organization
LDC	Least Developed Country
MDN	Mobile Directory Number
M-Pesa	(M for Mobile, Pesa is Swahili for money)
MVNO	Mobile Virtual Network Operator
OECD	Organization for Economic Co-operation and Development

PSLE	Primary School Leaving Examination
PTOs	Public Telecommunications Operators
P (pula)	Pula (Currency of Botswana)
RoHS	Restriction of Hazardous Substances Directive
SAP	System Applications Processes (Software)
SCT	Society for Clinical Trials
SEM	Structural Equation Modelling
SI	Systems of Innovation
TAM	Technology Acceptance Model
TAM2	Technology Acceptance Model 2
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UB	University of Botswana
UNESCO	United Nations Educational Scientific and Cultural Organization
UNDP	United Nations Development Program
USD/US$	United States Dollar
UTATU	Unified Theory of Acceptance and Use model
VANS	Value Added Network Services
VDCs	Village development Committees
VoIP	Voice Over Internet Protocol
WiMAX	Worldwide Interoperability for Microwave Access

LIST OF FIGURES AND TABLES

CHAPTER I INTRODUCTION

1.0 Introduction

Existing work related to consumer sophistication research points to the fact that poorly skilled consumers are inclined to make poor consumption decisions. These decisions can have a lasting impact environmentally, economically and even health-wise. With over 150% mobile phone penetration rate in Botswana, evidence is emerging that such levels of ubiquity are proving a challenge for some of the consumers (URL 1). These challenges manifest in different forms including poor e-waste management, counterfeiting and economic pitfalls as a result of a generally changing market landscape. Regulators and marketers alike have moved to attempt to curb some of the mentioned challenges. Despite these interventions, it remains clear that the challenges continue unabated. What is clear is that consumers are not aware of implications associated with their consumption decisions before, during and post-consumption. In addition, there is limited effort from both regulators and marketers to explore the consumer base to seek solutions. The bulk of existing literature is more fixated either on the devices and how to further increase penetration or mobile money transfer solutions with a limited body of literature that explores the consumer base in an attempt to derive solutions on the basis of consumption.

Participants for this study were shopping mall patrons and workers at two main malls in Gaborone, Botswana. Shopping malls were selected because they are a public space that attracts people from diverse backgrounds. The researcher had initially explored the possibility of other places such as banks and academic institutions, but they did not offer the same diversity and therefore generalisability as offered by shopping malls. The other reason for selecting shopping malls to conduct data collection was largely due to its nature as a study about consumption, the familiarity with some of the issues raised made the entire process less challenging. A convenience sampling method was used to select participants for this research.

A survey was used as a collection tool for this study. The survey was divided into 2 main parts. The first part consisted of 13 questions/statements adapted from the IPS Consumer Sophistication model, measured on a 5-point Likert scale. The author adapted the model and drafted measuring tools on its basis because it encapsulates consumer sophistication better

than other existing literature. Another reason for this adaptation is the fact that its multidimensional nature allows for deeper insight into the level of consumer sophistication. The second part of the survey contained questions about demographic data including the respondent's age, gender and income.

The survey was attempted in total by 320 individuals. However, some of the respondents did not complete the whole set of questions which generated missing values during the data coding process. After cleaning up the data including outliers we were left with 307 completed surveys. The following provides a basic overview of the study sample: 55.9% were male while 44.1% were female; 36.9% of the respondents were between the ages of 16-25, 47.8% were between the ages of 26-35, 10% were between 36-45, 3.4% were between 46-55 and only 1.9% were over the age of 56; 11.5% of the respondents reported no income while 6.3% said they were unemployed; 42% were regular employees whilst 12% reported as self-employed.

The research questions in this study seek to achieve direct observation of the level of consumer sophistication among urban mobile consumers on the basis of sociodemographic variables. As a result, a systematic and scientific approach was deemed necessary for this study. From literature consultation, the researcher discovered that the positivist paradigm lends itself to the use of quantitative methodology and therefore it became a natural choice as far as paradigm is concerned. Establishing the level of consumer sophistication counts as an attempt to measure a phenomenon, which is the basic objective of quantitative methodology.

This study employed the theory of market segmentation to explain the influence of Gender, Age, Income and Education on the level of consumer sophistication as defined by environmental awareness, information orientation, IP vigilance, health awareness, product knowledge, brand consciousness and quality judgement. The emerging challenges that result due to poor decision making in consumption of mobile technologies are being countered with broad supply strategies. Profiling consumers on the basis of their level of consumer sophistication reveals trends and patterns that are root causes of poor consumption. These revelations should act as a foundation to formulating both marketing and public policy

strategies. Previous studies have not been exploring this link in the mobile sector, in solution seeking for the aforementioned challenges or in the context of Botswana. This study adds to a scant body of work in consumer sophistication and by extension to marketing science.

The purpose of this study was to identify the relationship between socio-demographic characteristics and level of consumer sophistication among urban mobile consumers in Botswana. This was a demand-side approach designed to identify and profile those within the consumer base likely to contribute to poor e-waste management, facilitate proliferation of illicit mobile phones, poor economic decisions in purchasing and other challenges associated with the changing market landscape. Findings such as these can assist in the formulation of public policy strategies targeted at particular segments of consumers and astute marketers can strengthen their position by bringing marketable solutions in mitigating these challenges. Both descriptive and inferential statistics were analysed in order to describe respondents as well as establish the relationship between the variables. The independent variables in this study are gender, age, income and education. The dependent variables are Information orientation, Brand consciousness, Quality judgement, IP vigilance, new product Knowledge, Health awareness and Environmental awareness. The first part of analysis employed t-tests and ANOVA to compare means and confirm whether a relationship existed between dependent and independent variables.

The Second part of the analysis used K-means cluster analysis to segment consumers on the basis of their level of sophistication as well as reveal their characteristics. These results indicate the existence of a relationship between socio-demographic characteristics and consumer sophistication. Some of the more interesting findings are in relation to gender and income level. What the gender based outcomes reveal is an inability by current marketing strategies to reach the female population. Existing marketing strategies are gender blind in that they fail to recognise the difference in preferences or consumer needs based on gender. This demonstrates a clear need to formulate strategies geared towards enhancing awareness among the female consumer group. Particular attention needs to be paid to the female consumers in the lower income bracket since that is where more demand and consumption is recorded.

As far as income is concerned, the results of this study confirm that higher income mobile consumers in Botswana are more environmentally aware than lower income consumers. There are several possible scenarios that can be used to explain this finding. The study has further revealed that environmentally aware consumers represent a base constituency of the growth in this particular market. Issues of sustainability are often referred to as first world problems, meaning developing countries believe they have more pressing basic needs than sustainability. Similarly, and contextually in the case of a developing economy such as Botswana, the idea of sustainability is largely sellable to those in the higher income bracket. General belief is that they have lesser pressing needs than it is to low income people who struggle with basic necessities of everyday life. Insights such as these are necessary for the development of effective marketing and regulatory policies.

This study makes a theoretical contribution developing a conceptual framework for the analysis of factors influential in the sophistication levels of mobile telephony consumers in Botswana. The study uses the sociodemographic aspect of the market segmentation theory to help identify levels of consumer sophistication among subgroups within the consumer base. The concept of consumer sophistication was used to develop 7 major variables aimed at providing answers to the research questions posed herein. The researcher is not aware of any study that has fused the concept of consumer sophistication with the market segmentation theory to reveal consumption practices among mobile telephony consumers.

From a public policy perspective, especially regarding the aforementioned e-waste management strategies, findings point us to the subgroups where most of the waste is likely generated. In an attempt to formulate strategies to manage e-waste in the face of ubiquitous technological devices like mobile phones, it's important to understand consumer behaviour and profile consumers as a way of establishing a starting point in the strategy. The education levels will first determine the intervention tool, if its information that needs to be disseminated how do we package it – for each particular group, so that it yields results? What such findings reveal is that blanket interventions targeting high school leavers all the way to consumers with post graduate education are unlikely to yield the desired outcome.

Looking ahead, some of the limitations identified are that the study does not take into consideration the role of the family and its specific influence on the consumer's level of consumer sophistication. Variables like marital status and number of people in the household were not incorporated in this study, and they have proven influential in socio-demographic analyses before. Further to that this study was only limited to urban mobile phone consumers and future research can look to incorporate a more holistic sample population in order to be able to draw differences in consumer sophistication levels on the basis of geographic location. That is necessary because the household composition of urban dwellers in vastly different from that of rural dwellers in terms of the economics, education, gender, marital status of household heads and many other socio-economic factors. Therefore, due to the fact that a select group of socio-demographic factors utilised in this study have proven to have an effect on the level of consumer sophistication, it would be interesting to further analyse the effect of more socio-demographic factors.

Botswana is a country in Southern Africa with a land area covering some 581,730 KM2. Botswana has made strides economically, emerging from being one of the poorest countries when it attained independence in 1966, to becoming one of the few success stories in the region. The first three decades, post-independence, saw an average annual GDP growth of 9.2 percent, matched only recently by China. The United Nations further reports the official population of Botswana at 2,303,820, making her one of the least densely populated countries. According to Botswana Tourism organization, 38% of the total land area in Botswana is devoted to national parks, reserves and wildlife management areas.

Rapid mobile phone uptake in Botswana has been lauded as a sign of the enabling regulatory framework that exists within the country (McCormick 2001; Sebusang and Masupe 2003; URL 2; URL 3; URL 4). The presence of mobile technologies has brought about immense change to the way of living in Botswana and other developing countries on the African continent. There is now an availability of innovative and convenient services such as mobile money, and first time users experience the internet through their mobile connection (URL 5). "In short 10 years, what was once an object of luxury and privilege, the mobile phone, has become a basic necessity in Africa" (URL 9). These were the words of Rwandan President Paul Kagame back in 2007 acknowledging the impact mobile phone technologies have had in daily lives of people on the continent of Africa. However, instead of the predominant focus

on devices and their pervasiveness, the researcher calls for a detailed look into the consumers, who they are and what lessons can be drawn from their consumption practices by both marketers and regulators alike.

1.1 History of Telecommunications in Botswana

1.1.1 Regional influence

It is imperative to acknowledge the socio-political influence of South Africa on the region when exploring the history of telecommunications in Botswana. Both parallels and contrasts can be drawn from this combined history of the two countries. By the time Nelson Mandela was released from prison in 1990, liberalization and privatization of South Africa's telecommunications assets had already begun in earnest. It is also important to note that at the time, South Africa had the most developed telecommunications infrastructure on the continent and enjoyed the highest telephone connection per capita rate, as a result Botswana and other neighbouring countries used this as an occasional benchmark for their reform processes (Ayogu and Hodge 2010). However, this was a racially skewed development statistic following decades of a system designed specifically to keep the majority of the population underdeveloped. Despite teledensity (the number of telephone connections per 100 people) in south Africa being just under 10 overall, in the rural and primarily black communities it stood at just 1% (Gillwald 2005). The year 1994 marked the first democratic post-apartheid elections but prior to the elections there was fierce political disagreements, between the then minority government and the incoming ANC government regarding a policy that was designed to drive the liberalization and privatization of state assets in the telecommunications sector. During the convention for a democratic South Africa (CODESA), the African National Congress (ANC) articulated a policy orientation that was restructuring and redistributing simultaneously (Horwitz 1997). The logic behind this was that by expanding electricity, telephone, transportation and water access to the previously disadvantaged, it would not only enhance their quality of life but also facilitate their capability to have a meaningful role to play in the economy. Therefore, as a result of the dramatic social transformation in South Africa at the time, policy formulation found itself caught between a need to redress racial inequalities and to encourage effective economic integration. To date the jury is still out on whether the approach has yielded notable success on either the correcting of historical legacies or on the achievement of national economic

objectives. In summarizing the lack of success in this reform approach, the blame is put on the lack of regulatory capacity to implement government policy (Gillwald 2005).

To the Western border of Botswana lies Namibia, who gained independence from the pro-white regime in South Africa. Namibia just like South Africa was faced with the reality of a deeply racially skewed economy including limited participation of the black majority as well as deplorable living conditions and negligible access to telecommunication. The reform task was also similar in that it had to redress the racial imbalance as well as contribute to a vibrant economy for all people in Namibia. All three countries telecommunication sectors were preceded by an overseeing body that included postal services, so the initial task had always been to break up the two so that each stands on its own. Despite the similarities between Namibia and South Africa in terms of reform approach, the peculiarity of the Namibian reforms came in the form of its focus. While the idea behind reforms was to create a more open and vibrant market, the Namibian approach was largely focused on the transformation of the national service provider Namibia Telecom. Policy was implemented to strengthen the grip of Namibia Telecom first before any discussion about potential liberalization of the market. The initial plan, which took place in 1992 involved the corporatisation of the organisation as well as reorganisation of the corporate governance with Namibia Telecom. This exercise also included the decentralisation of operations. Following that was the automation and digitisation of the network, a process that was expected to reach completion in 1998. As follow up to this, the next phase was dubbed a precursor to the information society that Namibia was envisioning, therefore there was a fastracking of the digitization of the backbone infrastructure to reach all thirteen political regions in the country. Next telecomm Namibia set themselves an ambitious target of becoming one of the top 10 telecommunications operators in the world. This was done through multiple roll out of value added services and the use of its extensive financial and infrastructure muscle to dominate the new entrants that had just been introduced to the market. This strategy included what was termed geographical diversification, a strategy that involved using economies of scale to exert dominance over new private entrants with limited capital to reach all corners of Namibia (Heuva, 2007).

1.2 Botswana Policy

In 1980, through an act of parliament, the Botswana Telecommunications corporation (BTC) was established. This move saw a breakaway from the Botswana postal services, each body now operating on its own. As aforementioned, most African states and indeed around the world had established a single post and telecommunications service upon independence. Further to that, these bodies also integrated functional and operational decision making as well as regulatory functions. The structure of the new corporation was such that it retained monopoly status as well as regulatory powers. The customer base of BTC at the time of this transition stood at 6,500 (McCormick 2001). Another interesting fact about this development was the management structure of the corporation. A UK based company named Cable and Wireless was tasked with the running of the company under a management contract. This arrangement remained in place until 1995 when new reforms took shape.

Two presidential directives by cabinet in 1992 altered the telecommunications market in Botswana. This was done following a determination by the Cabinet of the market being characterized by a growing unsatisfied demand for telecommunications services in both urban and rural areas and among businesses as well as households (Government of Botswana 1995). The first directive (CAB. MEMO/117 SWC 13/30) was geared towards providing competition in the provision of Telecommunications while the second directive (CAB. MEMO/98 SWC 13/30) was a call for appropriate ownership of mobile phones in Botswana. These directives gave birth to the eventual Telecommunications policy of Botswana in 1995, the same year Botswana graduated from a Least Developed Country (LDC) to a Middle-Income Country (MDC).

Of particular importance and relevance to this study is the outlined Roles and Functions in the policy document. Government was tasked with the overall policy functions and establishing legal framework for the Industry. The envisaged regulatory authority was to be tasked with issuing regulations and implementing policy. Further tasks included general supervision of the sector as far as compliance and performance was concerned. For the operators, the task was to provide the networks and services as well as associated investments. Consumers were also given a role, as users of the service their function was to decide which products and services made up the industry.

An interesting policy approach for Botswana, which differed generally with reform efforts of other countries including South Africa was the commitment to establish an autonomous regulatory authority prior to any liberalization and/or privatization exercise. Due to what was cited as the lack of in-house expertise and a recognition of the complexity of the project, consultants were brought in from abroad to guide the implementation of the reform. It is important to note that unlike other countries in the region, Malawi included, this reform was not spearheaded by the Bretton Woods Institutions. After a bidding exercise, a contract was awarded to a consortium of companies consisting of Swedtel and ISO-Swedish Management Group (Government of Botswana 1995). The process was kick-started by a countrywide consultation tour. In light of what government viewed as far reaching implications of restructuring a huge sector such as telecommunications, the consultants as well as relevant government officials went around the country consulting among others district and urban headquarters. Other relevant contacts in this consultation exercise included Village development committees (VDCs) as well as the business community. The whole consultation exercise was undertaken in the first half of 1995.

The 1995 telecommunications policy for Botswana then informed the amendment of the Botswana Telecommunications Corporation Act in 1996. The two main objectives of the act were to end the monopoly of BTC and secondly to establish a telecommunications regulatory body. To achieve the initial objective, the legislation called for enabling new entrants to enter the sphere and offer competition to BTC. The abolishment of BTC's monopoly also meant curtailing its power to prescribe tariffs, and make by-laws and regulations. Drawing upon international best practice regarding successful liberalisation processes and the autonomous nature of the regulatory authority, the second part of this amendment act covered in detail the establishment, constitution and membership of the regulatory authority.

1.3 The Birth of Botswana Telecommunications Authority (BTA)

December 1996 market the formation of Botswana Telecommunications Authority with a five-member board. Apart from the CEO who also acted as board chairman, other seats were occupied by a representative of the Ministry of Commerce and Industry as well as another from the Ministry of Finance and Development planning. A representative of the business

community was also roped in to safeguard the interests of the private sector, and lastly in accordance with the Authority's aim to protect consumer interests the last seat went to a representative of domestic consumers of telecommunication services. (Government of Botswana 1995). As far as the functions, powers and duties of the Authority were concerned, its overall task was to supervise and promote the provision of efficient telecommunications services in Botswana. The achievement of this broad task would be achieved by among others; settlement of disputes that may arise between licensees, between licensees and other service providers, and between licensees and members of the general public; the monitoring of competition in the telecommunications sector; make regulations specifying the type of equipment to be used in the provision of telecommunications services; power to require information; powers of inspection; powers to set up committees if it deems them appropriate in the execution of its mandate; and most importantly no person was to offer telecommunication service unless they had been granted a license by the authority to do so (Government of Botswana 1995). However, it is important to note that despite the bestowal of all these powers, it would not be until July 1997 that the Authority was fully granted its ability to issue service licenses. This part of the deal was delayed so as to enact other sections of the Act in preparation for the issuing of licenses.

1.4 Licensing

Licensing cellular services was considered an urgent matter on the agenda of the newly formed BTA. In May 1997, the Authority opened an invitation to tender for licenses to provide mobile telecommunications services in Botswana. Some of the requirements of the bidders included local employment as well as training policy. Proposals were also supposed to indicate the initial paid up share capital including the proportion held by citizen owners. These conditions influenced the bidding approach as most proposals came in the form of joint ventures and consortia of both local and international enterprises. The five bids received and opened on August 12th 1998 came from; (1) Botswana Vodacom Cellular, which was a joint venture between Botswana Telecommunications Corporation (BTC) and Vodacom South Africa; (2)Bharti TCLI Afrocell Botswana Limited, Jamal Trading Company acted as a local partner to a joint venture between companies from India and Mauritius; (3) Mr Strive Masiyiwa headed the Mascom Wireless Consortium, which comprised of DECI holdings as a local partner and a joint venture between Portugal Telecom and T.S Masiyiwa holdings; (4)

The MTN Botswana consortium, a combination of MTN holding in South Africa as well as Loapi Holdings from Botswana; (5) Vista Limited, combination of local companies such as Hemamo Investments, Thusanyo Investments, Inter public, Omega Holding Leno holdings and an international partner in France Telecom.

Eventually the two licenses were awarded to Vista, who adopted the brand name "Simply Cell" and Mascom Wireless. The two companies were set to operate in the most populated areas of Botswana in the form of Gaborone and Francistown corridor. In addition to that, Mascom was given mandatory coverage obligation in the areas between Francistown, Kasane and Maun. On the other hand, Vista was granted the area between Lobatse, Gantsi and Mamuno. Both these designated areas had lower population density and the logic behind the separation was that they could not support both service providers. An interesting condition in the license agreement was the expectation by the authority for the licensees to provide full coverage within 48 months in their respective mandatory areas. Following compliance with this agreement, the licensee would now have gained the freedom to operate in any territory within Botswana including the competitor's territory. These events marked the beginning of competition in the telecommunications space in Botswana as we know it today. Both license agreements were valid for a period of 15 years and it would be 5 years before the authority considered opening the market to further competition.

Both companies already had the experience of rolling out telecommunication services. Bidding invitation had required partners within the ownership structure who had been servicing more than 50,000 customers by the end of 1996. Mascom Wireless had Portugal Telecom in their ranks while Vista cellular had France Telecom in their ownership structure. Just to highlight the nature of the demand for mobile telecommunications services that existed on the ground; neighbouring South Africa had already been introduced to cellular phones as far back as 1989 and there were already individuals in Botswana who had bought phones and service in South Africa and would occasionally drive down to the east of Gaborone towards the border to use them there. This in itself highlights the continued regional influence on Botswana's telecommunications trajectory. Even though the expectation was that it would take about 10 years for the entire cellular market to reach

100,000, within 28 months, total market subscriptions were comfortably over 150,000 and growing rapidly (McCormick 2001).

Further liberalisation in 2003 saw the issuing of another license in the telecommunications space. BTC was issued a 15-year license after hitherto operating without a recognized license since corporatization in 1980. As the market grew and new technologies emerged, it became apparent that the regulation must be reviewed too. With the introduction of broadband, new digital broadband technologies made it possible for operators to offer several types of services that were previously seen as peripheral to the telecommunications or broadcasting space. An example is that Internet Protocol Television (IPTV) was restricted in the Republic of Korea until the 2008 IPTV Business Act permitted telecommunications operators to offer television programs in real time over their networks (URL 10).

1.4.1 Open access principle and Unified licensing framework

Around 2004, the rigidity of the traditional licensing framework was proving counterproductive to the intentions of BOCRA. The service-specific framework typically required separate licenses for wireless, wireline and broadcasting services. This prohibition of offering services outside the license category made it impossible to integrate into the market new technologies, such as Global Personal Mobile Communication by Satellite (GPMCS) as well as Mobile Virtual Network Operators (MVNO). As a result unified licensing approach aimed at achieving the following; Encouragement of the growth of new applications and services; Simplification of existing licensing procedures to ease market entry and operations; Regulatory flexibility to address market and technological developments; Efficient utilization of network resources, so that individual networks may be used provide a broad range of ICT services; And encouragement of a full range of operators including large scale and micro enterprises.

This further liberalization of the market by BOCRA was naturally followed by a lifting of restrictions on Value Added Network Service providers (VANS) to provide Voice over Internet Protocol (VoIP) as well as granting permission to network service providers to self-provide transmission links (BOCRA 2011). In 2007, continued liberalisation in the form of

introducing technology-neutral licensing gave birth to BTC's mobile service arm bemobile. The mobile penetration at this time stood at 1.4 million combined subscribers which represented about 80% mobile penetration rate (BOCRA 2011).

1.5 Current Situation

As far as the fixed telephony market is concerned, BTC still remains the sole provider of fixed mobile technology services and is currently undergoing a privatisation exercise. The organization has had to navigate its way around a challenging and evolving environment including the 2005 tariff rebalancing exercise that sought to lower the cost of international tariffs but in the process increased the cost of some local calls. Botswana Fibre Networks Ltd (BoFinet) was founded in 2012, breaking away from BTC to stand alone as a wholesale provider of national and international communication infrastructure. BoFinet services retail organizations in the telecommunications space such as licensed public telecommunications operators, licensed Value Added Network Service providers as well as international telecommunications operators and carriers (URL 11). This development has further liberalised the market space in Botswana and diminished greatly the monopolistic powers of BTC. In terms of fixed line telephone subscriptions, it has all but plateaued around the 170,000 mark as a result of preference for the convenience offered by mobile communications (URL 11). ADSL connections are also proving less favoured because a lot of the consumers are now accessing the internet through their mobile phones and WiMAX devices. Having recently gone public through an initial IPO, it will be interesting to observe the direction the organization takes.

Using subscription rates as a measure of success for the companies in this space, Mascom has very much taken the lead since day one. It is important to note that their prior experience setting up Econet in Zimbabwe stood them in good stead. They were so confident of success in bidding that they started laying down some equipment on the Botswana-Zimbabwe border to support their early entry strategy. Evidence (McCormick 2001) reveals that following some management and promotional difficulties, Vista cellular also took off, resulting in a customer base of just over 50,000 within 2 years of inception. Mascom at that time had already surpassed the 100,000 mark in terms of subscriptions. The latest statistics from BOCRA (URL 12) indicate a combined total of 3,475,327 subscribers in a population of just over 2 million, as of March 2015. The subscriber allocation per operator is as follows;

Mascom has 1,839,782 subscribers; Orange (formerly vista cellular) has 1,124,092 subscribers; and bemobile has 511,533.

1.6 Statement of the research

The main organising principle of a research paper is always the research problem. Thereby allowing for writing and focus on the problem under investigation. According to Labaree (2009), "it represents the core subject matter of scholarly communication, and the means by which we arrive at other topics of conversations and the discovery of new knowledge and understanding" (61). This section outlines the research problem or organising principle for this study.

Botswana has one of the highest mobile phone penetration rates in Southern Africa and the world. Due to the prevailing regulatory conditions, consumers in Botswana are faced with a vast array of mobile technology product choices. Issues that are emerging point to an inability to deal with such high levels of mobile phone ubiquity by consumers in Botswana. Consumer sophistication skills are necessary for sound consumption decisions before, during and after consumption. A lack of consumer sophistication skills can lead to poor consumption decisions, which can have damaging health, environmental and economic implications. This can have a lasting impact on the quality of life for both individuals and families.

1.6.1 E-waste

E-waste is a global problem but it has become an issue highly synonymous with developing countries. Some of the most documented cases of poor e-waste management include China, the Philippines, Ghana and Ivory Coast. Issues surrounding e-waste mostly get attention when developed countries dump their electronic waste in developing countries under the guise of recycling. What is not highlighted is the fact that even countries as small as Botswana are grappling with e-waste management issues. The Global Partnership in Waste Management (UNDP) indicates that the lifespan of computers has decreased rapidly from six to two years, and for countries like Botswana with high mobile phone penetration it means equally high rates of disposal since cell phones have an even shorter lifespan. As recently as March 2015, the Botswana Telecommunications Authority (BTA) held a stakeholder

workshop on e-waste management. The workshop concluded with a general call to sensitize the nation about the pitfalls of poorly managed electronic waste. In terms of defining the role of consumers going forward, vigilance and information seeking was encouraged. The consumer is the last point before disposal and therefore the researcher agrees with sensitizing and encouraging vigilance among the consumer constituency. However, before educating the consumer there is a need to identify and profile consumers, and using consumer demographics to explore levels of awareness among them is a good starting point for effective sensitization.

1.6.2 Health concerns

The UN reports 6.9 billion mobile phone subscriptions around the world, with the ubiquity of the technology rising by the day. Studies continue to probe the relationship between mobile phone use and health, particularly exposure to electromagnetic fields. Despite that, the International Centre for Research on Cancer under the auspices of the World Health Organization has proceeded to categorize electromagnetic fields generated by mobile phones as possibly carcinogenic to humans. Carcinogens are basically agents or substances that can cause cancer by way of altering the genetic structure of cells so that they multiply and become malignant (URL 13). In a world of growing demand for information disclosure, this is another debate that simply refuses to go away. The Botswana Communications Regulatory Authority (BOCRA) had to respond to increasing public concern about the health effects of electromagnetic fields generated by mobile phone devices. "We further assure the public that there is consensus in scientific literature that there is no evidence of adverse health effects by use of cell phones and their radio base stations with the applicable limits as mentioned above" (BOCRA 2009).

1.6.3 Macroeconomic concerns

There has been an emergence of macroeconomic data that pose further questions as far as the challenges a consumer in Botswana faces. A recent study in Botswana (IMF 2013) has revealed a rapid increase in private consumption as a result of increased unsecured lending. Even though such challenges are addressed through financial sector regulations, they still resonate with aims of this study in the sense that the change in the market landscape is also

influenced by a sudden access to finance which is quoted in the IMF report (2013) as "financing private consumption". One of the recommendations put forward was that "staff sees merit in carrying out a comprehensive assessment of household borrowing, disposable income and investment activities and monitoring them on a regular basis" (IMF 2013). Such developing trends call for a better understanding of the consumer, the role they play, the products and services they consume, how they arrive at the decision to adopt, and how they actually use the mentioned product or services. Following that, a more holistic approach to public policy can be formulated, factoring in the sophistication levels of the consumer.

Consuming sustainably is a great mark of sophistication in a consumer, and sophisticated consumers go a long way in determining the path that economies chart by deciding the success and failure of products as they enter the markets. It is therefore in the best interest of policy makers and marketers to ensure continued education of consumers through among others the provision of information. Further to that there is a need to establish whether the education is indeed reaching its intended target and effecting change, if so how does the change vary within the population.

1.6.4 Counterfeiting

Situation around the world

As aforementioned, developing economies are almost synonymous with mobile technology penetration in light of the impact it has had on everyday life and the rate at which it has been accepted by people of the developing world. One classic example of such countries is Kenya with their runaway success in mobile money (M-Pesa). However, a recent report (URL 3) estimated the number of counterfeit mobile phones in Kenya at 3 million from a total of about 30.4 million devices at the time. In Tanzania, the trademark infringements of mobile phone devices are estimated at between 10 to 20% of market share. In Nigeria, the communications Commission (URL 14) reports that 250 million counterfeit ICT products find their way into the Nigerian market annually, the majority of which are mobile phone devices. They quote the figure at 15% of the global counterfeit market. Asia pacific, the region with the highest proliferation of counterfeit devices stood at 125 million counterfeit mobile phones in 2011 and was expected to rise to 148 million in 2013. For large economies such as India, the statistics are more profound, with an estimated counterfeit industry of about 1.5 billion USD,

direct tax losses estimated at 85 million USD and indirect tax losses at 460 million USD (URL 3).

Botswana context

Botswana is home to Samsung's second most lucrative market in the Southern African region behind South Africa, and they have raised concerns about the level of counterfeiting in the market. The after-sales care reveals a substantial number of counterfeit devices in circulation that consumers mistakenly bring to Samsung outlets for fixing only to be turned away. A director within Samsung Botswana was quoted recently raising alarm. "I have gone out to many different areas in Botswana and have found many fake products being sold in your market. There are a lot in Botswana. You buy a phone that comes with a strange stylus that turns out to be useless" (URL 15).

With a population of around 2.1 million, BOCRA puts the number of active devices on the market at 3.4 million, which translates to more than 150% penetration rate. As aforementioned, the high penetration rates carry with it higher chances of proliferation of counterfeit devices. In 2013, BOCRA was transformed through an Act (Communications Regulatory Act 2013) that compelled all licensees, suppliers and distributors of equipment to register for type approval. The deadline for this exercise was set at August 31st, and if violated, the party in question would be liable to a civil penalty amounting to P2 million (USD 200, 000) (URL 16). The authority further reiterated its prohibition of the use of any equipment which had not been type approved in either telecommunications, broadcasting or postal services. The type approval was said to be done with the intention to ensure that all communications equipment in the country was electrically safe, electromagnetically compatible and capable of interworking with other devices without causing interference (URL 17).

No reliable statistics have been availed in terms of the number of counterfeit mobile devices in the Botswana market even though media publications (URL 15) put the figure at 2 counterfeits for every 10 devices. Reports and communication from the authority (BOCRA) also indicate existing and continuous retailing and consumption of counterfeit mobile devices. In fact, both retailers and consumers hold differing views about the initiative to stem the flow of counterfeit devices (URL 18). A retailer interviewed said they would "lose a number of customers who prefer cheaper phones" (URL 18). Another retailer expressed more

enthusiasm about the act, "I'm happy with it. It means our customers will only get quality equipment" (URL 18). As far as the consumers are concerned the counterfeit devices are cheaper and still look stylish. Some of the devices receive positive reviews for their ability to accommodate four sim cards, provide internet platforms and all the other high tech specifications found in genuine brands including; iPhone, Nokia and Samsung.

What the aforementioned reveals is the fact that marketers and government agencies are more favourable to the idea of clamping down on manufacturers, distributors and retailers in an attempt to stem the flow of counterfeit devices. If not, the approach is to assume the market is homogenous and offer general solutions. As previous studies have demonstrated (Albers-Miller 1999; Dowell, Hart and Yeung 2000; Wilcox et al. 2009; URL 19), as long as there is demand and consumption of these products, there will be continued illicit manufacturing, distribution and retailing of them. Counterfeiting is often referred to as a victimless crime (Hart et al. 2004) and the consumers remain somewhat of a mystery. On that note, the central premise of this research is to identify those within the consumer base who are likely to support proliferation of illicit goods either knowingly or otherwise. Using demographic and psychographic variables, this study attempts to profile mobile technology consumers in urban Botswana on the basis of their vigilance to intellectual property infringements when making their purchases; environmental and health awareness; information orientation; knowledge of new products; brand consciousness and quality judgement. The study also attempts to establish the extent to which the environment, especially the marketing mix plays a role in these purchases. Understanding the consumer subgroups, their levels of vigilance, and factors that influence their behaviour is a good starting point to formulate strategies to counter the aforementioned challenges from the demand side, for both marketers and policy makers.

Other challenges globally in relation to changing market landscape

Below are concerns raised in the OECD competition assessment toolkit with regards to increased liberalisation of ICT related industries. These concerns reflect the reality and challenges that are being experienced by developing countries (URL 20). What the OECD toolkit is communicating as well is the fact that increased liberalisation without taking into consideration the consumers and their role in the greater scheme of things is an incomplete approach:

- A greater variety of goods and services which reflect a more competitive market environment, and the acceleration of dynamic goods and services whose characteristics change frequently (such as mobile phones, toys and information technology)

- Growing product complexity which has led to increased use of intermediaries, the increased use of standard form contacts and an emphasis on information disclosure

- Changes in spending patterns, including the much greater proportion of consumer spending on services

- The influence of technological change which has contributed to greater product choice and changes in spending patterns, but also presents new risks for consumers

- The introduction of competition into markets for provision of essential services including; telecommunications, energy and water, which has benefitted consumers but also presented challenges in terms of switching and complexity; and:

- Greater consumer heterogeneity, in terms of increased numbers of sophisticated consumers but also a wider range of vulnerable consumers and higher expectations of goods and services (URL 20).

1.7 Purpose of study

The purpose of this study is to identify the relationship between socio-demographic factors and the level of consumer sophistication among urban mobile phone consumers in Botswana.

1.7.1 Theoretical perspective

The logic behind quantitative research is to explain and predict the probable relationships between independent and dependent variables. This study adopts Kotler's (2003) Theory of Market Segmentation. The theory is premised on a consumer-driven strategy and highlights two major sections to it; (1) which consumers will we serve? (2) How will we serve them? "There is no single way to segment a market. A marketer has to try different segment variables, alone, and in combination to find the best way to view the market structure" (Kotler 2003). The segmentation theory can be a four-way interactive model made up of geographic, psychographic, demographic and behavioural variables.

The market segmentation theory assists in explaining the influences of age, gender, income and education (demographic factors) on environmental awareness, information orientation, IP vigilance, health awareness, product knowledge, brand consciousness and quality judgement, (psychographic and behavioural factors) among urban (geographic factor) mobile phone consumers in Botswana. The study will identify "which consumers will we serve?" and form the basis for "how will we serve them". The segmentation theory captures and offers an accurate blueprint for both marketers and policy makers to follow.

1.8 Research Questions

In an attempt to identify the relationship between socio-demographic characteristics and the level of consumer sophistication among urban mobile consumers in Botswana, the following questions were proposed.

1. What is the relationship between gender and the level of consumer sophistication among urban mobile consumers in Botswana?
2. What is the relationship between age and the level of consumer sophistication among urban mobile phone consumers in Botswana?
3. What is the relationship between level of income and the level of consumer sophistication among urban mobile phone consumers in Botswana?
4. What is the relationship between level of education and the level of consumer sophistication among urban mobile consumers in Botswana?
5. What are the characteristics of urban mobile phone consumers in Botswana?

1.9 Significance of study

As aforementioned, recent developments point to an inability by consumers to deal with the increasing ubiquity of mobile phone devices. The Botswana Communications Regulatory Authority's (BOCRA) attempts to clamp down on the proliferation of counterfeit mobile phone devices have not proven successful. The emergence of e-waste as a problem for Botswana is another issue that stakeholders in the telecommunications industry have raised concerns about. These issues pose a great threat environmentally, economically, health-wise and to the quality of life in general. These developments are not unique to Botswana, but with a higher mobile penetration than most in the region and globally (URL 21) it means an

enhanced magnitude of the problem. The issues at hand paint a picture of poor consumption decisions either before, during or after consumption. It has to be noted that without demand and consumption, these issues would not exist. As a result, they require strategies that mirror the root causes. The supply side approach to addressing these challenges is not proving very effective, therefore this study advocates for a demand-side approach to formulating counter strategies to the challenges at hand. The market segmentation approach on the basis of socio-demographic characteristics and consumer sophistication will provide a basis for formulation by revealing subgroups that need attention, the amount of attention required and inform greatly the course of action for both marketers and regulators (URL 21).

Future studies can take a nation-wide approach, but focusing on consumers in urban centres for the moment is a worthy approach since they are the early adopters of mobile phone devices. In most instances, rural consumers follow the lead of consumers in urban centres. It is therefore a good geographical area and consumer population to start from. A comprehensive review of relevant literature did not reveal any existing study on consumer sophistication in the context of Botswana or consumer sophistication in mobile technology industry. These discoveries enhance the significance of the study as it will add to a significant shortage of literature in this area.

1.10 Delimitations and assumptions

1.10.1 Delimitations

1. Only consumers above the age of 16 were contacted to participate in this study
2. The participants were selected because they owned a mobile phone device

1.10.2 Assumptions

1. The sample population was representative of urban mobile consumers in Botswana
2. The answers provided by respondents were honest
3. No assistance likely to influence responses was given to the respondents.

1.11 Definition of terms

Consumer Sophistication – consumer's level of information orientation, quality judgement, brand consciousness, product knowledge, health awareness, environmental awareness and intellectual property vigilance (IPS 2005).

Socio-demographic factors- of, relating to, or involving a combination social and demographic factors (URL 23) this study will use age, gender, income and education to explain socio-demographic factors.

Environmental awareness – consumption behaviour resulting from consumer's awareness of the environment (JETRO 2006)

Health awareness- consumption behaviour resulting from a consumer's awareness of their health (JETRO 2006)

Brand Consciousness – Brand and value context in purchase decision-making

Information orientation – a display of strong motivation towards shopping and searching for product information (Beatty and Smith 1987)

Intellectual property vigilance – avoiding to partake in intellectual property infringement (Jolly 2007)

New product knowledge – ability of a consumer to act as an information broker, to whom others turn to seek opinion and information on consumption choices.

Quality judgement – sensitivity and ability to ascertain the quality level of a product (Kim and Jung 2012)

1.12 Organization of chapters

Below is the organization of the dissertation according to chapters.

Chapter 1 establishes the research problem and lays out the research questions.

Chapter 2 outlines the relevant literature on technology adoption, consumer sophistication, socio-demographic factors as well as the application of the market segmentation theory.

Chapter 3 is a description of the methods employed in executing the study as well as formulation of the hypotheses.

Chapter 4 is a presentation of the analysis and what the hypothesis yielded.

Chapter 5 is a summary of the findings, discussions and recommendations.

1.13 Summary

An understanding of the relationship between socio-demographic variables and consumer sophistication among urban mobile consumer in Botswana will reveal consumer profiles and segments that can be utilized in the formulation of strategies to counter the challenges mentioned above. The nature of the variables and their influence will further be enhanced by the application of the market segmentation theory. This chapter looked at the history of telecommunications in Botswana and evolution of the market right through the reform process of the mid to late nineties. Highlighting major events along the way including the issuing of the first private licences and the tariff rebalancing exercise of 2005. The chapter then proceeds to set out the research problem, looking at both the global context and the context of Botswana before posing the research questions the study will attempt to answer. Significance of study and definition of terms follows the research questions and then a layout of upcoming chapters for the rest of this paper. The following chapter will attempt to review all relevant literature related to this study.

CHAPTER II LITERATURE REVIEW

2.0 Introduction

There is a certain level of competence as far as consumer sophistication is concerned, which allows a consumer to avoid poor consumption decisions that have far reaching implications. Management of one's consumption is a skill that has potential to affect the well-being of the individual, the family and the society at large. As mentioned in the previous chapter, poor consumption decisions as a result of low levels of consumer sophistication among some in the mobile technology sector are leading to a high proliferation of counterfeit devices, poor e-waste management, health concerns and macroeconomic concerns. This chapter reviews literature that is relevant to technology adoption, consumer sophistication and socio-demographic characteristics. Application of the market segmentation theory to consumer sophistication will be addressed in order to support the research objective of identifying a relationship between socio-demographic characteristics and consumer sophistication.

2.1 Mobile Phones as a technology

2.1.1 Technology

The definition of technology as a concept is not an easy task, largely due to its situational and value specific nature. However, the proposed study attempts a detailed breakdown of both technology transfer and technology adoption, therefore it is of utmost importance to define technology in order to identify issues related to the aforementioned activities. Multiple scholars over the past years (Galbraith 1967; DeVore 1987; Frey 1987; Mitcham 1980; Skolimowski 1966) have made attempts to define technology, informed by a host of differentiating variables including ideology and context. According to a previous publication (Choi 2009), there are two major schools of thought employed in comprehending technology: one is to define in a platonic sense by differentiating technology from science and the other is to provide characterizations of technology. Other scholars (Skolimowski 1996) viewed science as the here and now, while technology was the future, what is to be. He referred to it as a process of creating new realities. An alternative definition also (Galbraith 1967) encapsulates both the systematic and practical aspects of technology. He defines it as the systematic application of scientific or other organized knowledge to other tasks. As one of the major scholars in this area (DeVore 1987) places emphasis on the relationship between

technology and social purpose. He contended that technology has always been situated directly in the social milieu and conditioned by values, attitudes and economic factors; thus, the goal of technology is the pursuit of knowledge and know-how for specific social ends (Choi 2009).

Scholars opposed to the platonic definition of technology however argued for a characterization of technology. The leader of this approach being (Frey, 1987) who characterized technology as four elements: object, process, knowledge and volition. Technology as object is regarded as the concept of physical embodiments, involving tools, machines, consumer products, instruments, or any objects that have intentionally been created to extend practical human possibilities (Choi 2009). The efficient development of an object represents technology as process. Based on (Mitcham 1980) assertions, human intentions influence all technology. When, how, and why technology will be used is entirely dependent on the will and intention of humans. He goes further to conclude that, volition as an incorporation of aims, intentions, desires and choices, provides links that tie together the aforementioned elements of technology.

Deviating away from the definition towards the activity, prior researchers (Savage and Skerry 1990) argue that the problem-solving activity undertaken by humans through the technological process and resources in order to derive a solution, is the ultimate outcome of technological activity. Another researcher (DeVore 1987) had made a case for technological activity as inclusive of everything from problem identification to the design and implementation of solutions. With the involvement of not only technical or physical elements, but human too. This position further solidifies other views of (Skolowmski 1966) who believed in technology as a form of human knowledge.

2.2 Mobile Phone History

The roots of the first land mobile service can be traced back to the UK in the 1940s while the first commercial mobile telephony is credited to AT&T as far back as 1947. The service was radio-telephone operating between Boston and New York. Next came the first telephone equipped cars produced in Stockholm, Sweden, and used predominantly by doctors-on-call

while in some instances they were used as banks on wheels. The aforementioned equipment was oversized, cumbersome with a very minimal battery life. The mid-sixties saw an introduction of equipment using transistors and much smaller than the previous ones, but some of them were still the size of regular briefcases and therefore had to be accommodated in the car boot. AT&T and Nordic Mobile Telecommunications Group (NMT) became leading companies in this space and by 1981 there was a total of 20,000 mobile telephone users in Sweden. This represented the highest number of users anywhere else in the world. Prior to that though, in 1979, Japan had introduced the first commercial cellular telephone system in Tokyo. This development also saw a significant expansion of services resulting in rapid uptake by the general public. A number of countries were making strides in this regard by ordering NMT services, among them Spain, Austria, The Netherlands and Belgium. Countries such as Germany, France, Italy and Britain began to design their own systems. Research (Agar 2003) points to technical trends, particularly miniatirisation as well as improvements in battery technology as major triggers of our mobile world that ushered in the rapid and unprecedented take up as well as widespread availability of mobile communication.

The evolution of generations originated from an analogue transmission using the electromagnetic spectrum in the same arrangement as any two-way radio (1G) to the out of band signalling introduced in the 90s, characterized by digital technology (2G). This development saw the delivery of the first text (SMS) in Finland in 1993. Besides the texts, Finland also became the site of the first digital content delivered to cell phones, including ringtones and advertising. The first test for (3G) was performed in Japan in 2001 and was largely considered a pacific rim phenomenon. In this case, the most notable development was the packet switching for data transmission. With the continuous development of various new technologies, there was evident increase in speed, which in turn allowed for the streaming of audio and video content. By the year 2007 the number of 3G customers was 295 million subscribers, which represented 9% of total global mobile telephony subscribers. Currently 4G has emerged with transmission speeds as much as ten times faster than 3G. Another characteristic of 4G is that it eliminates circuit switching and treats all voice traffic as Voice Over Internet protocol (VoIP). The evolutionary nature of technology means we will continue to witness the introduction of better and faster mobile technologies in the future. As far as mobile phone devices are concerned, great strides have been made in that regard as well. Below, is a description of one of the earliest forms of the mobile phone:

“The apparatus consisted of a receiver, a transmitter and a logic unit bounded in the boot of the car, with the dial and handset fixed to a board hanging over the back of the front seat. With the functions of an ordinary telephone, the car telephone was powered by the car battery. Rumour has it that the equipment devoured so much power that it was only possible to make 2 calls – the second one to ask the garage to send the breakdown vehicle to tow the car with its flat battery” (Lacohée, Wakeford and Pearson 2003: 208).

2.3 Foundational Theories in technology adoption

The evolution of information technologies as well as the continued change in the nature of each technology transcends to the theories of technological adoption too. Multiple theoretical models have been formulated, tested and developed, all in an attempt to attain a better understanding, predict and explain technology adoption at both organizational and individual level. Most studies on technology adoption can trace their origins back to the Theory of Reasoned Action (TRA) (Fishbein and Ajzen 1975; Fishbein 1980), which identified two main factors as influential to adoption, being “attitude” and “subjective norm”. Attitude in this case was defined as “an individual’s positive and negative attitude towards performing the target behaviours” (Fishbein and Ajzen 1975:216). The definition for subjective norm was given as “the person’s perception that most people who are important to think he should or should not perform the behaviour in question” (Fishbein and Ajzen 1975:5-6).

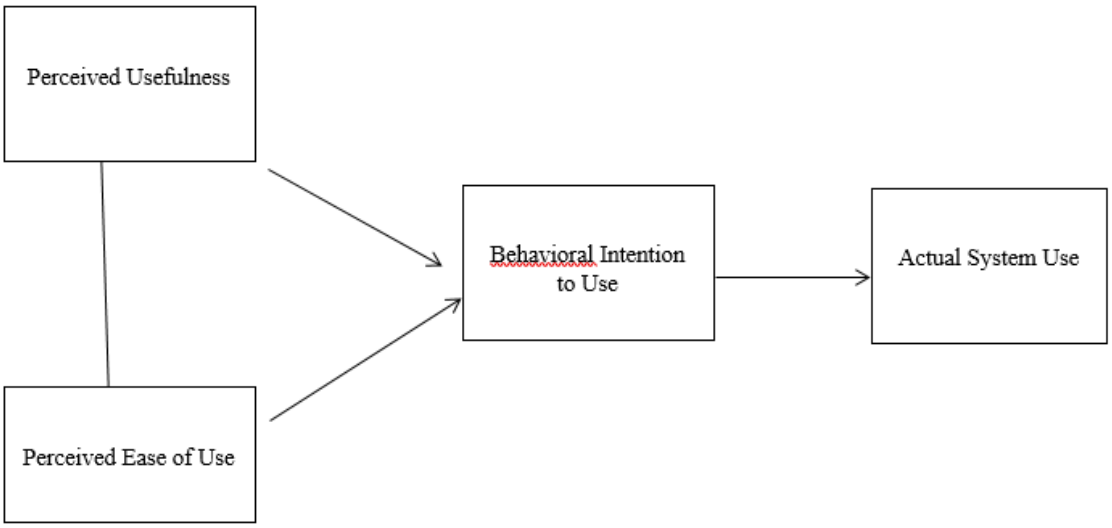


Figure 1- Technology Acceptance Model (TAM)

Source: Davis et al. (1989)

From the constructs of the TRA, a more popular and widely cited theory was formulated in the form of Technology Acceptance model (TAM) in 1989 by Davis. In this case, the two major variables detrimental to user behaviour and acceptance of technology were presented as "perceived ease of use" and "perceived usefulness". Davis (1989) further defined perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989:320) while he goes on to explain usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis 1989:340). TAM has been criticized as lacking in capturing the social aspect of technology adoption, which led to an extended TAM model or TAM2 by Davis and Venkatesh in 2000. This research (Venkatesh et al. 2003) went further to integrate all the major theories of technology adoption including TRA, TAM, Theory of planned behaviour (TPB), Innovation diffusion theory (IDT), and Social Cognitive Theory (SCT). This gave birth to the Unified Theory of Acceptance and Usage of Technology (UTATU) which has gone on to be used widely in the explanation of technology adoption and acceptance behaviour

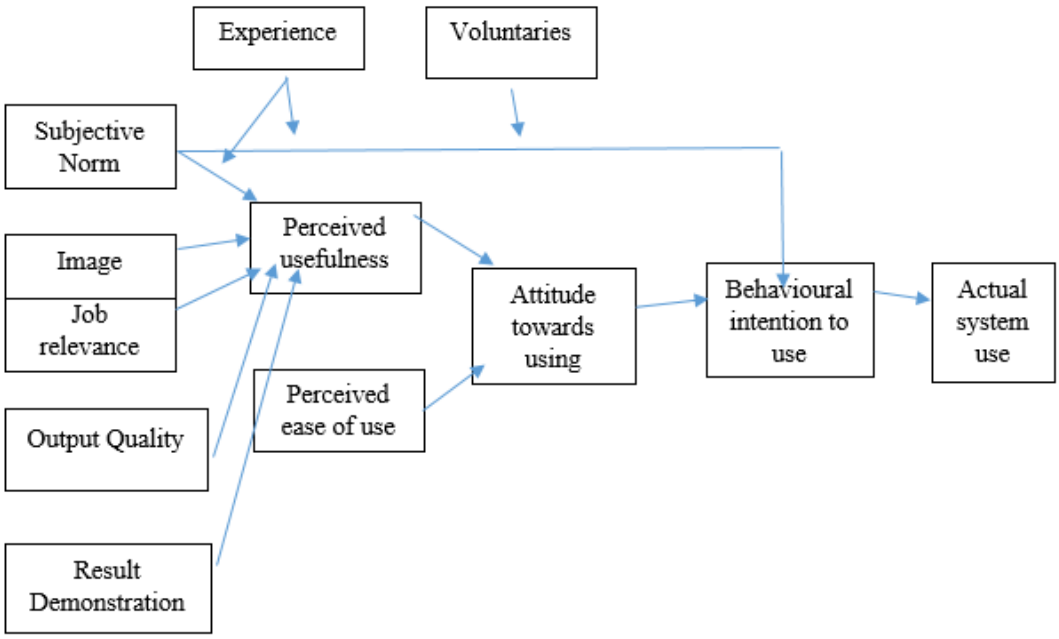


Figure 2- Technology Acceptance Model2 (TAM2)

Source: Venkatesh and Davis (2000)

Rogers (1995) divided adopters into five categories on the basis of the time it takes for them to adopt a technology. He distinctly identified, based on characteristics; Innovators, early adopters, early majority, late majority and laggards. Further to that Rogers believed that if an innovation is perceived to be high on relative advantage, compatible, trialable, observable and less complex then it stands a higher chance of being adopted than others. Building on previous work, continued research (Fishbein and Ajzen 1975; Fishbein 1980; Davis 1989; Alavi and Joachimsthaler 1992) identified cognitive style, personality, demographic and user situational variables as the more relevant factors that influence the adoption or rejection of technology.

There are aspects of the Technology Acceptance Model (TAM) advancement over the years that could be seen to resonate with this consumer sophistication. A case in point is TAM2 (Venkatesh and Davis 2000:186-204) which explained perceived usefulness and usage

intentions in terms of social influence and cognitive instrumental processes. One of the constructs in this TAM advancement is "subjective norm", which is referred to as a person's perception that most people who are important to him or her believe he or she should use the new system. A related component of consumer sophistication in this case is "information", which is defined as; how much the consumer knows about the product. I draw a comparison between the two factors on the basis of their leaning heavily on an aspect of consumer behaviour called "Information search and decision making". Subjective norms in this case are representative of what is known as external information search, for example, seeking the opinion of family or friends prior to making a purchase. With Information however it is not specific, it could be internal, based on previous consumption and knowledge, or external through media or word of mouth.

Criticism that is consistently levelled against studies related or using TAM model is that they are based on self-reported use of data, instead of actual data consumption. The subjective nature of self-reported data has been labelled unreliable in the measurement of actual system use (Legris, Ingham and Collerette 2003). In terms of the theoretical foundations of the model, one researcher in particular (Bagozzi, Dholakia and Klein-Pearo 2007) has been critical of the constructs and the poor theoretical relationships therein. He argued that as a fundamental terminal goal, actual use rather than behavioural intention to use has to be adopted, citing the time period between intention and adoption as having a potential for uncertainties and factors that might be influential to individual's decision to adopt. In the case of this proposed study, the reluctance of PTOs to release usage consumption data left the self-reported alternative as the only route feasible.

"Bagozzi remarked that TAM was a deterministic model and therefore an individual's act was assumed to be totally determined by his or her intention to act. But as Bagozzi argued, a person's intention could be subjected to evaluation and reflections, which might direct a person to reformulate his or her intention and even take a different course of action. Thus, he concluded the TAM model could not be suitable for explaining and predicting system use," (Chutter 2009). Evidence from subsequent research has continued to validate the use and reliability of TAM as a key theory for explaining system use.

2.4 Discourses on Technology, Transfer and Development

The debate as to the true meaning of technology transfer rages on to date. Earlier scholars (Levin, 1993) defined technology transfer as the development of a technology in one setting and that is then transferred for use in another setting. This definition however has been viewed as failing to capture the depth of technology transfer in that its focus only aims to highlight the difference technology development and utilization (Choi 2009). In an attempt to deepen the discussion, reference is further made to another study (Johnson, Gatz and Hicks 1997), who interpret transfer as both the movement of technology from the site of origin to the site of use and issues concerning the ultimate acceptance and use of the technology by the end user. Their main argument is that there is a need to recognize the needs of the end-user and the fact that the success of the transfer is dependent on an understanding of the context in which the technology will be used.

Another key study in this area (Akubue 2002) further argues that often enough a lot is assumed away when technology is equated with physical objects. Capital goods do indeed embody but do not by themselves constitute technology; they are products or object-embodies technologies that can be purchases freely on the international market." In fact, it is often the contention that material-transfer is not actually a form of technology transfer. According to this school of thought, the important ingredient in material-transfer is not know-how but show-how and the core technologies are embodied within the physical items" (Simon 1991). The export of a physical object or machine represents a substitute for the transfer of the technology, which would have been a necessity for local production of the same, an approach that adds up to a sort of a non-transfer (Emmanuel 1982).

Technology transfer is not the same perception and process for everyone (Choi 2009). "Universities, corporations, federal labs and developing countries have different roles and interest in technology transfer. For example, universities, as a provider of technology, view technology transfer as a means for serving community through knowledge sharing. On the other hand, technology transfer is regarded as a way to obtain competitive advantages through performance improvements in corporations that are recipients of this technology." (Choi 2009:3). In making reference to earlier definitions of technology; they (Frey 1987)

identify forms of technology as object, process and knowledge created by human intention. In further explaining his views on technology transfer he argues that technology tends to be the integration of all three components and therefore a provider of technology should try to transfer the integration of all components that make up that technology and not just one component.

Another view (Ofer and Polterovich 2000) is that of technology transfer as the useful exchange of ideas and innovations enabling the receiving country or region to expand on or utilized the knowledge receive. An alternative view (Osman-Gani 1999) suggests as wrong to see technology transfer as an end in itself; rather its importance derives from its ability to stimulate and strengthen the innovation process. "A critical test of technology transfers therefore is whether they stimulate further innovations within the recipient country" (Akubue 2002). Examples given in this regard (Pacey 1990) are the transistor technology from the United States that provoked the development of new kinds of consumer products in Japan. Another example is the invention of the cannon in Europe, stimulated by the information regarding the invention of gunpowder and gun-like devices in china.

Prior research (Akubue 2002) identifies four major modes of technology transfer: namely, foreign direct investment (FDI), joint venture, licensing and turkey projects. Researchers in FDI (Mallampally and Sauvant 1999; Siddiqui and Ahmad 2007) define it as a long term productive investment in foreign countries in which an investing Multinational corporation exercises either full or partial management control of assets and production in the countries involved. There is the assertion (Fahad et al. 2014) that there has been a global change in perspective with regard to FDI. Having previously been viewed as parasitic and hindering the development of domestic industries. "Traditionally, policy makers, especially those from developing countries were hostile towards FDI, today they are more encouraging and seek aggressively to attract FDI to their countries" (Fahad et al. 2014).

Joint ventures as a form of technology transfer has also gained popularity post the 1970's nationalization of many foreign firms around the developing world. It is a strategy adopted with the intent to enjoy similar benefits to FDIs but with lesser risk of nationalization. Earlier

work (Certo 1986) defined joint ventures as a partnership formed by a company in one country with a company in another country for the purpose of pursuing a mutually desirable undertaking. Ownership for arrangements of this kind is normally based on equity share (Griffin 1990). The parties involved each brings forth a portion of the equity or an equal amount in physical plant, raw materials, cash or other assets. Joint ventures are also highly dependent on the legislation that governs such agreements for the particular country.

"Licensing agreements can be between independent business enterprises, parent companies and wholly or partially owned subsidiaries, and joint ventures between private and/or public firms." (Akubue 2002:6). Griffin (1990) asserts that under the terms of a licensing agreement, a firm allows another company to use its brand name, trademark, technology, patent, copyrights or other expertise. The agreement carries with it specified conditions of operation, in addition to the payment of fees and royalties. The amount in terms of fees and royalties are normally calculated on the basis of percentage sales or value –added.

The scenario of turnkey projects is such that a foreign organization performs the construction of a production facility and then turns the key to a domestic company or some other organization upon the official completion of the project and is commissioned as ready for operation. (Stewart and Nihei 1987) state that, investments funded by international organizations and government agencies are basically of the turnkey nature. They proceed to assert that single activity production facilities such as cement plants, sugar refineries and steel mills are the most ideal for turnkey projects.

From the aforementioned mechanics of technology transfer we now explore the intricacies within the mechanics; the forms or channels for the transfer of technology. Previous studies (Mansfield and Romeo 1980; Das 1987; Wang and Blomstrom 1992; Gorg and Greenway 2001) have identified imitation, human capital and exports as the main avenues of technology transfer. "The usual manner in which domestic firms react to overseas competition is to imitate their technology so as to be on par with them" (Mansfield and Romeo 1980: p7). Complexity of the product, process, management or organisational innovation are major determining factors in the extent to which host country firms can imitate foreign MNEs.

Some of the prior research (Fahad et al. 2014), point to the fact that the simpler and to a certain extent the cheaper a particular innovation is to imitate, the greater the likelihood of it being adopted by the host country firm.

In a previously referenced case study of the United Arab Emirates (Fahad et al. 2014) the researcher built on previous work to extend the host country factors for FDI-induced technology transfer. The study identified imitation, human capital, trade openness, absorptive capacity, Level of economic development, competition and crowding out, and institutional development. Human capital as a factor highlights the importance of labour as deduced from traditional economic models (Cobb and Douglas 1928; Solow 1956; Swan 1956). The point of interest in this case being the assertion that it is not the size of the population that matters but rather the productivity (Swan 1956). Trade openness results in what is referred to as trade based technology transfer, and the benefit in this case accrues to firms who are exposed to the international market (Aitken, Hanson and Harrison 1997; Barrios, Goeg and Strobol 2003; Greenway, Sousa and Wakelin 2004). Absorptive capacity refers to the skill and knowledge possessed by a firm. Previous studies (Cohen and Levinthal 1989, 1990, 1994) build on the belief that a certain level of prior knowledge is a pre-requisite for the effective use of new technology and eventually the derivation of business benefit. Another interesting factor is the host country's level of economic development. Scholars in this area (North 1990; Blomstrom and Kokko 1998) view economic development as a multidimensional concept which implies an improvement in income, social and institutional factors. Of the three aspects of economic development, the level of income is the most directly measured (North 1990). This factor is more interesting due to the fact that it is where demand conditions are determined. Proponents of FDI as a mechanic of technology transfer (Wang and Blomstrom 1992; Aghion and Howit 1998; Glass and Saggi 2002) believe the entrance of MNEs provokes renewed urgency to innovate on the part of domestic firms, hence the need to acquire modern technologies. The realization is that if domestic firms do not effectively compete they will be driven out. Therefore, competition and crowding out is regarded as a key factor in the host country economy. The entrance of MNEs is also dependent on the institutional development of a country. The open and accommodative the economy is the more likely it will attract investment from MNEs. Previous work (McMillan 1993; Anderson 1986; Zarsky 1999 and Dowell et al. 2000) has established evidence to support this argument.

It is important to note however that ICT technologies, including mobile phones, are normally diffused by profit seeking entities and therefore do not come free of charge. This has given rise to a call for governments to drive down the cost of technological products and services. "Prices for information and communication technology (ICT) services are falling according to ITU's latest publication, *Measuring the Information Society* 2010, released on 23 February. It also confirms earlier estimates that by the end of 2009, there around 4.6 billion subscriptions to mobile phones equivalent to 67 of the 100 inhabitants of the planet. In developing countries, the rate of mobile phone adoption passed the halfway mark to reach the 57% mark in 2009, more than double what it was in 2005" (ITU 2010: pp22)

The ITU statement provided above captures the concerted global efforts designed to lower cost and increase mobile phone penetration so that every citizen of the world is connected. The means to achieve the above include increased liberalization and increased competition in markets around the world especially developing countries as this is where most of the potential for growth still remains untapped. Botswana has been a case in point, achieving mobile penetration rates of 166% (ITU 2013).

"The freedom that the Botswana Telecommunications Authority (BTA) engaged in policy implementation, liberalisation and pricing allowed it to gradually and deliberately open up the market to further competition, and though its clear dispute handling mechanism allowed investors' confidence in regulatory oversight, allowing for further studies and for further liberalisation, pricing and many other aspects. That has allowed government for mid-2006 to open up the market further by allowing voice over IP (VOIP), unrestricted international voice gateway licensing and ushering in of technology neutral licences for the current operator" (URL 4:11). Technology neutral licenses have allowed the Public Telecommunications Operators (PTO's) to enter multiple markets in the ICT sector including competition against Internet Service Providers (ISPs). This has led to introduction of a flurry of products and services including the acquisition of more technologically advanced gadgets to diffuse into the market (e.g. smartphone). This development alters the landscape of the market immensely and further challenges the ability of the consumer to engage in rational purchase practices. However, few if any studies exist that determine the sophistication levels of the consumers and the challenges the market place presents to them. Current policy in Botswana, enacted in

2005 culminating in the establishment of the Competition Authority, does strive for increased competition and in essence abundant choice for the consumer, but beyond that it is silent on countering the market challenges encountered by the consumer. Well-meaning as the policy may be, this could be a sign that it is already outdated or that it requires revision to ensure it is comprehensive. While various studies have been undertaken on adoption and usage of mobile technologies in developing countries including Botswana (URL 4; Van Biljon and Kotze 2008; Chabossou et al. 2009) none of the studies either by practitioners or scholars have investigated the relationship between mobile technology adoption and consumer sophistication, and how the continuous evolution of the marketplace affects the adoption decision.

Countries around the world are still living the legacy of telecommunications reform strategies that took place around the world in the early 1990s. Different strategies were adopted by different countries largely based on socio-economic standing, and it is essential to highlight the fact that reform process in many developing countries was done with the aid of the Bretton Woods institutions (The IMF and World Bank). Countries assisted by these institutions tended to fully liberalise in earnest (e.g. Malawi) but countries with much of a hand in the formulation of their own strategies started liberalising at a much later stage (e.g. Botswana). The mobile telephony industry on the African continent is one that generates interest for industry players, scholars and policy makers alike. Following the aforementioned telecommunications sector reforms multiple ICT related industries emerged across the continent including a dynamic mobile telephony industry (McCormick 2001; Mutula 2002; URL 4). As developing countries seek to become more innovative and diversify their economies, issues such as technology transfer and technology adoption have found room in discourse for economic development. This pursuit for knowledge-orientation has also meant a shift is strategies for both marketers and policy-makers

Genuine attempts are being made by progressive African governments to lay the foundations for transition. “developing countries around the world are seeking ways to enhance economic growth by improving key institutions of knowledge innovation and technological advancement (Mokubung 2009) A study by the food and agriculture organisation (URL 5)

identified several challenges that are faced by African countries in their quest to enhance their economic growth via science and technology applications.

- Weak link between science institutions and private sector
- Low and limited public and private sector expenditures on research and development
- I appropriate science and technology policies
- Limited public understanding of science and technology
- Brain drain of African scientists
- Weak and thinly spread research and development institutions

"The research institutes and universities should be able to work at the frontiers of their disciplines to capitalize on the technological late comer development. Being late developers in the technology game can be advantageous to the economy. That involves exploiting existing technologies in lower cost settings and it also involves technology learning. For example, Kenya succeeded in the late comer strategy in its floriculture industry. It exploited existing technologies and as result its floriculture became a leading exporter earner, garnering 25% of the European market. The Kenyan floriculture industry has now grown to the point that more technologically sophisticated aspects of the business moved from Europe to Kenya" (URL 6)

Countries in the developing world have for decades imported technologies from the developed world, an exercise that has proven futile to their quest for enhanced competitive advantage. Prior publications (Akubue 2002) reflect that in the post-war period from the late 1940s through the early 1960s in particular, a great number of former European colonies in Africa and Asia emerged to become independent states after years of colonialism. The acquisition and application of technology was considered integral to accelerated economic development for these newly built nations. From a net exporter of food in the 1960's the African continent is now a net food importer despite all the agricultural machinery imported over the years (United Nations 2011:3). There has been negligible progress made from successful technology transfer strategies. Considering this static nature of innovative

capability present in most of these recipient countries, decades of technology transfer have not produced the desired outcome.

This leads to many questions as to why things turned out the way they have. “What went wrong? Why has the outcome of technology transfer to the third world been so disappointing? What is technology? What is technology transfer? Is technology transfer to the third world what it should be? Under what conditions can the transfer of technology stimulate innovation?” (Akubue 2002:1).

No single view can provide an adequate answer to these questions because of the multi-faceted nature of the issue at hand. However, one major reason advanced by scholars in this area (Kolfer and Meshkati 1987; Simon 1991; Mittelman and Pasha 1997: 61; Akubue 2002; Choi 2009) is that inaccurate perceptions and assumptions about technology have adversely affected the outcome of its intended transfer. A popular assumption is that technology comprise of physical devices alone. The immovable aspects of technology, such as skills, knowledge and organization might be more critical than the physical aspects for the successful transfer of technology (Mittelman and Pasha 1997).

An influential prior study (URL 8) defined technology adoption as the choice to acquire and use a new invention or technology. The acquisition and usage of technologies does not seem to be the major bone of contention as far as this debate in concerned. In fact, the aim of the aforementioned arguments is to divorce technology transfer from technology adoption. “indeed, capital goods embody but do not by themselves constitute technology; they are products or object embodied technologies that can be purchased freely on the international market” (Akubue 2002). He goes further to cite the purchase of a house not necessarily constituting a transfer of the architectural and construction knowledge and skill that went into its establishment. In an attempt to further disassociate technology transfer from technology adoption, (Simon 1991: 8) goes on to argue that in fact it is often the contention that material-transfer is not actually a form of technology transfer. “The export of a machine rather constitutes a substitute for the transfer of the technology which could have been necessary in order to produce it locally and it’s a sort of non-transfer” (Emmanuel 1982:22).

The researcher notes with approval prior assertions regarding technology transfer and technology adoption, the argument however is in their lack of appreciation for the role played by the consumer in the greater scheme of things. "By the same token the purchase and possession of a machine or equipment by the third world country neither bestows upon the people of the country the scientific and technological knowledge essential to its production locally nor the ability to set it up for efficient production" (Simon 1991: 8). This is another valid assertion however, even though purchase and possession does not bestow the technological ability to set up production, it provides the consumer with a benchmark and foundation for future expectation. Technology is not regressive in its form, it may not be linear in its evolution but it is definitely progressive, and it is its progressive nature that ensures its future consumption and relevance. As agents of the innovation system interact as alluded to by one of the early studies (Rosenberg 1972), the consumer should be in a position to inform innovators and policy makers alike, of the direction to take and pitfalls to avoid based on the demand conditions. Let us not overlook the fact that the demand conditions and consumer tastes are built on usage and consumption of current products, which in the aforementioned scholars' rightful view some are failed attempts at technology transfer.

2.4.1 The Context of Botswana

Despite registering an average of 9% economic growth rate from 1966-1999 (URL 21) making it the fastest growing economy in the world during that period, Botswana has largely lagged behind in competitiveness in comparison with other developing countries with lesser economic growth rate. It is important to point out the fact that Botswana is what can be referred to as a mono-cultural economy, largely driven by diamond mining since the early 1970s. At 166% mobile penetration rate (URL 2) Botswana has one of the highest mobile phone densities in Africa and indeed the world. However, the Global Competitiveness Report paints a bleak picture of Botswana's innovative capacity and competitiveness.

"Technology end-users will be empowered to play a critical role in setting the pace for innovation and sustaining a competitive edge in R&D by demanding goods and services according to their specific needs. This will be supported through the development and

implementation of a coordinated demand driven R&D agenda that respond to end-user needs and stimulate the achievement of high value knowledge intensive growth" (URL 22). This is an extract from the Research Science Technology and Innovation policy which highlights the policy attempt to incorporate the consumer in the innovative process, in an attempt to further boost competitiveness.

Countries respond to challenges of competitiveness in many ways. According to a previous study (URL 24), the emphasis is normally placed on institutional stimulants that reinforce the development of higher technology. "They include labour mobility, the availability of specialty suppliers and services such as contract manufacturing, venture capital and legal assistance. Many countries have designed their own distinct policies to create and sustain high technology firms. The potential environmental influence includes a world class university, an affiliated science park where research can be commercialized and the availability of ample sources of venture capital. They also include adequate infrastructure such as Transportation system and a pleasant physical environment" (Seyoum, 2005).

2.4.2 Initiatives geared towards transition to knowledge based economy

In 2009, with a view to counter the skills gap that exists within multiple sectors of the Botswana economy, the National Human Resource Strategy (NHRS) was finalised and put in motion. The first initiative undertaken was to consolidate the Tertiary Education Council (TEC) and the Botswana Training Authority (BOTA) into one entity, resulting in the birth of Human Resource Development Council. An exercise undertaken with the intention to reduce fragmentation in the approach as well as duplication of tasks.

"It highlights the important perspective that for Botswana to successfully deal with a rapidly changing national context as well as a highly competitive global market place will depend on the endeavour of its people. It recognised that to be acknowledged as a "winning nation" hinges on the development of each citizen's individual potential. It further recognises the strategic role of human resources development so that each citizen can play a meaningful role in their community, society and the world" (URL 22).

In 2011, the policy of Research Science Technology and innovation (RSTI) was formally adopted as a revision to the Science and Technology policy of 1998. This was pursued in response to the rapid technological evolution, globalisation and national development goals as espoused in Vision 2016, National development plans and Millennium development goals. It was also done with the intent to motivate and guide the formulation of strategies geared towards transforming Botswana into an economy of knowledge orientation (URL 22).

2.5 Consumer sophistication in the innovation context

Based on a key theory (Porter 1990), factor conditions in this case refers to where the nation stands regarding factors necessary to compete in particular industry. Examples of such factors can be skilled labour and infrastructure. The demand conditions are an analysis of the domestic market demand for the particular product or service. Related and supporting industries means the presence or absence of supplier industries and other related industries in the nation that can also internationally competitive. The conditions that characterize domestic rivalry but most importantly the creation, organization and management of companies is what is referred to in this model as firm strategy, structure, and rivalry.

Porter's diamond model is one of the few studies that factor in the demand-side analysis in the measurement of country competitiveness as well as the facilitation of technology transfer. The role of the consumer is often overlooked when addressing this issue. He cites the example of the Italian ceramic tile industry and the role of consumers in shaping that particular industry, especially in its formative years. "Sassuolo's sustainable competitive advantage in ceramic tiles grew not from any static or historical advantage but from dynamism and change. Sophisticated and demanding local buyers, strong and unique distribution channels, and intense rivalry among local companies created constant pressure for innovation. By the mid-1960s, per-capita tile consumption in Italy was considerably higher than in the rest of the world. The Italian market was also the world's most sophisticated. Italian consumers, who were generally the first to adopt new designs and

features, and Italian producers, who constantly innovated to improve manufacturing methods and create new designs, progressed in a mutually reinforcing process" (Porter 1990: 73-79).

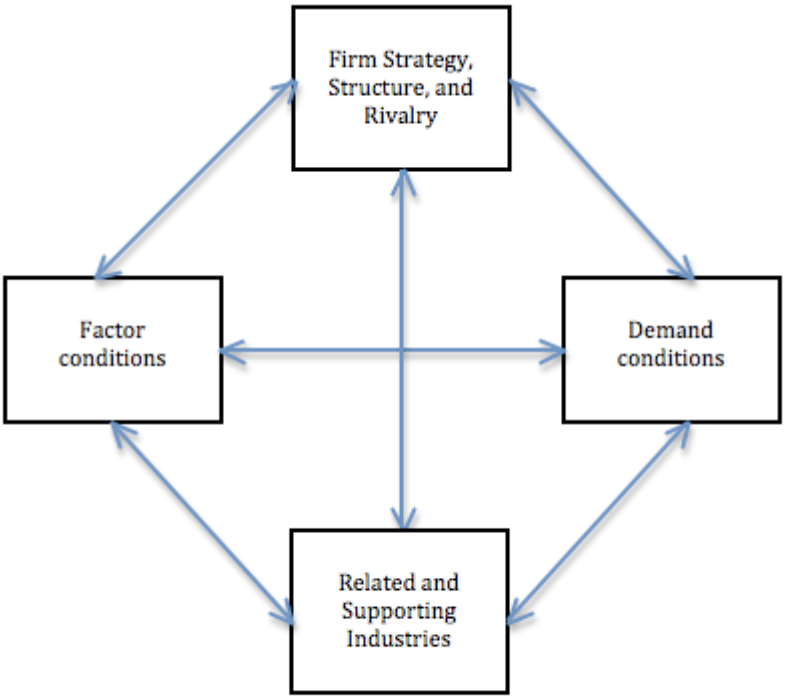


Figure 3- Michael Porter's Diamond Model

Source: Porter (1990)

Another theory that duly recognises the role of the consumer in the competitiveness of a nation is the Systems of Innovation (SI) theory. The theory recognises the existence of ecologies; being, agents and the institutional environment. In this case agents are referred to as the typical market based actors of a conventional economic approach. Within these actors there could be consumers, firms, governments and NGO's. The most distinctive factor about agents is whether they are for profit or not for profit. This distinction highlights the crucial role played by cooperatives, mutual companies, public sector agencies, universities and

public research laboratories, lest the debate about innovation systems gets lost in profit seeking context. It is the interaction between all these agents that form the basis for what is referred as an innovation system.

This component of the innovation system conditions the nature of the market and non- market transactions between agents. The environment can be broken down into one that conditions formal or market exchanges for example contract law and an intellectual property. Another aspect of the institutional environment is one that conditions the informal or non- market interactions like academic conferences and charitable activities. It is this component that gives rise to argument about the non-existence of the so-called free market because markets do operate within rules. For example, the economy of the USA is determined by the relationship between firms and the stock market in comparison with countries like Japan and Germany. This development has a direct bearing on innovation systems.

"A central finding in innovation research is that firms seldom innovate in isolation. Interaction with customers, suppliers, competitors and various other private and public organizations is very important, and a 'system perspective' is useful in understanding and analysing such interaction" (Edquist 1997: 15). The SI approach places emphasis on interdependence and non- linearity. The basis of this emphasis being that the system is characterized by reciprocity and feedback in multiple loops. Edquist (1997) goes further to emphasise that innovation processes are not only influenced by the components of the systems but also by the relations between them. The relation between consumers and other agents of the system is a major component of the innovation system at any level.

2.6 Game Theory Illustration

2.6.1 Prisoner's dilemma

Technology transfer and indeed technology diffusion in developing countries are activities undertaken by profit seeking entities just like elsewhere, and the interaction between the companies and the consumers is regulated by competition and consumer policy. An understanding of consumer sophistication levels is an important factor that should be considered in the formulation of public policy. Its importance also extends to technology diffusion strategies adopted by firms. To illustrate further the significance of consumer

sophistication, I choose to adopt a game theory approach used in a previous study (Titus and Bradford 2005) to reflect on consumer sophistication and its impact on ethical business practice. They employ the "Prisoner's Dilemma" and the "Corporate Dilemma" to illustrate how information and/or lack thereof can influence outcome. The examples are then used to explain real life market situation of a similar kind.

Scenario 1

The prisoner's dilemma is a game theory concept used to explain competitive behaviour under conditions of limited information (Axelrad 1984; Fader and Hauser 1988). As per the original conception, it involves the dilemma of two criminals awaiting trial, but held in separate cells. The criminals are believed to have committed a very serious crime, but as things stand and based on the insufficiency of the evidence, the District Attorney can only convict both of them of minor crimes. The only way for the DA to achieve a bigger conviction is through a confession from one or both of them. By virtue of his standing as a district attorney it means he is in possession of a significant amount of knowledge, experience and expertise with respect to criminal justice behaviour (i.e. sophistication). He decides to get creative with the conditions in order to necessitate the desired confession. He informs the prisoners individually that a confession to the more serious crime will lead to the recommendation of a reduced 5-year sentence, however if only one of them confesses then a token sentence of 90 days will be recommended for the confessor and the non-confessor in this case will serve a full 10 years. The information the prisoners are not privy to is that if neither of them confesses they will be convicted of the minor crimes and sentenced to 2 years in prison.

"This is called the prisoner's dilemma; mutual cooperation produces a desirable result while the pursuit of self-interest gives rise to an undesirable result. In this scenario, the dominant strategy tends to be confession over silence because the actions of the district attorney create the proper incentive to gain the desired behavioural result (confession)" (Titus and Bradford 2005:8).

2.6.2 The corporate dilemma

Scenario 2

The behaviour of consumers in the market can be as influential on the behaviour of competing firms in that it can create incentive for them to behave in a certain way. A firm operating in a particular market may wish to behave according to moral principles and guidelines, but evidence of consumer unsophistication (i.e. lack of knowledge, experience and appropriate consumer purchasers behaviour) may produce strong incentives for the firm to abandon those principles and behave unethically. This is referred to as the "corporate dilemma". Two hypothetical firms (fisheries) are competing for profit and market share in the silver salmon market, the highest quality and most expensive salmon. Unfortunately, silver salmon is in short supply and neither fishery is able to secure enough salmon to satisfy their profit objectives. Both fisheries are aware of a common practice in the industry of substituting a lesser quality fish, pink salmon for a higher quality fish, silver salmon. Each fishery is also aware of past consumer purchase behaviour indicating consumers' lack of sophistication and are unlikely to discover such substitution. Therefore, a fishery that chooses to offer silver salmon rather that engage in unethical product substitution is unlikely to be financially rewarded in the market. In this scenario, the purchasing behaviour of unsophisticated consumers presents the competing firms with an incentive that can eventually lead to a dominant strategy of unethical behaviour (mislabelling salmon) (Titus and Bradford 2005:8).

The two aforementioned scenarios highlight sophistication from different perspectives yet capture its significance rather similarly. The thrust of the matter in this case is that the dilemma architect (district attorney or silver salmon consumers) creates and administers the reward structure for the dilemma. "The District Attorney with an understanding of the two prisoners and their self-interests, provides incentive that increase the probability of socially desirable behaviour (i.e. confession). In contrast, the consumers in the corporate dilemma without an understanding of the fisheries and their self-interest, provide incentives that

increase the probability of undesirable behaviour (substitution and mislabelling)" (Titus and Bradford 2005:11).

2.7 Consumer sophistication in the context of this research

Demand conditions are a component of the diamond model (Porter 1990) that outlines the competitive advantages of nations. The emphasis is largely placed on the consumer's level of sophistication as a major factor in determining the quality and direction of a country's innovative capacity. Several scholars (Sproles, Geistfeld, and Badenhop 1978; Hirchman 1980; Barnes and McTavish 1983; Titus and Bradford 2005; Wu and Titus 2000; Seyoum 2009; Jeppesen and Molin 2003) have written on the concept of consumer sophistication to varying degrees and perspectives. Further to that the World Economic Forum has published the "Buyer's sophistication index" as a proxy for home demand conditions in the annual global competitiveness report.

Two major schools of thought have emerged over the years in this area of study. On one aisle of the scholarship (Sproles, Geistfeld and Badenhop 1978; Barnes and McTavish 1983) refer to consumer sophistication as the relevant knowledge, education and experience, which facilitate efficient decision making. One Scholar (Hirchman 1980) prefers to highlight the problem-solving capability of consumers, referring to it as consumer creativity; a factor he considers key in increasing the probability of selecting superior products.

On the other aisle, some researchers (Wu and Titus 2000; Titus and Bradford 2005) however posit that alternatively there is a need to expand the focus of the concept beyond the mere possession of knowledge and experience (i.e. potential) in wise purchase practices. In a more recent study (Newell, Wu, Titus and Petroshius 2011) further argued that; although it is interesting and beneficial to identify sophistication potential it may be argued that it is the actual practice which impacts consumer's wellbeing and that public policy should be behaviour driven rather than ability driven.

It is on the basis of this logic that the following definition for consumer sophistication in purchasing decisions was developed: "the participation in well informed actions during each stage of the purchase process that is systematic, thoughtful, and goal—directed throughout the entire purchase process, undertaken with knowledge of the consequences associated with its performance" (Newell, Wu, Titus and Petroshius 2011:17).

2.8 The Role of the Consumer

One of the arguments (Liu 2010) is that previous studies have placed a considerable amount of attention to the changing role of consumers. A string of studies have reflected the fact that there has been a continuous evolution of the consumer over time, where consumers are better educated (Hirschman 1980), well informed and more knowledgeable (Sproles, Geistfeld, and Badenhop 1978; Alba and Hutchison 1982), experienced in purchase (Sproles, Geistfeld, and Badenhop 1978), value driven (Feick and Price 1987), more efficient (Sproles, Geistfeld, and Badenhop 1978; Titus and Bradford 2005), competent in using information and searching (Feick and Price 1987) and more sophisticated (Titus and Bradford 2005; Saucer 1998; Zhang et al. 2010).

All the aforementioned characteristics therefore lead to common belief that sophisticated consumers reside in developed economies alone. "Sophisticated consumers often exist in mature markets where competition is fierce with a wide range of products available on the market and a considerable amount of market information is available to consumers" (Liu 2010: 3). The pervasive nature of certain technologies (e.g. mobile phones) in developing economies qualifies such markets to be recognised as mature to a certain extent. There is a dearth of studies relating to consumer sophistication in developing economies mainly because it is viewed as a developed economy phenomenon.

In further discussing the role of the consumer in national competitiveness, it is important to note the effect of home demand in determining the success or failure of the market. Sophisticated and demanding buyers pressure local firms to meet high standards of quality, features and service (Porter 1990). The study goes further to state that nations gain competitive advantage in industries or industry segments where the home demand gives local firms a clearer or earlier picture of buyer needs. "In countries where local customers are

knowledgeable and demanding, firms must work harder to satisfy their sophisticated and changing needs. Sophisticated buyers push companies to employ more advanced technologies and make higher value products" (Porter 1990). Another relevant study (Seyoum 2009) cites an example of customers in Japan who demanded high quality audio systems in their cars similar to the ones they used at home. As a result, manufacturers had to meet these challenges in order to remain relevant, and such innovation further enhanced the national competitiveness.

2.9 Health and Environmental awareness

Japanese consumers are credited with having largely influenced firms by their demanding nature. This notion of Japanese consumers is backed up by a study conducted within Japan (JETRO 2006) to assess the Health and Environment sector in Japan in an effort to identify Investment opportunities for foreign investors. "Pressure from demanding and sophisticated buyers is widespread in Japanese consumer industries. Japanese consumers will reject a product because of a small surface defect, one reason for the attention of Japanese consumers to 'fits and finishes'. Consumers demand high quality and superior service. Japan has a visual culture, in which the presentation, and the packaging, are as important as the product. Japanese consumers are also fickle in comparison to those in most other nations. They will readily switch brands if a quality difference is noticeable. The sophistication of Japanese buyers is reinforced by an extreme abundance of product information" (Porter 1990: 69).

The consumer is generally unable to observe the environmental impact of goods in the purchase situation, during consumption or post-purchase. The study among other things explored the awareness and behaviour of consumers regarding the environment and health. The respondents were asked whether at the time of purchase they had any awareness of whether the products were environmentally friendly. On a 7-point Likert scale from "considerably aware" to "completely unaware" at least 50% of them said they were "aware." A more detailed look into environmental awareness and consumption behaviour reveals that around 80% of respondents are environmentally aware, making comments including "fond of nature" and "choosing products that can be used with refills" (JETRO 2006).

That said, being aware and actually acting this knowledge or awareness are two different things. The study revealed that less than 30% of the 2859 respondents actually consume sustainably by way of collecting recyclable objects, purchasing products that bear the eco-mark and making efforts to purchase recycled or second hand products. The assumption however is that a consumer exhibiting environmental and health awareness is more likely to act sustainably than one who is unaware (JETRO 2006).

Table 1 Awareness at Time of Purchase of Whether Products Are Environmentally Friendly

Considerably Aware	Aware	Fairly Aware	Neither Aware Nor Unaware	Not really aware	Unaware	Completely unaware
2.7%	11.8%	37.6%	20.7%	19.1%	4,9%	3.3%

Sample size 2859 Source: JETRO 2006

As far as health-conscious awareness is concerned in relation to consumption about 80% of respondents in JETRO's study reported awareness by giving a response that corresponded with "health is the most important thing in life" (JETRO 2006). The study also reported a positive correlation between environmental awareness and health awareness and concluded that segmentation of consumers can be done on the basis of awareness and behaviour of both environment and health.

Table 2 Amount of Care Taken over Health

Take an enormous amount of care	Take care	Take Some care	Cannot say Either way	Do not take much care	Do not take care	Take absolutely no care
4.8%	22.5%	44.4%	11.8%	13.4%	1.9%	1.4%

Source: JETRO 2006

2.10 Intellectual Property vigilance

Based on the IPS consumer sophistication index (2005), this is basically the level of reluctance by the consumer to accept illegally copied products. The argument is that sophisticated consumers will always opt for authentic products than counterfeit. However, there is no study to establish whether that is driven by the potential quality concerns or the knowledge and reluctance of violation with regards to intellectual property. With recent developments surrounding counterfeiting around the world, it's essential for consumers to be alert to issues related to intellectual property.

2.10.1 What does counterfeiting mean for the consumer?

One of the major threats posed by counterfeit mobile phones is the fact that they enter the market through underhand or backdoor strategies and therefore escape the rigour of regulation and testing that legitimate products are subjected to. In Europe for example, there is what is called the Restriction of Hazardous Substances or RoHS, which restricts the use of lead, cadmium and other hazardous substances in the manufacture of electronic products. Similar restrictions exist in many regions of the world. Tests conducted by various other regional bodies of a similar kind in Brazil, China and India have found an alarmingly high presence of lead and cadmium in both the internal and external components of multiple counterfeit mobile phone devices. In some cases, the values of the lead and cadmium were thirty to forty times higher than acceptable levels (URL 25). The impact of such exposure to humans is not receiving much coverage as more focus is given to increased penetration and ubiquity of mobile devices. However, there is a clear risk presented by the high level of hazardous substances present in many of these counterfeit devices, the true cost of which, particularly with regards to increased disease burden and healthcare costs is presently unknown.

A study by Qualcomm (URL 26) on behalf of the GSM Association revealed that counterfeit mobile devices are not only hazardous but are of low quality too. Of the 18 devices that were tested, 16 failed the transmit performance requirements and 11 of them were 6-13db below requirements. According to the study, these two performance indicators point to a high level of degraded performance and therefore these devices carry with them a higher percentage of

call dropouts when used by the consumer. Another negative aspect of counterfeit mobile phones on the consumer side is the fact that they are sold without warranty. When issues of functionality start to arise with these devices it leaves the consumers with no room for recourse. Counterfeit and substandard mobile devices are also susceptible to malware and other malicious viruses. This therefore makes consumers using these devices very soft targets for cyber criminals. Considering the increasing amount of confidential information people carry around in their mobile devices, it is safe to say this provides great incentive for cyber criminals. Since there is no certainty as to the strength and capacity of the software installed in these devices, hackers are constantly circulating sophisticated malware to detect weak devices and remotely access important information including banking details, personal identity numbers, and other data that they deem useful to their cause.

2.11 Quality Judgement

Based on previous studies (Lambert 1972; Dychtwald and Gable 1990; Rice 1990) the assumption is that increased consumer sophistication should mean an increased ability to accurately judge product quality. That being said however, marketplace developments can aggravate consumer sensory limitations and leave the consumer with a lesser ability to make accurate judgement of product quality. Prior research (Lambert 1972) posited that consumers with higher levels of sophistication are more likely to select products with high quality rather than low price.

2.12 Brand Consciousness

Quality and brand are sub-factors of knowledge and experience. Knowledge as a factor influences the consumer as to the type of brand to search for and what features to examine (Alba and Hutchinson 1986; Brucks 1985; Holbrook 1978). Due to the high level of investment by companies in advertising and brand building, a lot of choice is availed to the consumer. An interesting contribution made to this discussion (Liu 2010) is that even though investment influences consumers, it is difficult to gauge how many of them can be regarded as sophisticated. It is complicated to clearly define the relationship between values and product use when it comes to sophisticated consumers. While further research (Amaldos and Jain 2005) demonstrated a certain degree of sophistication in relation to conspicuous

consumption, there is largely no evidence to suggest that brand consumption is a characteristic of consumer sophistication.

2.13 New Product Knowledge

Within the constituency of consumers, there are those that are regarded as innovators or opinion leaders. They are the type of consumers who adopt new products before they even become pervasive on the market. This is largely seen as innovative behaviour and is associated with sophisticated consumers. Lesser sophisticated consumers take expert advice from these innovators and often copy the adoption behaviour of innovative consumers. Sophisticated consumers are assumed to know products and services that enter early into markets and at an earlier stage than unsophisticated ones (Liu 2010).

In a marketplace dominated by myopic consumers, firms are more likely to exploit this lack of knowledge among the consumers (Gabaix and Laibson 2006). For example, in the banking sector, banks will advertise all the virtues of their accounts but hide add-on costs such as minimum balance fee, ATM usage fees and insufficient funds (bounced cheque) fees. Another market that operates in a similar manner is the printer market. The principal cost of ownership in printing is the ink cartridges. While manufacturers and suppliers advertise the low price of the printers, they deliberately omit the fact that ink cartridges cost ten times more than the printer itself over the life of the product (Gabaix and Laibson 2006). An insightful previous study (Hall 2003) revealed that only 3 percent of printer owners knew the true cost of printing.

On one hand (Piatetsky-Shapiro 1995) the belief is that such shrouding by companies cannot survive as competitive firms will educate customers of rival companies and win them over. Opposing scholars (Gaibax and Laibson 2005) however believe that the existence of myopic consumers creates a certain state of equilibrium that is immune to competitive pressure. An aforementioned study (Titus and Wu 2000) cited a case of “corporate dilemma” where a firm has an information edge over the consumers, and uses the consumer’s lack of knowledge to sell a substitute good instead of the stated good. The example used was a company substituting pink salmon which is more premium and in its place selling silver salmon but

still passing it as pink salmon and maintaining the same premium price. All the examples above point to product or service providers not finding the incentive to educate consumers, largely because the belief is that knowledgeable consumers are less exploitable and therefore less profitable. The approach from regulators and public policy is to further enhance competition to give consumers a broader range of options, irrespective of whether the consumer is sophisticated enough to make informed choices or not.

2.14 Information Orientation

The core of sophistication is related to the information search orientation of the consumer. Sophisticated consumers are more proactive in seeking information on products before actual consumption. Consumers who are more active show a greater level of involvement than those that are passive (Beatty and Smith 1987). Higher search effort is associated with higher purchase involvement. Further to that, more research (Sproles, Geistfeld, and Badenhop 1978) associates extensive information search as a behaviour is said to be exhibited by consumers with higher product involvement and motivation. In summary, one could say that sophisticated consumers display a higher level of external information search than just relying on the internal.

2.15 Socio-demographic Characteristics

Socio-demographic is a combination of sociological, which means in relation to sociology and demographic which means in relation to populations. Therefore, socio-demographic characteristics are factors that can be defined as both sociological and demographic. Previous studies in marketing and public policy have relied heavily on such characteristics to identify intervention gaps and map targeted solutions. For purposes of this study gender, age, income and education will define socio-demographic variables.

Socio-demographic factors form building blocks of market segmentation. Variables such as gender, age, education, marital status and income, form the base of market segmentation. Recent works concur on the popularity of socio-demographic variables in segmentation and

as a basis for marketing strategies (Kotler 2003). They opine that socio-demographic variables are easier to measure than most other types of variables, and that in order to formulate strategies to efficiently reach the targets, there is a need for a solid understanding of the market's socio-demographic characteristics. Another recent study (Varian and Scott 2012) undertook a literature review on segmentation studies in relation to sustainable food consumers, and of the sixteen that they reviewed, only one did not use socio-demographic variables in their segmentation analysis. These developments emphasize the importance of socio-demographic variables in market segmentation analysis. This study aims to inform both marketers and policy makers in crafting strategies to counter the aforementioned emergent challenges in the market, and therefore values the role of socio-demographic characteristics in exploring this cause.

2.15.1 Gender

A previous study (Gilg et al. 2005) showed gender as insignificant in all but one of environmentalist groups. Other studies exploring the significance of gender in this regard (Roberts 1990; Barr et al. 2001) reported a higher female dominance in environmental awareness. This finding is attributable to the commonly perceived gender roles and context of division of labour in household in relation to the consumption of goods (Gilg et al. 2005). The different socialization of boys and girls also has a bearing on their eventual interpretation of environmental and health issues according to Diamantopoulos et al. (2003). The aforementioned studies were undertaken in developed economies and based on the consumption of multiple products including household products. The current study is about technology adoption and previous studies (Comber, Hargreaves and Colley 1993; Jackson, Chow and Leitch 1997; Kennedy, Judd and Delgarno 2008) have established familiarity as a barrier to adoption when it comes to women as compared to their male counterparts.

Using gender as a predictor in counterfeiting research has proven fragmented in many previous studies. For example, a study in India (Kumar et al. 2015) reported insignificant relationships between consumer gender and their attitude towards counterfeiting. However, earlier studies in the United States (Beltramini, Petersen and Kozmetsky 1984) reported that females are more concerned with ethics when shopping than their male counterparts. In Japan, the male consumer is linked with being significantly more accepting of the notion of actively

benefiting from questionable consumption including counterfeiting (Erffineyer et al. 1999). There is evidence of a link beween this behaviour and the stereotype of the 'ruthless' Japanese businessman (DeMente 1994).

As far as technological information, practice and knowledge in relation to gender, there is a challenge to the historical stereotype of patriarchy in technology (Bray 2007). Wajcman (1991) also notes a distinction between what is referred to as two expressive and constitutive forms of masculinity, which both imply a mastery of technology. The term "mechanic" for example represents mastery on the basis of toughness and practical skills, whilst "software designer" represents mastery on the basis of intellectual aptitude according to Wacjman (1991). A publication titled "Boys and their toys collection" (Horrowitz 2001) further enhances this patriarchy, a development that has been countered by opposing researchers (Faulkner 2000; Kleif and Faulkner 2003) who opt for a different route by allowing men and women's technical aptitude to be put to the test by setting the self-representations against actual practice.

2.15.2 Age

One influential study (Diamantopoulos et al. 2003) identifies 33 studies that have explored the relationship between age and environmental consciousness and only two of them reported some significance. Further studies reported a higher level of consciousness among the younger members of the population (Arcury et al. 1987; Grunert and Kristensen 1993). Contrary to the above statement however, other published works found that the mean age of committed environmentalists was highest and the mean age of non-environmentalists was the lowest. It is important to also note that the type of 'good' in question is also central to determining the significance in this case. For example, it is imperative to note that the incorporation of other variables such as 'fairly traded goods' and 'recycled products' may offer alternative hypotheses (Gilg et al. 2005).

Previous studies on counterfeiting have revealed a generally consistent outcome in relation to age. A study exploring consumer ethics and morality in Japanese society (Erffineyer et al. 1999) revealed that younger male students among the Japanese population were more likely

to passively benefit from counterfeiting. There is evidence of a correlation between younger people and the consideration to purchase counterfeit fashion items (URL 19). A recent study (Swami, Chamorro-Premuzic and Furnh 2009) also found instances where age displayed a strong correlation with consumption of counterfeit products. This evidence is further supported by formative work done by early scholars (Kohlberg 1969, 1984) in cognitive moral development, which suggests that as people mature and gain experience they are more likely to exercise reasoning patterns that demonstrate a higher level of morality.

A study (Yoon et al. 2009) profiled elderly consumers and their decision making in consumption on the basis of their knowledge and experience. The study revealed that when the task and context exceeded the elderly consumer's resources, in terms of knowledge and experience, they adapted their decision-making process. However, when product information is presented in a more meaningful or user-friendly way, it eases the challenge of decision making for the consumers. One of the greater challenges for older consumers was telemarketing fraud, the AARP (1996) estimated that more than half the victims were people over the age of 50. Younger consumers have emerged as better equipped to handle the information overload of this technology age (Laurie 2004). Previous studies have also revealed a varying degree of product knowledge between different age groups (Feick et al. 2003; Quester and Smart 1996; Slama and Taschian 1985).

2.15.3 Income

A higher income may mean one has a range of alternatives in terms of products to choose from and a lower income may infer the direct opposite. It is on the basis of this that income has been utilized widely in research as a predictor of consumer behaviour. When it comes to environmental and health issues however, income means different things at different stages of consumption. In terms of awareness during the purchasing process, prior evidence (Gilg et al. 2005) reveal a challenge to reach a conclusion on income as a predictor among various groups. However, post-purchasing practices, for example consuming consciously, a trend indicating a positive relationship between higher income consumers and environmentally conscious actions has emerged in early work done in the area (Hines, Hungerford and Tomera 1987). Instead of income, one study (Diamantopolous et al. 2003) utilized a variable termed social class, which factored in income levels of a household. They concluded that

people who belong to higher social class indicate greater concern for health and environment. The aforementioned studies were all conducted on the basis of household goods and not specifically technological products, which pose unique challenges environmentally and health wise. These studies were also carried out in developed countries and it will therefore be interesting to find out how the income dynamics of a developing country come into play. Due to potentially wider income disparities and the issue of choice range introduced earlier, we hypothesize that:

The general consensus around income and counterfeiting is that genuine brands are relatively expensive, therefore because of the prohibitive nature of the pricing, people with lower income attempt to bridge that gap by consuming counterfeit goods (Hart et al. 2004). The IMF points to the income disparities in developing economies as another factor that contributes to counterfeiting (Scandizzo 2001). The emphasis is put on less income variance as encouraging only two types of consumption; the highest and most expensive by the wealthy and the lowest and cheapest by the poor. The gulf that is left in between provides incentive for counterfeiting. This therefore means societal factors such as identifying with certain lifestyles act as motivating factors for people outside the price range to turn to counterfeit consumption in order to achieve the image regardless (Juggessur and Cohen 2009). Pre-existing research (Bian and Moutinho 2009) also reports that high income levels have a negative influence on the purchase of counterfeit fashion products.

A study on Swiss consumers (Hochgraefe, Faulk and Vieregge 2012) revealed income level as one of the predictors of product involvement. Another product involvement study (Quester and Smart 1996) also identified consumer income as one of the major demographic factors influential when it comes to choice attributes in consumer wine purchases. Adopting a CFA and Structural Equation modelling approach (Rahbarian and Meshkani 2014) analyses came to the conclusion that people in the average income bracket displayed the highest level of information orientation and product knowledge. Product involvement can act as a trigger for economising upon a consumer's encounter with budgetary constraints. Further findings (Van Raaji and Eilander 1983) also reveal consumers with higher income unwilling to adopt economising strategies in situations where consumers with lesser income stopped the use of a particular product or opted for a cheaper alternative.

2.15.4 Education

Another factor more central to the investigation of environmental and health awareness is Education. Discourse on this subject matter often drifts into issues that may be difficult to readily grasp. The very nature of ecology with its complex interactions between organisms and environment serves to make its subject matter difficult to understand and assimilate. (Maloney, Ward and Braucht 1975; Straughan and Roberts 1999; Peattie 2001; Lin and Hyuang 2012). There are exceptions to this largely homogenous body of findings however (Ling 1975; and Samdahl and Robertson 1989). The aforementioned publications report a negative relationship between self-reported consciousness and education. Looking at the time these studies were undertaken and how much of a leap green consumption has taken over the past two decades, we will conclude that:

With regards to education, comparison is primarily between college-educated consumers and non-college educated consumers (Goolsby and Hunt 1992; Kelley, Hoffman and Davis 1993; Erfinneyer et al. 1999). These studies point to a predisposition towards ethical consumption among college-educated consumers. The general consensus is that those that are older and more educated tend to make more ethical decisions. Further to that follows the introduction of the concept of 'enjoyment' and conclusion on the basis of results is that people with higher education are less likely to enjoy purchasing counterfeit products, which is an implication that they are less likely to do so (URL 19). A study conducted in China (Kramer 2006) revealed a positive correlation between low education level and unethical behaviour including purchasing counterfeit products.

In relation to education, consumer product knowledge has been studied extensively over the past years (Bian and Moutinho 2009; Baker, Hunt and Scribner 2002; Alba and Hutchinson 2000; Brucks 1985. Kempf and Smith (1998), confirm that because higher levels of product knowledge come with higher cognitive capacity therefore education becomes an influential predictor. The proposition (Marks and Olson 1981) is that consumers with above average levels of product knowledge possess some more developed and more complex schemata, with well formulated decision criteria (Bian and Moutinho 2009). An alternate view (Tabassi et al.

2013) in a study about cars and confectionary industry found that the level of education attained had a positive correlation with the level of product knowledge.

2.16 The theory of market segmentation

Market segmentation similar to other marketing theories is largely premised on profit maximisation, this study however utilizes it in two ways. Firstly, to assist in policy formulation by way of identifying the particular segments within the urban mobile consumer population in Botswana. In the same token, on the basis of levels of consumer sophistication among various segments, the marketers can both counter the aforementioned challenges as well as identify gaps in the market.

The origins of market segmentation as a concept in the marketing sphere is attributed to the earliest recognised work (Smith 1956), which defined a segment as a group within a market that is clearly identifiable on the basis of certain criteria. The assumption of similarity among the consumers is based on their characteristics, needs and behaviours.

General concencus is that there are four major steps in market segmentation (Lamb and McDaniel 2003). The first step involves selecting a market or product category for study. It may be a new, related or already familiar market for the organization. The second step involves choosing a basis for segmenting the market. In choosing the segmentation variables there is no specific scientific procedure to follow, however, the aforementioned study considers a successful segmentation plan as one meeting the four basic criteria of; substantiality, identifiability, accessibility and responsiveness. The next step then becomes selection of segmentation descriptors. These are necessary for the identification of segment variables to be used. Profiling and analysing of segments is the fourth step. This information includes factors such as segment size, and can be used to rank the market segments on the basis of their usefulness to the objectives of the organization (ibid). The fourth step of selecting target markets comes more as a natural necessity rather than an official part of the segmentation process (Goyat 2011).

2.17 Designing a Customer driven market strategy

Select Customers to serve

Decide on a value proposition

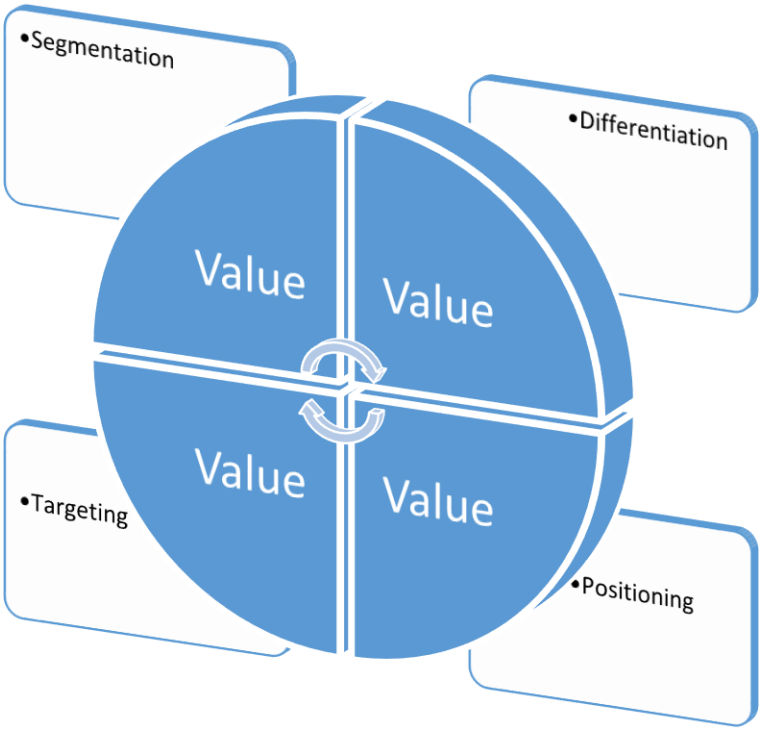


Figure 4 Designing Customer Driven Market Strategy

Source: Kotler 2003

Figure 4 is an illustration of (Kotler 2003) two main questions discussed earlier in this study; "which consumers will we serve?" and "how will we serve them?" As aforementioned the application of the market segmentation theory is applicable to this study in two main ways. The idea behind selection of customers to serve is to maximise value for them, this study adapts this to fit both marketing and policy strategies. By identifying the multiple segments of consumers on the basis of their levels of consumer sophistication is a basis for then deciding a value proposition in the form of empowerment or a fulfilment of a need that the consumers display. In other words, consumers displaying lower levels of knowledge, who are the primary targets of this study would then become recipients of value in the form of well thought out consumer driven strategies designed to counter the challenges elaborated on in the problem statement. Other prior researchers (Kotler 2003) also believe that there is no

single way to segment a market, and they put forth four major factors that can be used to segment a market being geographic, demographic, psychographic and behavioural. These factors can be used alone or in combination to find the view of the market structure. This study applies all four categories in order to segment the mobile phone market in Botswana. The independent variables of age, gender, income and education (demographic factors); The dependent variables being information orientation, environmental awareness, IP vigilance, brand consciousness, quality judgement, new product knowledge and health awareness (psychographic and behavioural factors); in assessment of urban (geographical) mobile consumers in Botswana.

2.17 Summary

Consumer behaviour research shows firms and regulators alike can learn a great deal from trends and patterns in the consumer base. It is therefore important to have a continued focus on consumption on the basis of consumer sophistication in an attempt to counter some of the challenges emerging in the mobile technology industry. Poorly sophisticated consumers are bound to engage in poor consumption decisions, and such decisions can have a lasting effect on the general quality of life.

This study employed the theory of market segmentation to explain the influence of Gender, Age, Income and Education on the level of consumer sophistication. The emerging challenges that result due to poor decision making in consumption of mobile technologies are being countered with broad supply strategies. Profiling consumers on the basis of their level of consumer sophistication reveals trends and patterns that are root causes of poor consumption. These revelations should act as a foundation to formulating both marketing and public policy strategies. Previous studies have not been exploring this link in the mobile sector, in solution seeking for the aforementioned challenges or in the context of Botswana. This study adds to a scant body of work in consumer sophistication and by extension to marketing science.

CHAPTER III METHODOLOGY

3.0 Introduction

"The methods section describes the rationale for the application of specific procedures or techniques used to identify, select, and analyse information applied to understanding the research problem, thereby, allowing the reader to critically evaluate a study's overall validity and reliability. The methodology section of a research paper answers two main questions: How was the data collected or generated? And, how was it analysed?" (Labaree 2009:62). In order to achieve set research objectives, there is a system of methods required in each stage. What the methodology chapter brings to the fore for the reader is the methods used to collect as well as analyse the data. From vast systems and rules available to the researcher, they have to offer an extensive communication as to the choice of specific methods.

This chapter seeks to provide an overview of the research design and data collection procedures employed in identifying the relationship between socio-demographic characteristics and consumer sophistication among urban mobile technology consumers in Gaborone, Botswana. The chapter will also describe in detail the rationale behind the choice of tools used in the survey process as well as ethical implications. Botswana has one of the highest mobile phone penetration rates in Southern Africa and the world. Due to the prevailing regulatory conditions, consumers in Botswana are faced with a vast array of mobile technology product choices. Issues that are emerging point to an inability to deal with such high levels of mobile phone ubiquity by consumers in Botswana. Consumer sophistication skills are necessary for sound consumption decisions before, during and after consumption. A lack of consumer sophistication skills can lead to poor consumption decisions, which can have damaging health, environmental and economic implications. This can have a lasting impact on the quality of life for both individuals and families.

3.1 Purpose of Study

The purpose of this study is to investigate, in a mobile technology adoption setting, the relationship between socio-demographic characteristics and consumer sophistication. Consumer Sophistication in this regard is explained by product information, brand and quality judgement, new product knowledge, environmental and health awareness, price/value awareness and intellectual property vigilance. Socio-demographic factors are explained by age, gender, income and education. The study employs socio-demographic characteristics to identify multiple levels of sophistication among the various consumer subgroups. The anticipation is that the outcome of this study will form a basis for formulating strategies to effectively counter some of the problems emerging as a result of poor consumption decisions. The study further develops a matrix to classify consumers on the basis of their sophistication levels:

-Establish levels of consumer sophistication in relation to socio-demographic factors

-Establish characteristics of urban mobile consumers in Botswana

- Draw public policy implications

- Draw market implications

3.2 Research Question

Development of a research question is the process of looking at an issue that might be a problem that is taken for granted and formulating a question about it. The research question emphasizes lack or absence of understanding about an issue. It is this gap that the researcher wants to address (Sweet and Grace-Martin 2008:4).

The umbrella research question is as follows;

What is the relationship between socio-demographic characteristics and consumer sophistication among urban mobile phone consumers in Botswana?

1. What is the relationship between gender and the level of consumer sophistication among urban mobile consumers in Botswana?
2 What is the relationship between age and the level of consumer sophistication among urban mobile phone consumers in Botswana?
3. What is the relationship between level of income and the level of consumer sophistication among urban mobile phone consumers in Botswana?

4. What is the relationship between level of education and the level of consumer sophistication among urban mobile consumers in Botswana?
5. What are the characteristics of urban mobile phone consumers in Botswana?

The socio-demographic profiling of consumers on the basis of their level of consumption was chosen as it was expected to reveal the root causes of existing problems such as counterfeiting and e-waste. The findings would therefore strengthen the case for a segmented demand-side strategy by both marketers and policy makers. The expected differences in levels of consumer sophistication among various subgroups would also magnify targets and help determine how information is packaged per subgroup for it to have desired outcomes. The expectation was that varying levels of education, income and age would reveal interesting varying levels of consumer sophistication.

3.3 Research Methods and Design

In order to complete this research, a quantitative, non-experimental and cross-sectional design was adopted to determine whether there is a correlation between the level of consumer sophistication and various socio-demographic characteristics. Cross-sectional surveys provide data to examine attitudes, beliefs, opinions or practices at one point in time (Creswell 2008). A quantitative approach was adopted to simplify the replication of the study in various contexts, including carrying out comparative studies in other locations. The rationale for a non-experimental design was in order to enable replication as well as to allow for further development of a segmentation matrix on the basis of levels of consumer sophistication.

"Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon" (Labaree 2009:61). In other words, this study employed a questionnaire survey as a data collection tool and manipulated the data generated numerally in order to fit groups of people through a segmentation matrix and eventually find an explanation for the phenomenon that is consumer sophistication.

3.4 Study Setting

The study was conducted in Gaborone, Botswana in Southern Africa. The country has an area of 581,730 square kilometres with a population of 2.1 million (URL 21). According to the World Bank (URL 21) Gross National Income (GNI) per capita is US$ 6,120 classifying Botswana as an upper middle income country. The country's economy is mono-cultural in that it is mining oriented with a limited agriculture sector. The main exports are diamonds, copper, nickel and beef (URL 21; Government of Botswana 2005). The major languages include; English (official language) and Setswana (national language) as well as several other tribal languages including but not limited to; Sesarwa, Sekgalagadi, Sesobea, Sekalanga, Seherero, Sembukushu, Sebirwa, Sengologa and Seyei (Government of Botswana 2005). It is important to note that diversity in the form of cultures and by extension language is becoming a topic of relevant discussion in Botswana as most of the tribal languages are neither taught in school nor used officially, a situation some activists view as due for a change.

The population of Botswana is made up of approximately 394,272 households (Central Statistics Office 2003:6; Government of Botswana 2005). On average, the age of household heads is 45.3 years, this number increases slightly in rural and urban villages. The average household size is 4.14 persons in cities/towns, 4.84 persons in urban villages and 4.30 persons in rural areas (Central Statistics Office 2003:8; Government of Botswana 2005). Statistics further reveal that Female-headed households are comparatively larger than male-headed households with an average of 4.38 members compared to 3.94 for males (Central Statistics Office 2003:8). The average number of children per household is 1.86 nationally (Central Statistics Office 2003:8). Those households whose heads hold no formal education have consistently lower income than those who attended some form of formal education (Central Statistics Office 2003:1). Nationally 71 percent of household heads have never had any formal skills training; this figure rises to 87 percent for rural areas (Central Statistics Office 2003:2).

3.5 Research Implementation

3.5.1 The Researchers Background

The researcher's background is key in establishing the factors that influence his or her approach to the research at hand. Past influences play a critical role in determining contextual and methodological approaches by a researcher. As an Economics and Political science major in undergraduate, the influences from early research were diverse in their nature. Political Scientists within the University of Botswana were interpretivist in their approach and therefore conducted largely qualitative research. On the other hand, the environment on the Economics side of the University was governed by positivism and a naturally quantitative approach to research.

My first encounter with what can be described as big data came with my first employment assignment with the biggest mining company in the country. I was under the employ of the pension fund as assistant project coordinator for a data clean-up campaign that involved perusal of more than 6000 employee files. Following that was a task to put together an up to date employee database. Subsequently I joined the supply chain division within the same organisation as part of the materials management team. The task also involved significant data collection from company suppliers and development of an up to date supplier database. This was all in preparation for an organisation wide restructuring process that involved eventual migration to the SAP business system. This experienced formed the basis of my interest in generating data, and even though there were limited analyses in both instances, the skills have been developed over the years.

The next employment saw me play a supervisory role in a government ministry offering direct services to the public. This offered me an opportunity to interact directly with consumers on a daily basis. This daily interaction generated a lot of data that was largely unexploited and still remains so to date. My curiosity with data management and consumer behaviour came together and formed a strong desire to become a business research professional leaning largely towards marketing science. My admission to the Global MBA at Doshisha university saw me undertake my dissertation research with Air Botswana. The work was qualitative in nature and titled, *The role of social media in the collaborative aspect of CRM: The Case of Air Botswana*. I worked collaboratively with Air Botswana on this project, assuming a consulting role and explored factors that lead to companies refocussing their strategies and resources to reconnecting with the consumer. On the basis of findings as well

as industry best practice, I formulated a strategic framework for Customer Relationship Management practices incorporating Social Media.

In preparation for my PhD I explored multiple service industries. In the end the telecommunications sector proved the biggest and most suited to this research. Coming from a country with recent but high mobile telephony penetration rates, it seemed appropriate to explore technology adoption and consumer behaviour in this space. With over 6 billion mobile phone devices around the world, this industry generates quite a lot of data on a day to day basis, but in an era where data has become king, sometimes researchers such as myself have to generate primary data of their own in order to perform analysis of consumption. In exploring previous research in ICT or Technology adoption in Botswana, evidence pointed towards an ethnographic interest in investigating this field.

3.5.2 Participants

Participants for this study were shopping mall patrons and workers at two main malls in Gaborone, Botswana. Shopping malls were selected because they are a public space that attracts people from diverse backgrounds. The researcher had initially explored the possibility of other places such as banks and academic institutions, but they did not offer the same diversity and therefore generalisability as offered by shopping malls. The other reason for selecting shopping malls to conduct this survey was largely due to its nature as a study about consumption, the familiarity with some of the issues raised made the entire process less challenging. The two malls chosen for this exercise were Game City Mall, which is one of the biggest malls in the city, as well as Molapo Crossing mall, which is relatively smaller in size. The reasoning behind the choice of the two malls was largely on the basis of the clientele both malls attract. Game city Mall is closer to Industrial, corporate and academic sites, whilst Molapo Crossing mall is much closer to residential and the peri-urban centres surrounding the city.

3.6 Sampling

A convenience sampling method was used to select participants for this research. Sampling methods that are a categorized as 'non-probability' are aimed at constructing a sample that can generate insights that are most useful to the researcher when exploring a particular focus of study. Multiple reasons can be put forward in explaining why it may not be possible or desirable to generate findings that are generalizable to a much wider population.

"There may be particular sources of data which the researcher is able to access in a way that is unusually rich, and which could not be obtained in the same way by other researchers. Their findings are not, therefore, straightforwardly generalizable to a wider population, but nevertheless have the potential to generate valuable insights. The basic aim here though, is to be able to say something theoretically about the findings from the particular sample we have studied in a way that generates insights or questions about the other cases or contexts. One implication of this is that studies based on non-probability samples need to be designed in a way that is consciously informed either by existing theoretical debates or the development of new theory using an approach such as grounded theory" (Lynch 2011:2).

It is on the basis of these aforementioned conditions that the researcher formed an approach. The choice and judgement of places to conduct the survey was also on the basis of these considerations.

Prior to conducting the study, I conducted in-person meetings with representative from management of both shopping malls. The study outline and objectives were presented to both management teams and no resistance or objections were raised from their side. A couple of points discussed included, not allowing the survey to disrupt the shopping activities of uninterested patrons or seeking them out inside the various shopping outlets. It was agreed that the mall intercept approach be conducted in the corridors. If the study went over the four-week agreed timeline, the researcher was supposed to inform the management company of the development the primary researcher and two research assistants were introduced to the security companies in both malls after the verbal agreement to proceed with the survey exercise was reached. To incentivise participation in the study, a chance to win P200 (US$20) worth of airtime in a random draw at the end was included, only for participants who wished to take part. For the ensuing four-week period the primary researcher personally conducted the survey with occasional assistance of two research assistants. The first week yielded 186 respondents, 92 respondents were registered for the second week, the third week registered

19 respondents and the last week 15 respondents were registered. It is important to note that additional surveys were collected online. Consistent with the tablet assigned survey, convenience sampling was used to derive respondents via word of mouth. The study was voluntary and respondents were informed of that fact and the general nature of the study through a consent note (Appendix A) that accompanied both the assigned tablet and the online survey.

Another important factor to note is that prior to conducting the study, a research permit (Appendix B) was sought and granted by the ministry of local government. It is illegal to conduct academic social research, or medical research without permission from the relevant ministry within Botswana.

This study profiles urban mobile technology consumers in Botswana. In total 307 people completed the survey. With more than 150% mobile penetration rate in Botswana (URL 25), this constituency is excellent as a choice not only because it captures a variety of demographic subgroups but also because they represent a higher likelihood of familiarity with the variables of interest in the study. Discourse on issues such as health and environment in relation to consumption start in urban centres, even though such discourse exists simultaneously in rural areas, an urban centre such as Gaborone represented a good starting point for this study and for subsequent studies as well.

3.6.1 Time horizons

The study was conducted over a four-week period from August 21st, 2014 to 21st September 2014.

3.7 Instruments

QuestionPro is an application that allows a researcher to conduct a survey both online and offline. The offline survey is conducted via the use of assigned devices, and in the case of this study it was an assigned tablet. After conducting surveys offline, you can then connect to the internet via the same device and upload the responses to the central repository of the application. Due to limited connectivity in shopping malls, this application proved very

convenient in that the researcher and research assistants could safely collect responses during the day in offline mode then connect to internet and the end of each day to update and track progress of the survey as it went along. Feedback from respondents indicated an excitement to use the device for answering instead of traditional pen and paper data collection. The survey was written in English but conducted using both English and Setswana to ensure a good level of clarity and comfort for all participants.

The survey consisted of three major sections (see Appendix B). The first part was a 13-question consumer sophistication measure, developed by the researcher using the IPS (2005) definition of consumer sophistication. Each item is measured on a 5- point Likert scale 1 = "disagree strongly" and 5 = "agree strongly". The second part of the questionnaire sought to collect socio-demographic data of respondents including gender, age, income and education. The third section of the survey gathered general consumption information including type of subscription and service provide. In total this was a 25-question survey and it took an average of 6 minutes to complete.

The rationale behind developing a measurement tool by adapting the IPS definition is because among all the existing definitions that the author came across (Sproles, Geistfeld, and Badenhop 1978; Hirchman 1980; Barnes and McTavish 1983; Titus and Bradford 2005; Seyoum 2009; Jeppesen and Molin 2010), it's the one that captures better the broadness of consumer sophistication and breaks it down well enough to cover all its important aspects. The data for from the 13 items generated under section 1 was tested for reliability using Cronbach's alpha = .756

The second section generating socio-demographic data is essential for any study that aims to pursue a segmentation analysis. Consumer needs, wants and usage rates vary closely with socio-demographic variables (Kotler 2003). They further emphasize the importance of socio-demographic variables by stating that, even though segmentation can be done on the basis of other factors, demographic characteristics must be known for formulation of any effective and efficient strategies.

3.8 Operationalizing the variables

The objective of this study was to establish the relationship between socio-demographic characteristics and the level of consumer sophistication. Consumer sophistication is explained by the following single item variables; information orientation, brand consciousness, quality judgement, new product knowledge, Intellectual property vigilance, environmental awareness and health awareness. Socio-demographic variables are explained by gender, age, income and education. The socio-demographic variables served as independent variables because they are used to predict levels of consumer sophistication among the various categories.

"Your goal in conducting quantitative research study is to determine the relationship between one thing [an independent variable] and another [a dependent or outcome variable] within a population. Quantitative research designs are either **descriptive** [subjects usually measured once] or **experimental** [subjects measured before and after a treatment]. A descriptive study establishes only associations between variables; an experimental study establishes causality. Quantitative research deals in numbers, logic, and an objective stance. Quantitative research focuses on numeric and unchanging data and detailed, convergent reasoning rather than divergent reasoning [i.e., the generation of a variety of ideas about a research problem in a spontaneous, free-flowing manner]" (Labaree 2009:63). On the basis of this statement, this study constitutes a descriptive but logical and objective study. It is neither spontaneous nor divergent in its reasoning. The researcher will continue to make a case in forthcoming sections as to the choice in such a paradigm.

3.8.1 Information orientation

This is defined as a display of strong motivation towards shopping and searching for product information (Beatty and Smith, 1987). To analyse information orientation, respondents were asked to rank how much they agree with the following statement on a 5 point Likert scale, 1=disagree strongly and 5 = agree strongly

Question 1.

I seek information on mobile phone products before making a decision to purchase

3.8.2 Brand consciousness

For purposes of this research, the definition adopted is – Brand and value context in purchase decision-making (Liu, 2010)

Question 3.

Mobile phone brand is very important to me.

3.8.3 Quality Judgement

The definition adopted in defining this variable is sensitivity and ability to ascertain the quality level of a product (Kim and Jung 2012)

Question 4. I use brand to judge the quality of my mobile phone

Intellectual property vigilance

Avoiding partaking in IP infringement (Jolly 2007)

Question 8.

I always go for authentic (original) rather than counterfeit (fake) mobile phone products.

3.8.4 New Product Knowledge

Ability of a consumer to act as an information broker, to whom others turn to seek opinion and information on consumption choices (Liu 2010)

Question 9.

I always know about new mobile products before they reach the market

3.8.5 Health Awareness

Consumption behaviour resulting from a consumer's awareness of their health (JETRO 2006)

Question 11.

I am aware of the health implications of my mobile phone

3.8.6 Environmental Awareness

Consumption behaviour resulting from consumer's awareness of the environment (JETRO 2006)

Question 12. I am aware of the environmental implication of my mobile phone.

All the dependent variables mentioned above were measured on a 5-point Likert scale.

As aforementioned a survey was used as a collection tool for this study. The survey was divided into 2 main parts. The first part consisted of 13 questions/statements adapted from the IPS model (2005) measured on a 5-point Likert scale. The author adapted the model and drafted measuring tools on its basis because it encapsulates consumer sophistication better than other existing literature. Another reason for this adaptation is the fact that its multidimensional nature allows for deeper insight into the level of consumer sophistication. The second part of the survey contained questions about demographic data including the respondent's age, gender and income.

The survey was attempted in total by 320 individuals. However, some of the respondents did not complete the whole set of questions which generated missing values during the data coding process. After cleaning up the data including outliers we were left with 307 completed surveys. The following provides a basic overview of the study sample: 55.9% were male while 44.1% were female; 36.9% of the respondents were between the ages of 16-25, 47.8% were between the ages of 26-35, 10% were between 36-45, 3.4% were between 46-55 and

only 1.9% were over the age of 56; 11.5% of the respondents reported no income while 6.3% said they were unemployed; 42% were regular employees whilst 12% reported as self-employed.

For the first part of the analysis (ANOVA) all the questions above were treated as single item variables to measure different aspects of consumer sophistication against a select list of influential socio-demographic characteristics. As indicated above, the dependent variables that measure consumer sophistication include information orientation, brand and quality judgement, intellectual property vigilance, new product knowledge, health awareness and environmental awareness.

Section 2 of the survey questionnaire consisted of questions designed to gather socio-demographic data of respondents. The independent variables gender, age, income and education were generated using the following questions.

3.8.7 Gender

Question 14. What is your gender?

The categorical response options were:

a) Male
b) Female

3.8.8 Age

Question 15. What is your age range?

The categorical response options were:

(a) 16-25
(b) 26-35
(c) 36-45
(d) 46-55

(e) Over 55

3.8.9 Education

Question 16. What is the highest level of education you have completed?

The categorical response options were:

(a) Junior secondary School and lower
(b) Senior Secondary School
(c) Vocational School/Junior college/Technical college/certificate
(d) Diploma
(e) Bachelor's degree
(f) Graduate school

3.8.10 Income

Question 19. What is your monthly income from all sources?

The categorical response options were:

No Income
(a) 1 -3,000 Pula
(b) 3,001 -6,000 Pula
(c) 6,001- 9,000 Pula
(d) 9,001- 12,000 Pula
(e) 12,001- 15,000

Pula

(f) 15,001 - 18,000 Pula

(g) More than 18,000 Pula

There is an assumption of objectivity in quantitative research as it seeks to establish and explain association between variables using quantifiable data (Creswell, 2008). The survey data in this study was used to determine the relationship between socio-demographic variables (age, gender, education and income) to consumer sophistication in the form of information orientation, brand and quality awareness, new product knowledge, health and environmental awareness as well as Intellectual property vigilance.

3.9 T-test and ANOVA

A t-test is a statistical technique used to compare means for 2 independent populations. The one-way analysis of variance (ANOVA) is an extension of the t-test used to determine whether there are any significant differences between means of two or more unrelated groups. The concept of ANOVA involves estimation of group means, assessing magnitude of variance attributable to specific sources as well as partitioning the variation according to source.

For purposes of this study, to test the hypotheses, both the t-test and one-way analysis of variance were conducted to establish the differences in mean differences between the independent and dependent variable. As an interpretation of whether the relationship between variables existed or not, a conclusion was drawn on the basis of the resulting significance value. A relationship indicates the difference in means are not because of chance (Stockburger 2008).

The difference between males and females as an example can best be understood by using a t-test to compare, as this research also reveals. Due to the fact that a t-test is inferential i.e the analysis is more extensive than just the description of the numbers provided by data from a sample. It also seeks to arrive at conclusions about the particular numbers when it comes to

the populations. This is achieved through the analysis of the difference of the two means derived from the group scores. What the t-test communicates with the researcher is the statistical significance, or whether the difference between the two means is a result larger that it would otherwise be expected by chance.

There is what is referred to as a dependent samples t-test. As aforementioned, the t-test is used mainly when the intention is to draw a comparison between two scores or groups and their mean. In other instances, however, there is often a meaningful relationship between the participants in one group to the other group. The more common example that can explain this is a research design that involves a pre-test and a post test. Simply put, due to the fact that the same population that exists pre-test is the same as well post-test, therefore it can be assumed that the scores between pre-test and post-test are dependent on one another. As a researcher however, one must be in a position to identify instances where scores from two groups are likely to be related. It is a crucial skill to possess for critical consumers of research.

The outcome of the dependent samples t-test reveals whether the difference between the means of the two groups are significant in the statistical sense, in other words, whether this difference is larger than would be by chance. Citing an age based program intervention, if the dependent samples t-test indicated significance, and the mean for participant quality was higher at the post test as compared to pre-test then the conclusion might be that the intervention has a positive effect on participant quality.

As compared to the dependent samples t-test, the independent samples t-test is employed in instances where means of the two groups are not dependent on one another. The independence from one another should be such that the participants comprise two separate groups with no linkage to members of the other group. A common example may be to use the same age based sampling, but in this instance information is sought from two groups that received two totally different interventions, this simply means the participants in each group comprise two separate and independent samples, therefore as a result the scores from one group are not dependent on the scores from the other group. In order to draw a comparison

between means of the two groups, one would therefore need to employ an independent samples t-test.

In summary regarding the t-test, its most important element is its level of significance when reporting. The significance level is what determines whether the difference between the means is greater than would otherwise be observed by chance. Typically, the expectation is for the p value to be less than 0.05. That is when a conclusion is arrived at that indeed the result demonstrates statistical significance.

The main oddity with Analysis of Variance (ANOVA) is in its name, suggestions have been made that it should have been named "Analysis of means instead as it tests differences between two or more means. In the end, it is named aptly as the inferences about means are made by analysing the variance. The differences among means tested under ANOVA are general rather than specific. As a result, omnibus null hypothesis is a term often used to refer to this non-specific type of hypothesis. Conclusion drawn from a rejection of the omnibus null hypothesis is that at least one of the population means is different from one other mean. Due to the fact that the Analysis of Variance does not reveal which means are different from one another it then offers less specific information than for example, the Tukey HSD Test. That said, the ANOVA still is by far the most commonly-used technique for comparing means, largely because there are multiple complex types of analyses that can be performed using the ANOVA that one cannot execute with the Tukey HSD.

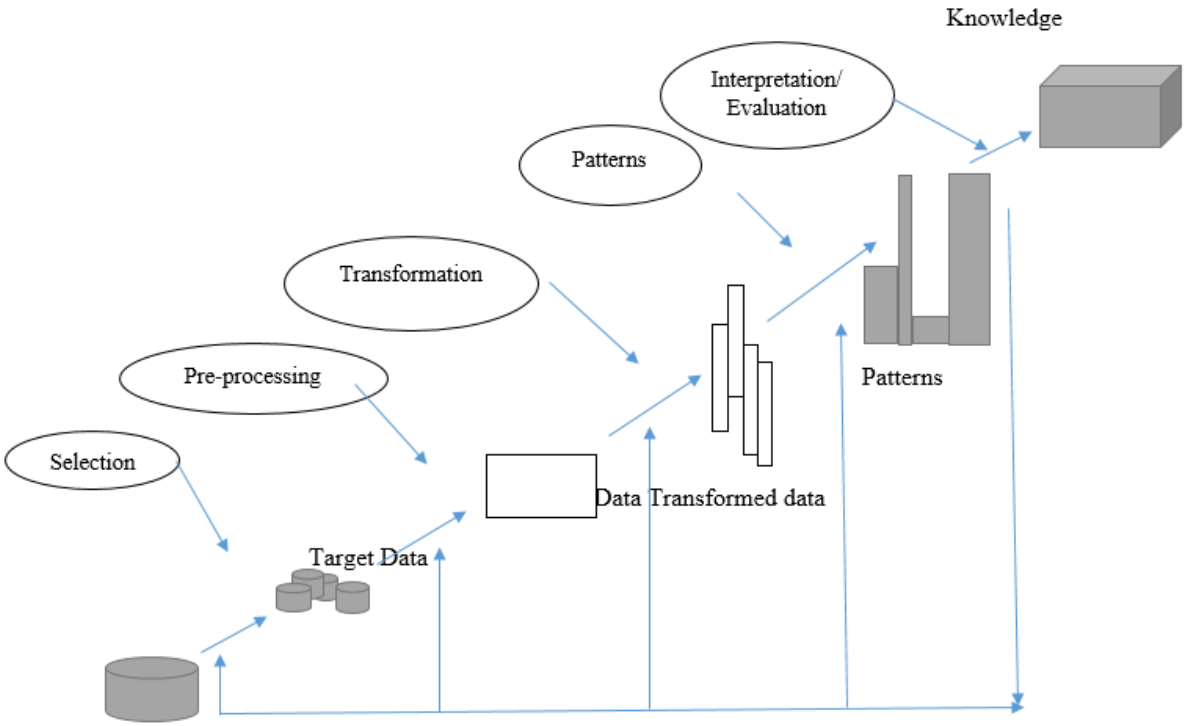


Figure 5 Steps of Clustering

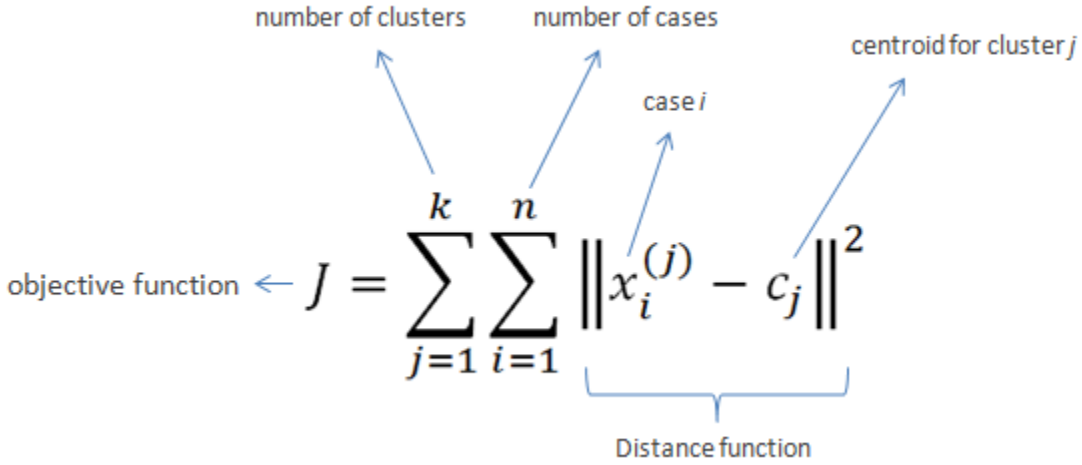
Source: Adapted from Fayyad, Piatersky-Shapiro and Smith (1996)

Figure 3 illustrates the process of clustering. Following the individual analysis of consumer sophistication of variables on the basis of socio-demographic characteristics, the study adopts a K-means clustering approach to answer research question 5. "What are the characteristics of urban mobile consumers in Botswana?"

Studies in marketing (Halkidi, Batistakis and Vazirgiannis 2001) refer to clustering as one of the most useful tasks in the data mining process for the discovery of groups and identification of distributions and patterns in the underlying data. The clustering problem is about classifying a data set into groups or cluster in a manner that data points in a cluster a more similar to each other than data points in other clusters (Guha, Rastogi, and Shim 1998). Clustering is a process found in multiple disciplines therefore it often comes under different names on the bases of the area of study such as typology (social sciences), numerical

taxonomy (biology). Partition (graph theory) and unsupervised learning (pattern recognition) (Theodoridis and Koutroubas 1999).

The operational definition for clustering can be put forth as: "Given a representation of n objects, find K groups based on a measure of similarity such that objects within the same group are alike but the objects in different groups are not alike. But what is the notion of similarity and what is the definition of a cluster? The presence of noise in the data makes the detection of clusters even more difficult, an ideal cluster can be defined as a set of points that is compact and isolated. In reality a cluster is a subjective entity that is in the eye of the beholder and whose significance and interpretation requires domain knowledge. But while humans are excellent cluster seekers in two to possibly three dimensions, we need automatic algorithms for high dimensional data. It is in this challenge along with the unknown number of clusters in the given data that has resulted in thousands of clustering algorithms that have been published and that continue to appear" (Jain, Meka and Dhillon 2008: 25).



Source: Jain, Meka and Dhillon 2008

The K-means begins with what is referred to as a random initial partitioning. This then continues apportioning and reassigning the data points to clusters on the basis of the similarity between the data point and the particular data point centroid. Based on this repeated action, the cluster centroids are updated. This process runs repeatedly until a convergence criterion is met. In other words, until there is no apportioning of any data point to a particular cluster or until there is notable minimal decrease in the squared error over multiple iterations. The implicit assumption here is that the overall distribution of the data

can be decomposed into a mixture of isotopic Gaussians. It is upon this assumption that the Euclidean distance in the cluster assignment step is adopted.

This algorithm (K-means) has proven popular with researchers due to its ease of implementation. The downside however is the sensitivity associated with the selection of the initial partition. Despite having been proven to converge to alocal minimum of the squared error criterion function, the k-means algorithm has always been questioned when it comes to the quality of the local minimum. The argument is that it can be of low quality in a global sense. When comparison is drawn with hierarchical agglomerative algorithms, the versatility of the K-means algorithm is also questioned. Prior research (Jain, Murty and Flyn 1999) has labelled resulting clusters from K-means as hyper spherical in Shape.

A K-means clustering was run on the data to identify major clusters with the consumer population. A classification/segmentation model of consumer sophistication levels was developed on the basis of the algorithm generated. The model also generates segments within the clusters, which are useful in deepening and revealing the characteristics of urban mobile consumers in Botswana.

3.10 Hypotheses

On the basis of the discussions in this and the previous chapter, the following hypotheses were arrived at. The hypotheses are written as null statements and are non-directional (Cresswell 2008).

3.10.1 Hypothesis 1

Gender has no effect on the level of consumer sophistication

H1a. The consumer's gender has no effect on their level of information orientation

H1b. The consumer's gender has no effect on their level of brand consciousness

H1c. The consumer's gender has no effect on their level of quality judgement

H1d. The consumer's gender has no effect on their level of Intellectual property vigilance

H1e. The consumer's gender has no effect on their level of new product knowledge

H1f. The consumer's gender has no effect on their level of health awareness

H1g. The consumer's gender has no effect on their level of environmental awareness

3.10.2 Hypothesis 2

Age has no effect on the level of consumer sophistication

H2a. The consumer's age has no effect on their level of information orientation

H2b. The consumer's age has no effect on their level of brand consciousness

H2c. The consumer's age has no effect on their level of quality judgement

H2d. The consumer's age has no effect on their level of intellectual property vigilance

H2e. The consumer's age has no effect on their level of new product knowledge

H2f. The consumer's age has no effect on their level of health awareness

H2g. The consumer's age has no effect on their level of environmental awareness

3.10.3 Hypothesis 3

Income has no effect on the level of consumer sophistication

H3a. The consumer's income has no effect on their level of information orientation

H3b. The consumer's income has no effect on their level of brand consciousness

H3c. The consumer's income has no effect on their level of quality judgement

H3d. The consumer's income has no effect on their level of intellectual property vigilance

H3e. The consumer's income has no effect on their level of new product knowledge

H3f. The consumer's income has no effect on their level of health awareness

H3g. The consumer's income has no effect on their level of environmental awareness

3.10.4 Hypothesis 4

Education has no effect on the level of consumer sophistication

H4a. The consumer's education has no effect on their level of information orientation

H4b. The consumer's education has no effect on their level of brand consciousness

H4c. The consumer's education has no effect on their level of quality judgement

H4d. The consumer's education has no effect on their level of intellectual property vigilance

H4e. The consumer's education has no effect on their level of new product knowledge

H4f. The consumer's education has no effect on their level of health awareness

H4g. The consumer's income has no effect on their level of environmental awareness

3.10.5 Hypothesis 5

H5a. Urban mobile phone consumers in Botswana possess homogenous characteristics

3.11 Theoretical Considerations

3.11.1 Positivism

Positivism uses a systematic and scientific approach to research; therefore, it is safe to assert that the paradigm has its roots in physical science. According to past research (Hughes 2001), positivism views the world on the basis of unchanging universal laws and the fact that every occurrence around us is explainable by the knowledge of these laws. In order for humans to understand the underlying cause of events, there is a need to systematically observe and record phenomena around us, and then slowly work out these universal Laws. The story of sir Isaac Newton and the apple is often cited to illustrate this process. The apple fell right down to the ground as Isaac Newton was walking around an orchard, the aforementioned process started unfolding because this event then intrigued Newton to wonder how far above the earth the force of gravity started to take effect. He started to develop the theory of gravity. In conclusion, the universal law in this case is gravity, arrived at after observing an event, in this case the falling apple (Keesing, 1998). Even though Scientific discoveries date as far back as 4800 BC from the area that is present day Egypt and Sudan (Lee 2008), positivism is not only associated with scientific discovery, rather it involves the application of scientific methodology. The European Renaissance (Fifteenth and Sixteenth centuries) and

Enlightenment (Eighteenth century) saw the emergence and development of the scientific method as a means of exploring the world around us (Fraser et al. 2004).

Alternatively (Moore 2010) another view of the positivist paradigm is that: "Positivism assumes that scientific knowledge is the highest form of knowledge, and that scientific knowledge comes from studying directly observable and measurable events. Other knowledge claims, for example, those based on religious of metaphysical assumptions are held to be imperfect because they are not derived from actual publicly observable experiences. According to positivism then, the world consists of laws and principles that are discovered through direct observation. If we do not know enough about some aspects of nature, we must study, measure and otherwise directly observe our subject matter more closely. Indeed, if we cannot do so, we must assume that the purported subject matter does not even exist. Moreover, scientific knowledge has the degree of certainty necessary to be regarded as foundational, for example as a basis for structuring society and thereby improving it" (Moore, 2010: 2).

3.11.2 The scientific method

The method is applicable in many subject areas. The standard rule involves the basic assumption that whatever is being studied is subjected to the underlying, unchanging universal laws. According to scholarly work (Johnson and Christensen 2008), further assumptions must be made by positivist researchers including: they should operate within agreed norms and practices; it is possible to distinguish between more and less plausible claims; and that science cannot provide all the answers.

Key features of the Scientific Method:

1. Observation and Collection of data
2. Looking for patterns and developing a theory
3. Forming a Hypothesis to test the theory
4. Conducting research to test the hypothesis
5. Support of adjustment of the theory (Coolican 2004)

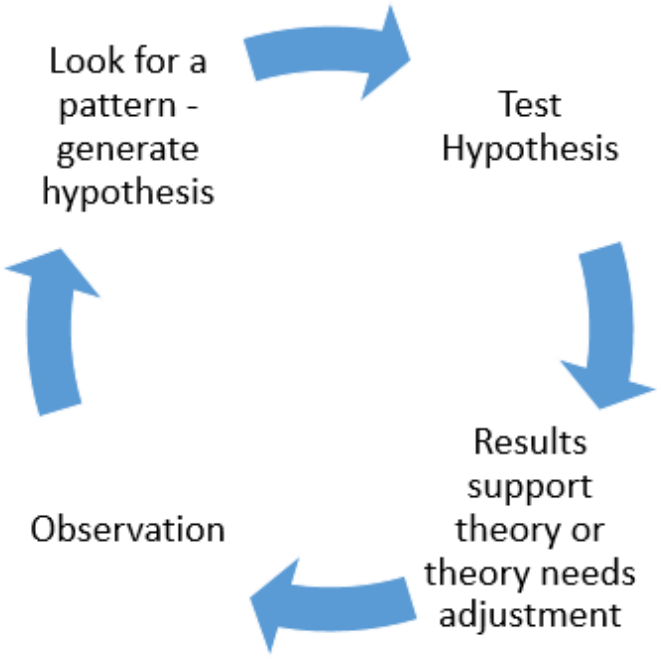


Figure 6 The Research Wheel

Source: Adapted from Wallace (1971)

There are two main approaches within this framework: an exploratory approach and a confirmatory approach:

- In the exploratory approach the researcher makes observations and searches for patterns. Upon the discovery of a pattern then an idea or theory is put forward about why this particular pattern occurs. The approach is also known as the inductive method

- In confirmatory approach, instead of the pattern or observation the researcher starts with the theory about why a particular phenomenon is occurring. From that stage, a hypothesis is developed based on the theory. The next stage then involves the empirical investigation in order to test the hypothesis. If the hypothesis is upheld by this data, then this supports the underlying theory. Confirmatory approach is also known as the deductive method.

3.11.3 Positivism and the quantitative approach

The positivist paradigm lends itself to the use quantitative methodology largely because in itself it leads to a scientific and systematic approach to research. It is almost conclusive that most of the time researchers adopting a quantitative methodological approach maintain focus on the confirmatory stage of the research cycle. In essence it means a focus on the formulation of a hypothesis and then followed by a collection of numerical data to test the hypothesis. Therefore, the basic objectives of quantitative methodology are to measure, quantify or find the extent of a phenomenon (Johnson and Christensen 2008)

What are the characteristics of quantitative research?

- The confirmatory part of the research cycle is emphasized
- Behaviour is seen to be predictable and regular
- Common aims of research are to explain and predict
- The researcher is interested in general laws that apply to whole groups rather than particular groups
- There is an attempt to study behaviour under controlled conditions with an attempt to isolate the effect of single variables
- An objective approach is taken, that is, different observers should be able to agree to what is being observed
- Data is based upon precise measurement using structured and validated data collection instruments

- Data analysis aims to look at statistical relationships

Strengths

- By application of highly controlled procedures and quantifying variables it is possible to obtain results that are helpful in refining theories
- Because of the rigid control of variables, findings are generalizable, which means the findings from participants under study can be extended to a wider population
- In the positivist paradigm, there is emphasis on a strict application of scientific methods as well as control of variables. This therefore means that findings are viewed as valid and able to be replicated by others

Limitations

- The need to control variables often leads to small units of human behaviour being studied
- Scientific methods such as the use of highly structured questionnaire may yield superficial information. If one wants to study the behaviour of consumers sometimes there is need to employ methods that delve deeper
- The positivist approach also requires the researcher to be objective but paradigm studies (Mclaughlin and Coffey 1990) explain the fact that in real life one does not find out about other individuals by remaining distant
- The aforementioned study (ibid) proceeds to assert that objectivity may be an illusion as it is impossible to remove the influence of the researcher in the data gathering process
- Occasionally scientific research applies a degree of deception, whereby participants are not fully told the real reasons for the research, which might in turn raise ethical questions
- More often than not, scientific research puts the researcher in a more dominant, powerful positon than the participant

3.11.4 Interpretive Paradigm

Interpretive research is founded on the assumption that knowledge is gained or at least filtered through social constructions such as language consciousness and shared meanings (Klein and Myers 1999). It places emphasis on the socially constructed nature of reality, and beyond that, the paradigm acknowledges the intimate relationship between the researcher and what is being explored as well as the situational constraints shaping this process. As far as methodology is concerned, interpretive research does not predefine dependent and independent variables and neither does it test out hypothesis (URL 27). Interpretive research aims to produce an understanding of the social context of the phenomenon, and the process whereby the phenomenon influences and is influenced by the social context (Walsham, 1993). There are four types of generalisations (ibid): the development of concepts; the generation of theory; drawing of specific implications domains of action; as well as contributions of rich insights.

Putting analysis into context is central to the interpretivist paradigm. This includes employing meaning instead of measurement oriented methodologies, such as interviews and focus groups (Reeves and Helberg 2003). These approaches rely on a subjective relationship between the researcher and the participants. The Idea behind the interpretivist paradigm is not to generate a new theory but rather to judge, evaluate and refine theories (Walsham 1993). Interpretivism is not a single paradigm, it is in fact a large family of diverse paradigms (Burrel and Morgan 1979). Philosophically it finds its base on hermeneutics and phenomenology (Boland 1985). The most well-known exponents of hermeneutics are arguably Gadamer and Ricoeur, and it is a major branch of the interpretive philosophy (Klein and Myers 1999). Hermeneutics can be treated as both an underlying philosophy and a specific mode of analysis, and goes further to elaborate that: as a philosophical approach to human understanding, hermeneutics offers the offers the philosophical grounding for interpretivism; and that it suggests a way of understanding the meaning or trying to make sense of textual data in its role as a mode of analysis. (Bleicher 1980). An early study (Gadamer, 1976) asserts that the movement of understanding forms a circular relationship, in that it moves from the whole to the part and back to the whole. This captures its attempt at

understanding human beings in a social context. All work categorized as interpretive and hermeneutic in nature is founded in this principle.

The definition of the concept of phenomena is appearance of things, or things as they appear in our experience, or the way we experience things (URL 28). Therefore, a phenomenological study describes the meanings of the lived experiences for several individuals about a concept or the phenomenon (Cresswell 2008). The gathering of deep information as well as perceptions through the inductive qualitative methods such as interviews and observations basically captures the aforementioned concept and how it plays out in the human sphere (URL 29). Another view (Aspers 2004) cites observations and interviews as key data collection methods in phenomenological studies.

What are the characteristics of interpretivism?

- There are multiple realities
- Reality can be constructed through human interactions, and meaningful actions
- Discover how people make sense of their social worlds in the natural setting by means of daily routines, conversations and writings in the process of interacting with those around them. Writings in this case can be in the form of both text and pictures
- Social realities exist due to varying human experiences, in the form of knowledge, views, interpretations and experiences
- How the mental process interprets events is based on influence by interaction with social contexts
- Those active in the research process socially construct knowledge through their experience of real life or natural settings
- Interpretivism employs the use of more personal, interactive modes of data collection
- The methodology of the interpretivist paradigm involves text messages, interviews and reflective sessions
- Normally the research is a product of the researcher's values in interpretivism (Thomas 1993)

Strengths

- There is no imposition of a controlling mechanism, therefore the researcher can see the reality in its context
- The employment of social and political dimensions results in richer descriptions of phenomena
- The close involvement between researcher and phenomena leads to qualification of certain issues that may otherwise not be captured in a controlled setting

Limitations

- The adequacy of an explanation is based on the agreement between the researcher and the participant and that has largely been viewed as a weakness
- The interpretivist paradigm depends largely on a high level of researcher's skills and that is not always the case
- The reality in the interpretivist paradigm is socially constructed between the researcher and the research phenomena therefore the generalisation of research findings becomes difficult to achieve
- The close investigation in interpretive paradigm has also been viewed as allowing biases to find a way in (Gale and Beeftink 2005)

3.11.5 Critical Postmodernism

This paradigm is a combination of two rather contrasting views of the world, namely critical theory and postmodern scholarship (Gephart 1993). The former is founded on the German tradition of philosophies and political thought of Marx, Kant, Hegel and Max Weber. As a tradition, it was developed by the Frankfurt school. Postmodernism as a school of thought is partially the result of work by French Intellectuals in the form of Lyotard, Derrida and Foucault (Gephart 1993). The two theories are viewed more as platforms for intellectual movements rather than specific theories and according to an aforementioned study (Reeves and Hedberg 2003), Critical Postmodernism's milder approach has given it momentum to

grow as a field beyond the supposedly radical postmodernism. The paradigm seeks to bring about educational reform and acts as a force of liberation that is in constant conflict with the powers of oppression.

Critical research aims to be an emancipatory tool that eliminates the cause of unwarranted alienation and domination and in the process, enhance opportunities for realising human potential (Hirschheim and Klein 1994). 'To make this possible, critical theorist assume that people can consciously act to change their social and economic conditions. They do however recognise that human ability to improve their conditions is constrained by multiple forms of social, cultural and political domination as well as natural laws and resource limitations (Klein and Myers 1999). Critical scholarship can also be viewed as aiming to transcend taken for granted beliefs, values and social structures by making them visible through encouraging self-conscious criticism as well as through the development of emancipatory consciousness in scholars, members of society in general (Kincheloe and Mclaren 2000). The critical theory seeks to deconstruct the "hidden curriculum" or text and search for the truth and understanding within the social context (Reeves and Hedberg 2003:33).

Strengths

- Multiple voices and local politics are favoured over meanings generated by elite collectives
- Viewed as the unifying doctrine of the academic left
- Deconstruction uncovers indeterminacies in modernist text

Limitations

- Content and Scientific results are shaped by local historical and cultural context
- Products of scientific enquiry must always be viewed as social constructions, and their validity is dependent upon the consensus of experts
- Scientific knowledge is just one story among many
- The best way to appraise scientific claims is through a process of political evaluation
- Science is characterized by its complicity in all the negative and oppressive aspects of modern history (Waalmsey 2003)

3.11.6 Research Paradigm interpretation

The research questions in this study seek to achieve direct observation of the level of consumer sophistication among urban mobile consumers on the basis of sociodemographic variables. As a result, a systematic and scientific approach was deemed necessary for this study. As aforementioned, the positivist paradigm lends itself to the use of quantitative methodology and becomes a natural choice as far as paradigm is concerned. Establishing the level of consumer sophistication counts as an attempt to measure a phenomenon, which is the basic objective of quantitative methodology (Johnson and Christensen 2008). Evidence to assertions made above can be derived from the systematic structure of the questions as follows:

1. What is the relationship between gender and the level of consumer sophistication among urban mobile consumers in Botswana?
2. What is the relationship between age and the level of consumer sophistication among urban mobile phone consumers in Botswana?
3. What is the relationship between level of income and the level of consumer sophistication among urban mobile phone consumers in Botswana?
4. What is the relationship between level of education and the level of consumer sophistication among urban mobile consumers in Botswana?
5. What are the characteristics of urban mobile phone consumers in Botswana?

3.11.7 Rejection of other Paradigms

Interpretivist Paradigm

The interpretivist paradigm seeks to explore social explanations behind phenomena, and despite this study employing sociodemographic analysis, the multiple realities that often arise in interpretivism made it incompatible for this study. The relationship between the researcher and the phenomenon being is another reason the interpretivist approach was disregarded.

Having existed with the context of this research and lived the reality, it was imperative that the researcher adopt a paradigm that would detach him from the phenomena and eliminate any intimacy and potential bias. Due to interpretivism's dependence on the agreement between the researcher and the participant as a determination of adequacy, it would have proven counterproductive to the objectives of this study to adopt an interpretivist approach. It was therefore on the basis of the aforementioned conditions that the interpretivist paradigm was rejected.

Critical Postmodernism

There are some parallels that can be drawn between the approach adopted by this study and critical postmodernism. For example, on the basis of other views (Foucault 1997) postmodernism scholars believe that formation of discursive texts is inseparable from power. The language that defines "manager" gives power to one group and takes it away from the other (Waalmsey 2003). The argument that then ensues is that power then resides in the demarcations and systems of discourse that sustain them. In the case of this study "consumers" are therefore held to the task of consuming and "service providers" and "regulators" decide their fate, even if ill-informed. Whoever created the discourse has already apportioned less power to the consumer and the text continues to assert that inferiority vis a vis regulators and service providers. However, the inability of the critical postmodernism paradigm to quantify consumer sophistication on the basis of sociodemographic variables meant it was disregarded as the appropriate philosophy for this study. A decision that neither renders it inferior nor confirm superiority of the selected paradigm.

3.12 Ethical considerations

Three key principles form the corner stones of research ethics, namely, autonomy, beneficence and justice. The researcher took these principles aboard during both the collection and the analysis of data throughout this study. All these considerations were made during the course of this study in an attempt to provide a humane research environment as well as to strengthen the validity of the results. There were a number of ethical issues that had a bearing on research participants in this study. These issues include socio-demographic characteristics, behavioural as well as psychographic factors. Ethical consideration must also

be extended to the methods employed in both data collection and data analysis. Even though strides have been made on equality, Botswana still remains a largely patriarchal society (URL 30). For example, even though men and women have equal opportunities to join politics and be voted into positions of power, only a few women get to these positions and in general Batswana would still predominantly vote for a man than a woman. The primary researcher for this study is male and therefore, even though the study was voluntary, such deep seated bias might have played a role in influencing the respondent's choice to participate. This issue was counter-balanced by the presence of female research assistants whenever possible.

Another issue is in relation to the level of education. As a developing country, the level of education one has attained is still viewed as an indicator of social class and is very much associated with the economic status of an individual. In a pen and paper setting the participant would have felt under pressure to note down their accurate level of education in the presence of the researcher, or having to hand in the paper after completion would have been difficult as the element of anonymity is erased. In anticipation of this, and to mitigate the problem, the researcher employed the assigned device approach. With the tablet the respondent could stand a few feet away from the researcher as they completed the survey and only call for attention if they sought clarity. Upon completion they clicked "submit survey" and the application then returned to the home page, which meant they did not have to attempt concealing any information for fear of their anonymity being compromised.

Another issue taken into consideration was that of Power Distance in relation to socio-economic status. Power Distance is defined as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" (Hofstede 1993:28). Applying this to the context of the research, the power distance can be viewed or described by the extent to which respondents believed that those who are more educated have disproportionate amount of power. In this case both research assistants and the researcher were graduate school students. Care was taken in this regard to explain thoroughly the aims of the study and its voluntary nature with the issue of power distance in mind. In this scenario, the power distance between the researcher and the respondent had the ability to influence their answer. The greater worry was a scenario where the respondent issues answers that they believe would be appealing to the research assistant rather than an honest reflection of their thoughts.

Respondents as mentioned were from varying socio-demographic backgrounds and those were taken into consideration in data handling. For example, in the case of outliers, when cleaning up the data, the researcher was mindful of the diversity so as to not mistakenly eliminate valid entries as outliers.

3.13 Summary

The chapter provided an overview of the mechanics of the study. It outlined the purpose of the study and the research questions. The formulation of the research hypotheses was also presented in this topic as well an explanation of both the dependent and the independent variables. This chapter touches extensively on theoretical considerations as well as making a case for the positivist paradigm, and the reasoning behind the rejection of other paradigms. The latter part of the chapter explained the data management, analysis and procedures used to test the hypotheses proposed in the study.

CHAPTER IV RESEARCH STUDY FINDINGS AND DISCUSSION

4.0 Introduction

"The results section is where you report the findings of your study based upon the methodology [or methodologies] you applied to gather information. The results section should simply state the findings of the research arranged in a logical sequence without bias or interpretation. A section describing results [a.k.a., "findings"] is particularly necessary if your paper includes data generated from your own research" (Labaree 2009:63). The first part of this chapter only presents the outcome of the research whilst avoiding the urge to delve into interpretation and analyses. Primary data was generated in this research therefore its essential to dedicate a section to reporting such data before proceeding to offer analysis and eventually answers to the research questions

The goal of this study was to reveal a need for a demand-side multi-dimensional approach to formulating both marketing and public policy strategies targeted at mobile technology consumers in Botswana. In order to pursue that goal, an examination of the correlation between socio-demographic status and level of consumer sophistication was examined. Before a presentation of the findings of the study, this chapter presents descriptive statistics on the basis of the independent variables being gender, age, education and income. Simultaneously the chapter touches on the contextual background of each variable as far as Botswana is concerned, giving the reader a more comprehensive understanding of the study environment and how it potentially informs the responses of participants and by extension the findings of the study. Analysis of variance and t-tests were used to examine 7 major hypotheses that answer research questions 1 to 4. A K-means cluster analysis was then performed to come up with a matrix model to segment consumers into groups according to their level of consumer sophistication. The segmentation analysis was used to reveal characteristics of urban mobile consumers and in the process, provide answers for research question 5. The study also presents the conceptual model of variable interaction in its three-layered form of how consumer sophistication variables interact with sociodemographic variables, as well as how segments emerge in order to reveal findings of this study.

Survey and questionnaires have proven effective as data collection instruments over the years. To gain insights however, we have to subject the data to analysis and the choice of technique

as far as analysis is concerned therefore becomes imperative. This study employed three major statistical analysis tools: Analysis of Variance (ANOVA); t-test; and K-Means cluster analysis to develop a matrix model. The metric data in this study was collected through the use of a 5-point Likert scale and therefore that leads us to analysing differences in average scores between respondent groups as identified on the basis of sociodemographic variables. An example is the comparison of two groups at a time such as men vs women or college graduates vs non-college graduates, a case which calls for the use of a t-test in order to assess the significance of any differences. In a case that involves more than 2 groups subject to analysis, the situation calls for the use of ANOVA or other non-parametric techniques.

The Analysis of Variance or ANOVA allows the researcher to determine if there is statistical significance to the differing mean values between three or more groups. According to recent work (URL 31), ANOVA is particularly useful when analysing the multi-item scales common in market research. For purposes of this study, employing ANOVA as a technique in analysis means we assume the null hypotheses to be that there is no difference in the level of consumer sophistication among whatever select number of group under investigation. In order to establish statistical significance, ANOVA uses the F-test to determine whether the variance in the responses to a variable of consumer sophistication is large enough.

It must be stated that ANOVA only indicates whether or not there is statistical significance, it does not reveal the direction in terms of which group is higher or lower than the other. The researcher therefore used Statistical Package for the Social Sciences to perform post-hoc analysis that allowed him to compare groups for individual differences.

"The proper use of ANOVA in analysing survey data requires that a few assumptions be met including normal distribution of data; independence of cases and equality of variance (each group's variance is equal). If these assumptions cannot be met, then there are non-parametric tests available which do not require these assumptions. Data by itself is just that. However, when we judiciously employ statistical tests we can create insight that can have a positive impact on our marketing efforts" (URL 31).

The following is a summary of the sociodemographic data that was gathered from each respondent and it includes gender, age, income and education. As stated before the majority of the respondents were male (55.7%) as compared to female (44.4%).

4.1 Background on Gender Issues in Botswana

Gender as a factor in consumption runs deeper than meets the eye. In fact, the dual legal system in Botswana has been put on trial multiple times when it comes to gender related matters. Botswana operates under an indigenously based customary law, as well as the constitution, which is largely an inheritance from former colonial powers. Customary law was founded on different tribal practices found in specific tribes around the country, and because often times one tribe rejects practices of the other and vice versa, a lot of it remains unwritten and is practiced on the basis of interpretation by Dikgosi (local traditional rulers/chiefs). It is safe to say customary law was very much in favour of men and perpetuated discrimination against women. There has been notable political will to introduce gender mainstreaming from the national policy on Women and Development in 1996 to the compilation of a disaggregated gender database for senior management positions in both the public and private sectors. These initiatives are nowhere near enough to correct what is viewed as a long history of disadvantage for women.

Personal and property rights affected by customary law in the past included the issue of marriage and inheritance. Mokomane (2004) notes in the case of married parents under customary law (when separated/divorced), that child custody is traditionally granted to the father's family and the mother in this case is offered visitation rights only. Inheritance rites generally favour male children (and their male descendants) under customary law, even allowing for the entire disinheritance of female children. Multiple cases of elderly women being disinherited of their family land by the male children of deceased brothers have been reported in the previous decade (Cailleba and Kumar 2010). In addition, there is significant promotion and maintenance of male control over the nation's productive resources by underlying customary norms, primarily the land. Due to the fact that inheritance is organized through male lineage, this further excludes women from gaining control of the land (Mokomane 2004). The dominant male perspective is institutionalized in much of Botswana's society, as noted through various research studies over the past two decades. One

such study, undertaken in 2012, focused on analyzing 25,110 news articles and concluded that, "news in Botswana, through various media channels, was primarily delivered through the voices and perspectives of men. Few women sources are quoted in reports, other than stories related to issues such as gender violence. Female journalists are only allowed to cover a limited number of issues, including for example, entertainment and the courts. Such a strong male influence on public views is likely to result in biased reporting and continues to reinforce gender stereotypes in Tswana society; it clearly indicates that despite changes in common law, gender inequality remains strong in practice, especially in more traditional and rural areas" (Cailleba and Kumar 2010:333-334). The subordination of women is deeply ingrained in Tswana society and perpetuated by both men and women. Gender inequality, particularly in rural or remote area remains prevalent, women are underrepresented in politics and feminist organization struggle with establishing and achieving their objectives regarding women's empowerment (Cailleba and Kumar, 2010).

The issue of gender inequality is not unique to Botswana, in fact the reason why it is a core factor in market segmentation theory is because of the varying levels of inequality across the globe. As highlighted in previous sections of this study, corporations continue to analyse and segment markets on the basis of gender due to the varying societal roles when it comes to gender in specific cultures across the world. This analysis of gender on the basis of consumption in the context of Botswana reveals the influence it has on the level of consumer sophistication.

Table 3 Participants' Gender

Gender	Frequency	Percentage
Male	171	55.7
Female	136	44.3
Total	307	100

Source: Author's Drawing

4.2 Background on population age structure in Botswana

The African continent is home to the youngest population compared to other continental regions. It is reported that in 2010, 70% of the region's total population was under the age of 30 (URL 32). People in the age-range 15-24 formed just over 20% of the entire continent's population. This presents both challenges and opportunities. The predominant presence of youth has the potential to be a great driver of Africa's development, but with challenges such as unemployment continuing unabated, it could also be a recipe for unrest as frustrations continue to mount.

Botswana is no different when it comes to the youthfulness of its general population: 32.9% of Botswana's population fall within the range of zero to 14 years of age; 21.6% are between the ages of 15 to 24 years of age; 37% range in age from 25 to 54 years; only 4.4% fall in the category 55-64 years; and lastly 4% make up the 65 years and over category. Even though the birthrate stands around the 24.8 mark at the moment, latest figures (Statistics Botswana, 2011) projects a decline to about 19.9 in 2031. That will however be complemented by a death rate decline from the current 11.9 to about 7.6 in 2031. This development will result in a slight decline in natural increase/growth rate from the current 1.29 to 1.23. Infant mortality rate is also expected to decline from the current 30.08/1000 to about 11.2/1000 by 2031.

Socioeconomic issues at the national level are affected by age structure of a population, for example a young nation anticipating a high percentage of school going children must make strategic investments towards the education of those children. Conversely, a nation with an ageing population such as Japan, has to make increased investments towards the health sector in order to care for senior citizens.

The concept of age in technology adoption and consumer sophistication has been addressed more extensively in previous sections of this study, and the role of age in relation to market segmentation theory has also been cited before. As a young nation, age is key in determining the sophistication levels of consumers in Botswana, and findings of this study confirm this. The table below shows the age profile of the population surveyed. 47.2% of the respondents reported being between the ages of 26 and 35, whilst data was collected from only 6 people over the age of 55.

Table 4 Participants' Age

Age- range	Frequency	Percentage
16-25	115	37.5
26-35	145	47.2
36-45	30	9.8
46-55	11	3.6
over 55	6	2.0
Total	307	100%

Source: Author's Drawing

4.3 Background of education structure in Botswana

Preschool education is primarily designed to cater for children between the ages of zero and six. It comprises mainly of activities geared towards early childhood stimulation. These can be broken down into the following categories: baby care (0-2 & a half years); day care, nursery or play school (2 & a half to 4 years); as well as pre-primary education (4 – 6 years). Education at this level is found in private day care centres. These facilities used to be largely found in urban centres, but according to UNESCO (URL 33) about 59.5% of them were found in rural areas since approximately 1997.

Primary education marks the first stage of what is a ten-year basic education program. The entrance age for this stage was previously 7, but following the 1996 amendment made on the revised national policy on education, children can enter primary school in the January following their 6th birthday. The primary school leaving examination (PSLE) is undertaken by all pupils at the end of standard(grade) seven. The minimum entry requirements for one to sit for these exams is 6 years in public schools or 5 years for private schools. The maximum entry for the PSLE is ten years but it must be noted that in instances of unique circumstances, for example children in remote areas who may have exceeded ten years of primary school,

special allowances are made to grant such a student an opportunity to complete their primary school level. Thus, allowing these students to continue to advance in their education.

Secondary education in Botswana is broken down into two phases. The first part is a three-year junior secondary school program, which completes the ten-year basic education program. The examinations conducted for the completion of the junior secondary school program are known as Junior Certificate (JC) Examination. It must be noted that unlike the automatic progression from Primary School to Junior Secondary School, progressing to the next phase is on the basis of the student's performance. Following that is a further 2-year Senior Secondary School program. The examinations conducted in this phase are Cambridge Overseas School Certificate Examinations and the GCE O-level examination. This qualification grants one access to tertiary education and higher education. The three-year Junior Secondary Education was reintroduced in 1996 following its abolishment in the 1980's.

"According to the UNESCO Institute for statistics, in 2005 the total enrolment at the secondary level (including lower secondary) was estimated at about 169,000 students, mainly enrolled in general programs (93%). The gross enrolment ratio was 79% and the net enrolment ratio was estimated at 56%. It is estimated that some 10% to 15% of school going age children are still not in schools, the majority of whom are children with disabilities, those with learning difficulties, orphans, child labourers and street children, girls, remote area dwellers and those from poor families" (URL 33).

The tertiary education system is largely dependent on the institution and therefore the nature and structure of various programs available. After decades in which the University of Botswana (UB) was the sole recognizable institution of higher learning in the country, the past ten years has seen an emergence of multiple tertiary institutions with capacity to offer up to degree programs and even higher. Among these are Botswana International University of Science and Technology (BIUST), Limkokwing University of Creative Technology, Botho University, Botswana Accountancy college (BAC) and Ba Isago University, representing a mix of public and private institutions. At the present moment, full-time Masters and PhD studies are only offered by the University of Botswana as well as the Botswana International

University of Science and Technology. Through partner programs with overseas universities such as Derby and Sunderland, one can enrol for part-time Master programs with local institutions among them Botswana Accountancy College and Botswana College of Distance and Open Learning (BOCODOL).

"The first National Policy on Education of 1977 endorsed the philosophy of 'Education for *Kagisano',* which means education for social harmony. Based on the four national principles of democracy, development, self-reliance and unity, social harmony is an important factor for the society of Botswana. In this context, an ideal education system would be one that can be instrumental in the production of a society whose characteristics reflect the national principles, a society in pursuit of the national ideal of social harmony" (URL 33).

In summary, sociodemographic variables are key components of the market segmentation theory adopted by this study. By extension, the importance of analysis in relation to education in the context of Botswana cannot be emphasized enough. Prior sections of this study have indicated this importance in the global context by way of reviewing and revisiting bodies of work around this theme. Since the founding of Botswana as an independent republic, education has been one of the most central issues, beyond the notable expenditure over the years, it has also continued to shape society and influence thinking. Findings of this study will also reveal how it is also a key component of to consumer behaviour in Botswana.

The table below summarises the educational profile of the respondents. A large number of them (38.1%) indicated having completed a bachelor's degree and only 3.9% of them indicated having completed Junior secondary school or lower. Botswana enjoys comparatively higher level of literacy in the region, and education grants and loans are readily available for every citizen who enters a tertiary level institution locally.

Table 5 Participants' Education Level

Education level	Frequency	Percentage
junior secondary school and lower	12	3.9
senior secondary school	47	15.3
vocational school/junior college/technical college/certificate	25	8.1
Diploma	64	20.8
bachelor's degree graduate school	117 42	38.1 13.7
Total	307	100%

Source: Author's Drawing

4.4 Background of income structure and distribution in Botswana

Despite a phenomenal GDP growth recorded between the years of 1966 to 2002, Botswana remains one of the most unequal societies in the world. During the aforementioned 36-year period, the economy registered an average annual growth of 9%, the highest in the world for that period. This saw a rise in the per capita income from $293 to $3516. Another notable statistic is the reduction of poverty levels from about 59% in the financial year 1985/86 to 30% in the year 2002/03. The poverty levels have continued to decline to about 20% in the year 2010 (Okatch 2015). The greatest concern however is the continued increase of the Gini coefficient, which stood at 0.537 in 1993/1994 financial year but rose to 0.573 in the year

2002/03. The Gini Index "measures the extent to which the distribution of income (or in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total incomes received against the cumulative number of recipients, starting with the poorest individual or household. The Gini Index measures the area between the Lorenz curve and a hypothetical line of absolute quality, expressed as a percentage of the maximum area under the line. Thus, a Gini Index of 0 represents perfect equality, while an index of 100 implies perfect inequality" (URL 10). With respect to Botswana, The Gini index is currently reported at 0.645 by statistics Botswana, which demonstrates a continuously widening chasm between the upper, middle and lower class (Okatch 2015).

Through employing a regression based inequality decomposition approach Okatch (2015) sought to establish the determinants of income inequality in Botswana using the 2002/03 Household Income Expenditure Survey (HIES). In summarizing the findings, the determinants were categorized into three major groups. The firs group was made of variables that make a positive and significant impact to income inequality namely; Secondary school education; training; number of paid employees per household; as well as the number of children in the household. The second group of variables were those that had a positive but minimal impact on income inequality such as; the sector in which one is employed; whether the household resides in an urban area; as well as whether the household is headed by a male. The last batch of variables were those that equalise income, among them being; primary education; age; owning between 1 and 10 cattle as well as social safety nets. Another factor that proved significant in contributing to income inequality in Botswana was wages.

There is evidence of inequalities in earnings according to citizenship and economic activity from as way back as 1990. There are notable disparities when one makes a comparison between citizens and non-citizens in terms of monthly earnings. Past research (Malema, 2012) reveals that in 1990, non-citizens reported incomes that were more than five times what the citizens earned at P2458.00 and P448.00 respectively. The higher earnings of non-citizens is actually reflective in all industries. In all the years taken into account (1995-2009), non-citizens have earned far more than what the citizens earned in the public, private and parastatal sectors. For the 15-year period of this study, non-citizens have on average earned at

least three times what citizens have earned. Given that citizens are a majority in this country, the wage differentials are most likely to have adverse effect and perpetuate poverty among the citizen community. What this translates into is a lower living standard than if the majority earned relatively higher than minority, a scenario that would see improved living standards. (Malema, 2012).

Income is central to consumption and therefore it is a key component when formulating marketing strategies. Market segmentation theory leans on income as a determinant of marketing approaches especially targeted marketing and selection of products and services. This study uses income to determine the levels of consumer sophistication among urban mobile technology consumers and these findings will be used to make recommendations for both public and corporate policy. Chapter 2, Literature Review, of this study provides extensive coverage of how and why income has been used as one of the major variables, especially in market segmentation analysis.

Table 6, below shows a summary of the respondents` monthly income. The largest group 30.9% reported earning between 1 and 3000 Pula. 11.7% reported no income while 12.1% reported earning in excess of 18000 Pula.

Table 6 Participants' Income

Income	Frequency	Percentage
no income	36	11.7
1-3000 Pula	95	30.9
3001-6000 Pula	33	10.7
6001-9000 Pula	31	10.1
9001-12000 Pula	36	11.7
12001-15000 Pula	21	6.8
15001-18000 Pula	18	5.9
more than 18000 Pula	37	12.1
Total	307	100%

Source: Author's Drawing

4.5 HYPOTHESIS 1: GENDER

Table 7 H1d Descriptive Statistics

Gender	N	M	SD	SK	KUR
Male	171	4.33	.716	-1.63	3.09
Female	136	4.03	1.03	-1.002	.235

Source: Author's Drawing

H1d the statement used to assess IP vigilance was," I always go for authentic than counterfeit mobile phone products" The 5-point Likert scale ranged from "Disagree strongly" to "Agree strongly"

The hypotheses sought to establish a relationship between the consumer's gender and the variable Intellectual Property vigilance, whose statement is explained above. Male consumers (N = 171) were associated with a numerically higher mean of M = 4.33 (SD = .846), while the female consumers (N = 136) were associated with a numerically lesser mean of M= 4.03 (SD = 1.032). An independent t-test was employed to test the hypothesis that the gender of the mobile technology consumer is associated with their IP vigilance in a statistically significant way. The assumption of normality was satisfied as groups displayed a Skew and Kurtosis less than |2.0| and |9.0|. The result of Levene's test satisfied the assumption of the homogeneity of variance with F (305) = 1.87, p = .172. The t-test results then revealed a statistically significant association at (305) = 2.78 p= 0.06. The result confirms the hypothesis that male consumers are more likely to possess higher IP vigilance than their female counterparts.

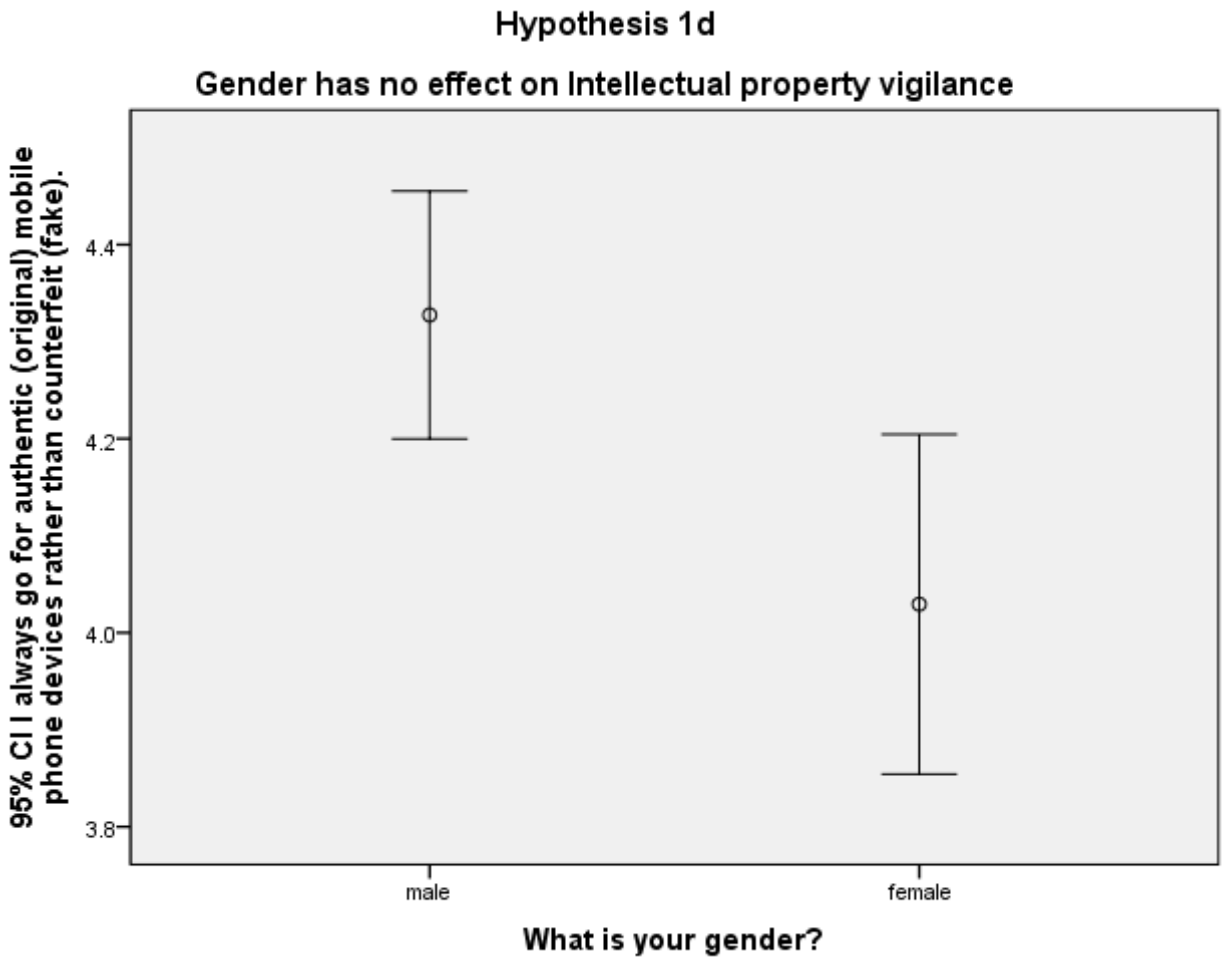


Figure 7 Hypothesis 1D

Source: Author's Simulation

Table 8 Hypothesis 1e descriptive statistics

Gender	N	M	SD	SK	KUR
Male	171	2.92	1.18	.083	-.980
Female	136	2.68	1.17	.489	-.804

Source: Author's Drawing

This hypothesis sought to establish the relationship between consumer gender and the variable Product knowledge. As the descriptive statistics indicate on the table above, male consumers (N = 171) were associated with a numerically higher mean (M = 2.92), whilst female consumers (N = 136) were associated with a numerically lesser mean (M = 2.68). In order to test for a statistically significant association between gender and the level of new

product knowledge, an independent t-test was undertaken. Both groups displayed Skewness and Kurtosis less than |2.0| and |9.0| respectively, and therefore the assumption of normality was satisfied. The test for homogeneity of variance was satisfied by Levene's F Test F (305) = .142, p = .706. The t-test revealed a statistically significant association by t (305) = 1.83, p = 0.068. It is therefore safe to reject the null hypothesis and conclude that there is a difference between the means and that male consumers possess a higher level of knowledge when it comes to new mobile phone products as compared to their female counterparts.

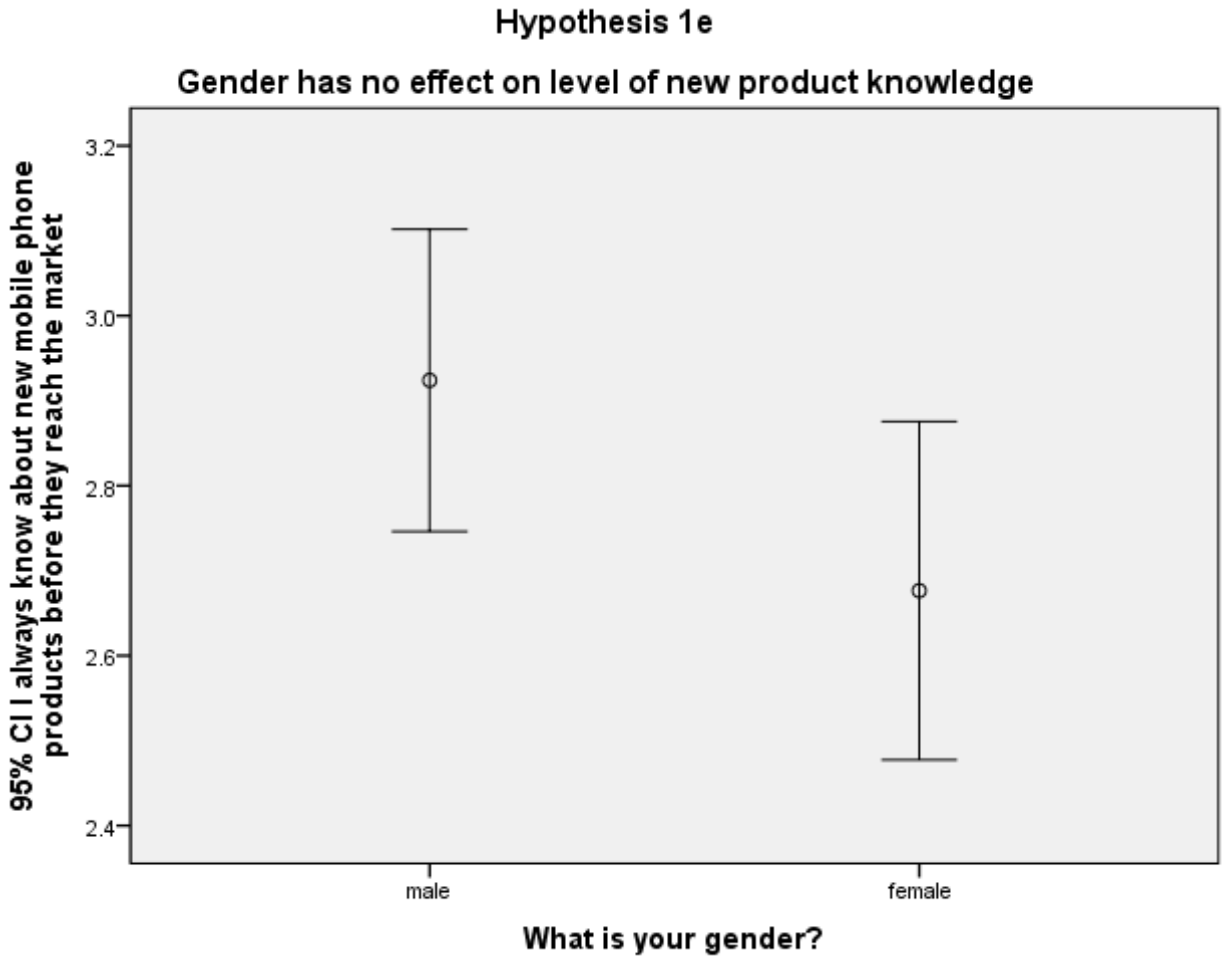


Figure 8 Hypothesis 1E

Source: Author's Simulation

4.6 HYPOTHESIS 2: AGE

Table 9 H2a Descriptive Statistics

Age Group	N	Mean	Standard deviation	Skewness	Kurtosis
16-25	115	3.96	1.23	-.18	-1.2
26-35	145	4.06	1.14	-.05	-1.17
36-45	30	3.77	1.16	-.37	-1.47
46-55	11	4.09	1.29	-.726	-.422
Over 55	6	3.00	1.64	.811	-1.03

Source: Author's Drawing

Table 8 represents descriptive statistics associated with the level of information orientation in 5 age categories of urban mobile consumers in Botswana. What emerges is that the 46-55 age group (N = 11) is associated with a numerically higher mean of M = 4.09 and the over 55 age group (N = 6) is associated with numerically the lowest mean of M = 2.47. To test the hypothesis that the age group one belongs to, has an effect on their level of health awareness, a one-way ANOVA was performed. Before the ANOVA an evaluation of the assumption of normality was undertaken and determined to be satisfied as all five groups displayed Skewness and Kurtosis less than |2.0| and |9.0| respectively. Following that a levene's F test was performed to test for homogeneity of variance and satisfied by, F (4, 302) = 2.87, p = .23

The ANOVA test yielded a statistically significant result. f (4, 302) = 2.05, p = 0.087, n^2 = .610. This therefore means that we reject the null hypothesis that age has no effect on the level of information orientation. The results also confirm that 61% of the variance in information orientation is accounted for by Age. A Post Hoc LSD test was also performed to establish the difference between the various means. The difference between the oldest group

(Over 55) and the other groups (16-25, 26-35, 36-45 and 46-55) was statistically significant (p= .022, p= .011, p = .086 and p = 0.036). Therefore, a conclusion can be drawn that consumers over the age of 55 display lesser information orientation when purchasing mobile phone devices than consumers in age groups under the age of 55.

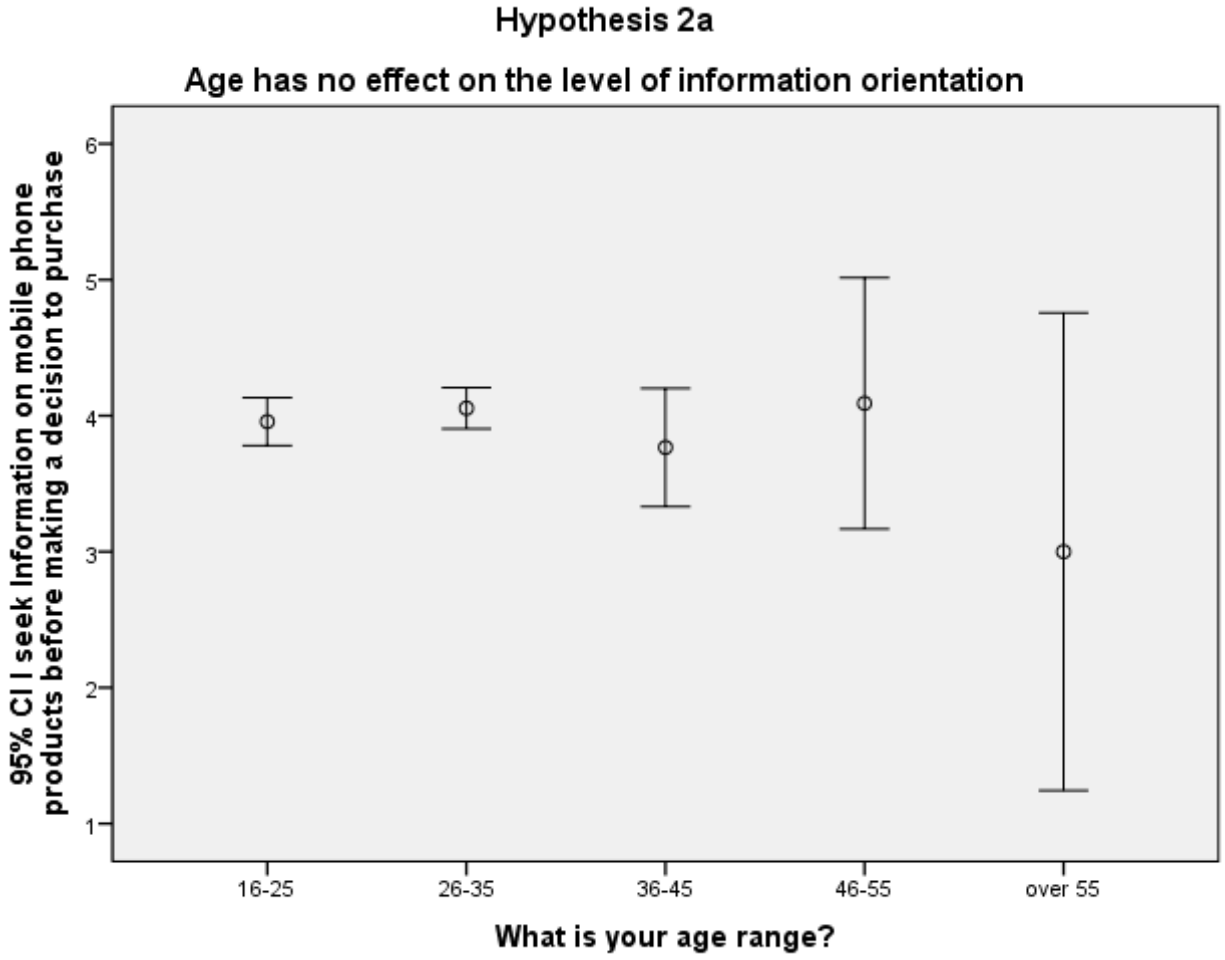


Figure 9 Hypothesis 2A

Source: Author's Simulation

Table 10 Hypothesis 2e Descriptive Statistics

Age Group	N	Mean	Standard deviation	Skewness	Kurtosis
16-25	115	2.69	1.14	.424	-.729
26-35	145	2.99	1.19	.077	-1.11
36-45	30	2.87	1.20	.144	-.741
46-55	11	2.27	1.27	1.16	.903
Over 55	6	2.33	.753	.313	-.104

Source: Author's Drawing

The statement of measure for variable new product knowledge was "I always know about new mobile phone products before they reach the market."

The table above presents descriptive statistics for levels of new product knowledge in five age group categories of consumers. The results reveal that the second youngest group (26-35) is associated with the numerically highest mean (M= 2.99) whilst the second oldest group (46-55) is associated with numerically the lowest mean (M = 2.27) in terms of knowledge about new mobile phone products. In an attempt to test the hypothesis that the age group one belongs to, has an effect on their level of new product knowledge a one-way ANOVA test was performed. To proceed with the ANOVA test, certain assumptions have to be satisfied. The assumption of normality was satisfied as all five groups displayed a Skewness and Kurtosis less than |2.0| and |9.0| (see table above). Another assumption tested for was the homogeneity of variance using Levene's F test, $F(4, 302) = .93$, $p = .448$.

The effect yielded from the one-way ANOVA proved to be statistically significant, $F(4, 302) = 2.80$, $p = .026$, $n^2 = .036$. This therefore means the null hypothesis of no difference between the means is rejected. The outcome also shows that 3.6% of the variance in the variable Productknowledge1 is accounted for by age groups. A Post Hoc LSD test was also performed to establish the difference between the various means. The difference between the oldest group (Over 55) and the three youngest groups (16-25, 26-35 and 36-45) was statistically significant ($p = .082$, $p = .018$ and $p = .049$). Therefore, a conclusion can be drawn

that younger consumers have higher knowledge about new mobile products as compared to older consumers.

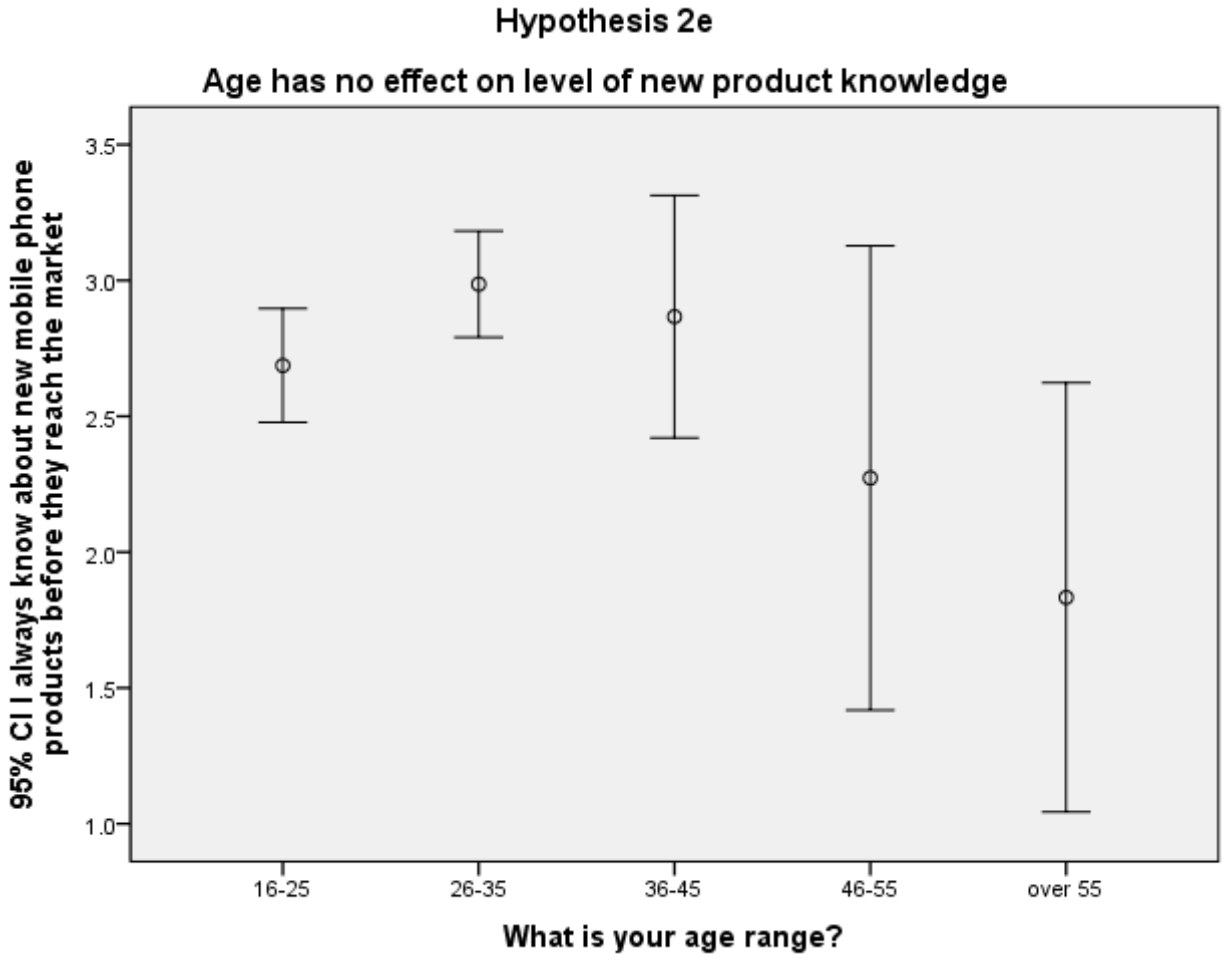


Figure 10 Hypothesis 2E

Source: Author's Simulation

4.7 HYPOTHESIS 3: INCOME

Table 11 H3e Descriptive Statistics

Income Group	N	Mean	Standard deviation	Skewness	Kurtosis
No Income	36	2.56	.877	.225	-.653
0-3000	95	2.68	1.13	.383	-.770
3000-6000	33	2.64	1.25	.753	-.582
6000-9000	31	2.81	1.28	.079	-1.38
9000-12000	36	3.44	1.18	-.409	-.765
12000-15000	21	2.81	1.17	-.10	-.966
15000-18000	18	2.83	1.20	.357	-.581
Over 18000	37	2.95	1.290	.106	-1.125

Source: Author's Drawing

The table above shows descriptive statistics of variable new product knowledge against income level. The statistics reveal that consumers with no income (N = 36) were associated with the lowest mean (M= 2.56) while consumers earning 9000- 12000 Pula (N= 36) were associated with the highest mean (M = 3.44). In order to test the hypothesis that the level of consumer income has a statistically significant bearing on their level of new product knowledge (Productknowledge1), a one-way ANOVA was performed. As indicated on the table above all groups displayed Skewness and Kurtosis of less than |2.0| and |9.0|repectively, therefore the assumption of normality was satisfied. The assumption of homogeneity of variance was tested and satisfied by Levene's F test, F (7, 299) = 1.44, p = .189.

The ANOVA test generated a statistically significant output with f (7, 299) = 2.10, p = 0.043, n^2= .047. We can therefore reject the null hypothesis and conclude that there is a statistically significant association between the level of income and the consumers' level of new product knowledge. The result also demonstrates that 4.7% of the variance in the level of product knowledge is accounted for by Income. A Post Hoc LSD test was also performed to establish the difference between the various means. The difference between the income group P9000-P12000 and the rest of the income groups was statistically significant (p= .001, p= .001, p

= .004, p = 0.026, p = 0.048, p = 0.070 and p = 0.069). Therefore, an interesting conclusion can be drawn that consumers in the 9000- 12000 income group display a higher level of information orientation than consumers in other income groups.

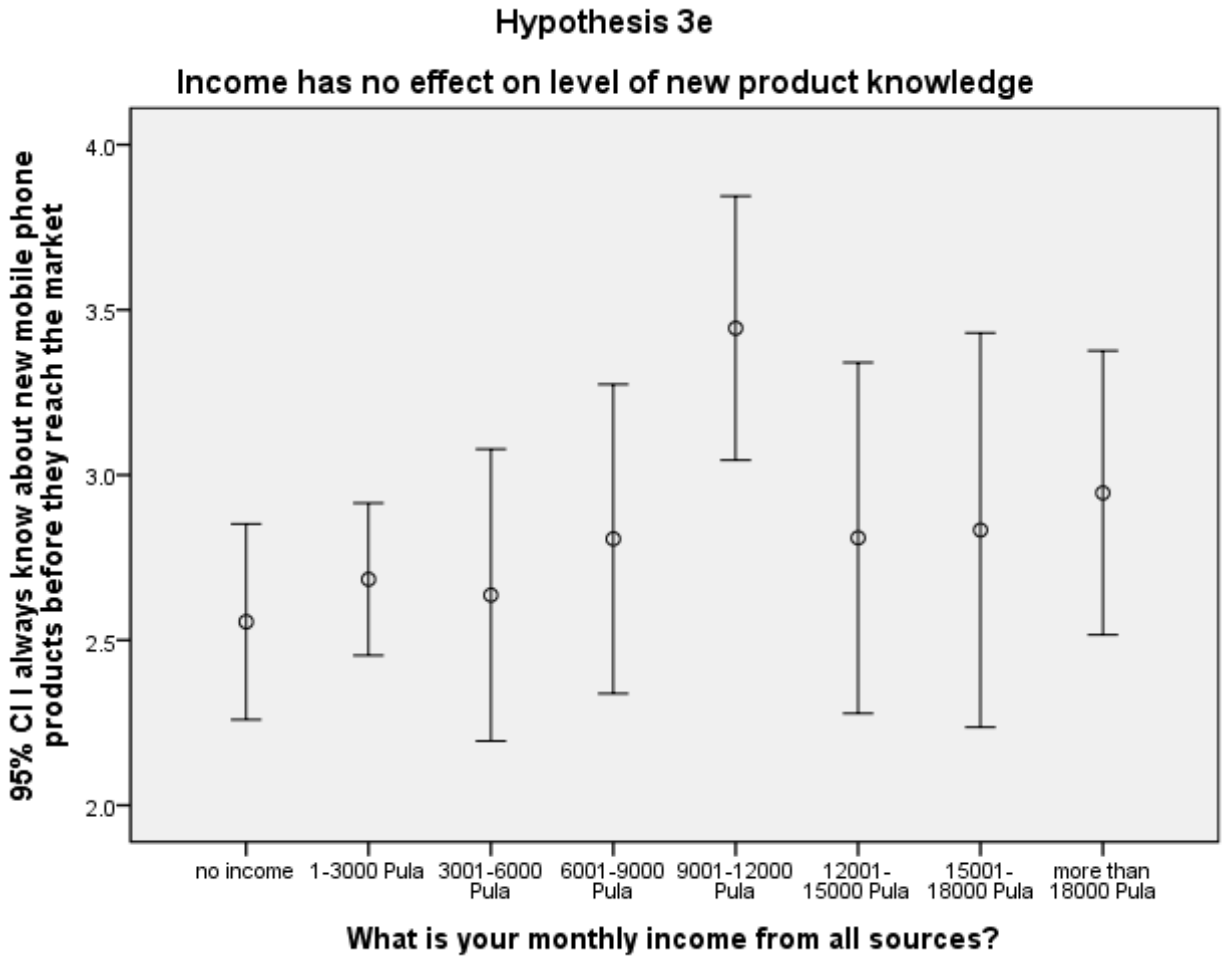


Figure 11 Hypothesis 3E

Source: Author's Simulation

Table 12 H3f descriptive statistics

Income Group	N	Mean	Standard deviation	Skewness	Kurtosis
No Income	36	3.17	1.11	-.351	-1.46
0-3000	95	3.21	1.53	-.308	-1.13
3000-6000	33	2.48	1.15	.237	-1.41
6000-9000	31	2.97	1.02	-.136	-.792
9000-12000	36	3.17	1.18	-.231	-.952
12000-15000	21	3.29	1.10	-.384	-.733
15000-18000	18	2.67	1.41	.390	-1.36
Over 18000	37	2.73	1.19	.247	-1.15

Source: Author's Drawing

Table 12 displays the descriptive statistics of hypothesis 3f. H3f sought to establish the relationship between Income and the level of health awareness among urban mobile consumers in Botswana. Consumers in the income bracket P 12000-P15000 (N = 21) were associated with numerically the highest mean of M = 3.29 whilst consumers in the income bracket 3000-6000 (N = 33) were associated with numerically the lowest mean of 2.48. To test the hypotheses that income has an effect on the level of health awareness, an one way ANOVA test was performed. All groups dispalyed Skewness and Kurtosis less than |2.0| and |9.0| therefore the assumption of normality was satisfied.The homogeniety of variance was tested using Levene's F test, F= (7, 299) = 1.58, p = 0.141. The effect yielded from the one way ANOVA proved to be statistically significant at f(7, 299) = 2.2, p = 0.034, n^2 = .822. This therefore means that the null hypothesis of no difference between the means is rejected and 82.2% of the variance in health awareness is accounted for by income groups. A Post Hoc LSD test was also performed to establish the difference between the various means. The difference between the group with the lowest mean (3000-6000) and four other income groups (no income, 1-3000, 9000- 12000 and 12000 - 15000) was statistically significant (p= .017, p= .002, p = 0.017 and p = .015). Therefore, a conclusion can be drawn that consumers in the 3000- 6000 income group display lower levels of health awareness compared to consumers in other income groups

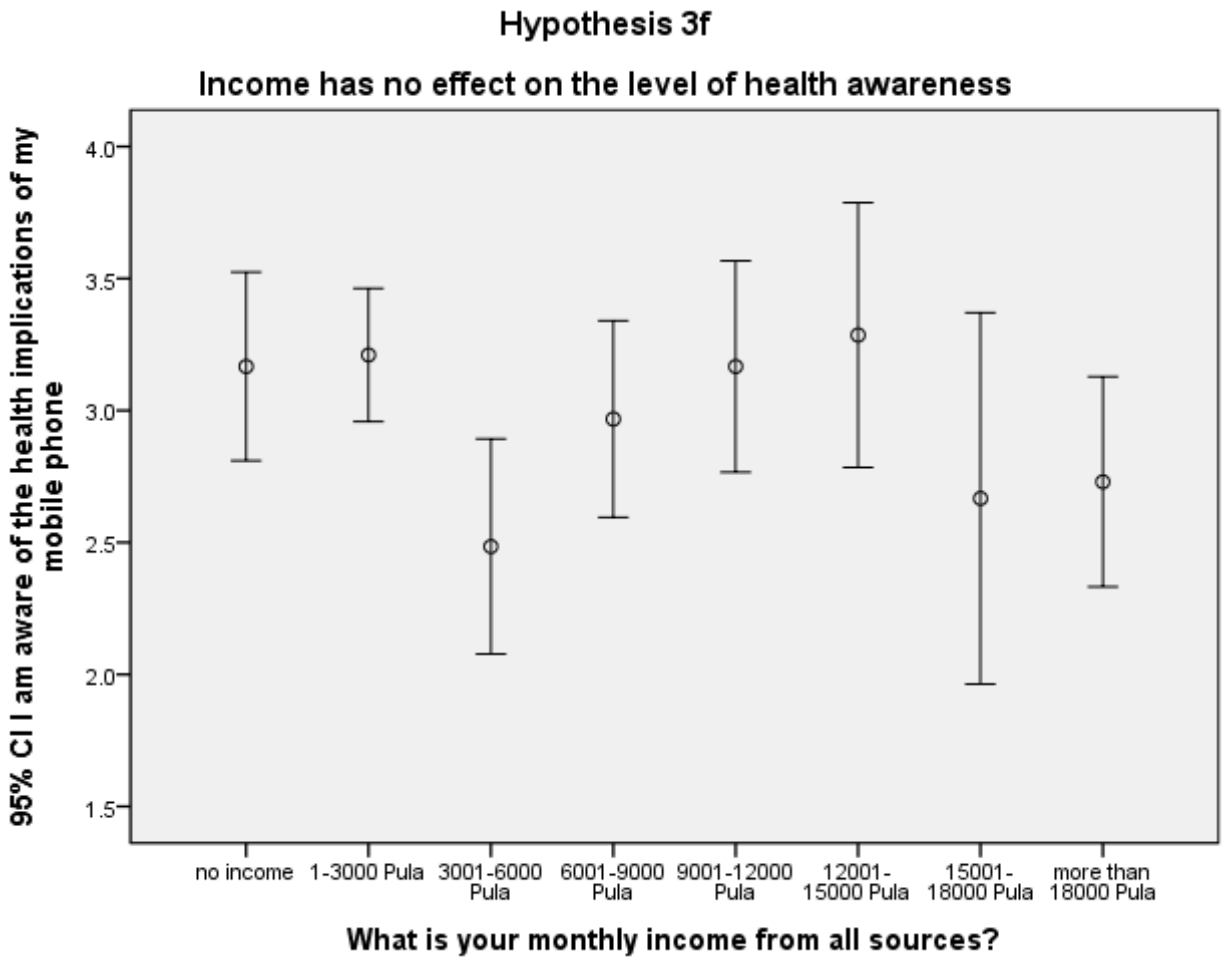


Figure 12 Hypothesis 3F

Source: Author's simulation

Table 13 H3g Descriptive Statistics

Income Group	N	Mean	Standard deviation	Skewness	Kurtosis
No Income	36	3.28	1.03	-.601	-.433
0-3000	95	3.13	1.12	-.438	-.918
3000-6000	33	2.36	.994	.606	-.669
6000-9000	31	2.97	.875	.065	-1.73
9000-12000	36	3.11	1.09	-.372	-.725
12000-15000	21	3.29	1.10	-.111	-1.361
15000-18000	18	2.61	1.24	.438	-1.07
Over 18000	37	2.78	1.16	.448	-.915

Source: Author's Drawing

Table 13 above displays the descriptive statistics of hypothesis 3g which sought to establish the relationship between income and the level of environmental awareness. Consumers in the income bracket P12000-P15000 (N = 21) were associated with numerically the highest mean of M = 3.29 whilst consumers in the P3000- P6000 bracket (N = 33) were associated with numerically the lowest mean at M = 2.36. To test the hypothesis a one-way ANOVA was performed. Before the ANOVA an evaluation of the assumption of normality was done and satisfied as all groups displayed Skewness and Kurtosis less than|2.0| and |9.0| respectively. The assumption of homogeneity of variance was tested using Levene's F test, F (7, 299) = 1.19, p = 0.308. This result means it was satisfied.

The ANOVA generated a statistically significant result, F (7, 299) = 2.95, p = 0.05, n^2= .93. On the basis of this result we therefore reject the null hypothesis that there is no difference between the means. The result also reflects that 93% of the variance in environmental awareness is accounted for by income. A Post Hoc LSD test was also performed to establish the difference between the various means. The difference between the group with the lowest mean (3000-6000) and five other income groups (no income, 1-3000, 6000-9000, 9000-12000 and 12000 - 15000) was statistically significant (p= .001, p= .001, p = 0.026, p = 0.004 and p = .002). Therefore, a conclusion can be drawn that consumers in the 3000- 6000

income group display lower levels of environmental awareness compared to consumers in all other income groups

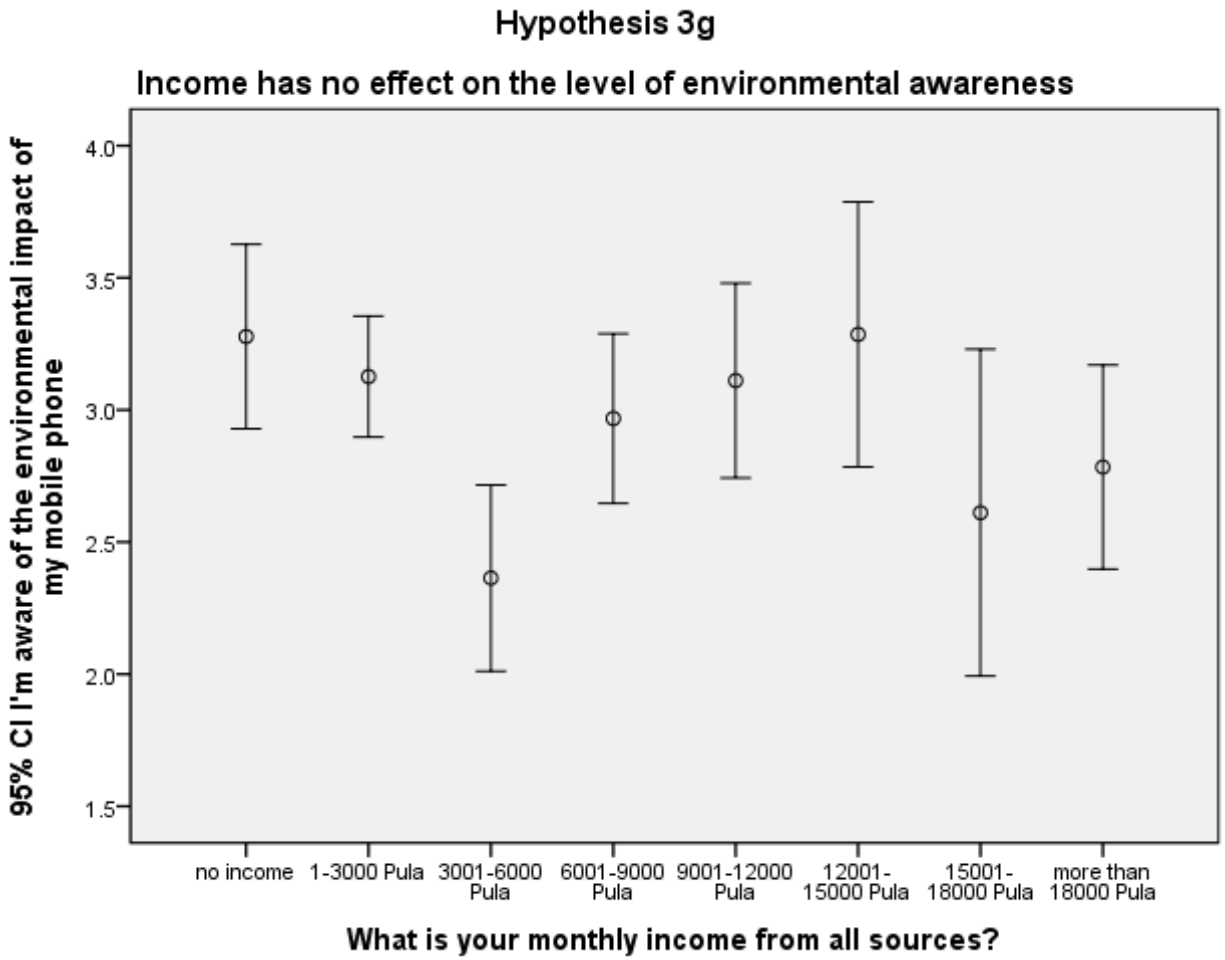


Figure 13 Hypothesis 3G

Source: Author' Simulation

4.8 HYPOTHESIS 4: EDUCATION

Table 14 H4c Descriptive Statistics

Education level	N	M	SD	Skewness	Kurtosis
Junior Secondary	12	3.75	1.55	-1.10	-.271
Senior Secondary	47	3.74	.943	-1.08	.894
Vocational School	25	4.00	.816	-.998	1.402
Diploma	64	4.09	.988	-1.418	-2.03
Bachelors	117	4.25	.655	-.680	1.05
Graduate School	42	4.21	.813	-.994	

Source: Author's Drawing

Table 4 provides the descriptive statistics related to this question. Consumers who have only gone as far as junior secondary school (N = 12) and senior secondary school (N = 47) are associated with the lowest numerical means M= 3.75 and M = 3.74 respectively. On the other hand, consumers who have completed bachelor's degree (N = 117) and some form of Graduate school (N= 42) are associated with the highest numerical means M= 4.25 and M = 4.21 respectively. In an attempt to test the hypothesis that the level of education the consumer has completed has a statistically significant association with their level of quality judgement (Brandquality2), a one-way ANOVA was performed. All sets of groups satisfied the assumption of normality because their skewness and Kurtosis fell under |2| and |9| respectively. The homogeneity of variance assumption was tested using Levene's test. $F(5) = 2.92$, $p = 0.02$. Due to the significance of the p value. The data was adjusted using Welch and Brown-forsythe, they gave p= .034 and p = .088 respectively, which allows us to proceed with the analysis.

The ANOVA test revealed a statistically significant association with t (5) = 2.72, p = 0.014. Therefore, the null hypothesis of no difference between the means is rejected. The result confirms a statistically significant association between the variable Quality judgement and level of education. The post hoc LSD revealed a statistically significant difference between bachelors' degree holders and the two least educated groups (junior secondary p = 0.056 and senior secondary p = 0.01).

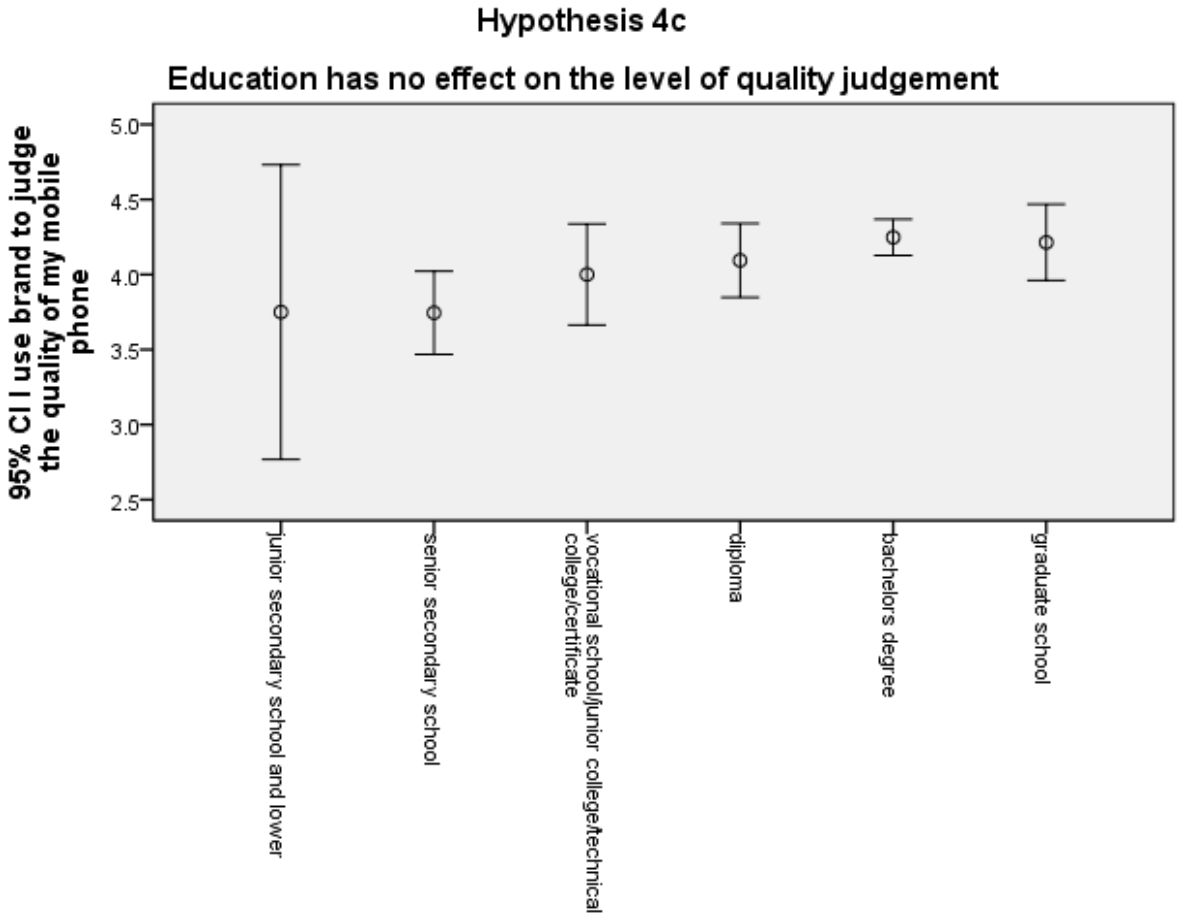


Figure 14 Hypothesis 4C

Source Author's Simulation

Table 15 H4d Descriptive Statistics

Education level	N	M	SD	Skewness	Kurtosis
Junior Secondary	12	3.75	1.36	-1.03	-.047
Senior Secondary	47	4.13	.924	-1.13	.748
Vocational School	25	3.84	1.15	-1.48	1.72
Diploma	64	4.27	.859	-1.13	.927
Bachelors	117	4.21	.918	-1.26	1.26
Graduate School	42	4.45	.832	-1.57	1.98

Source: Author's Drawing

The statement of measure for IP vigilance was "I always go for authentic products rather than counterfeit products". This was measured on a 5-point Likert scale.

Table 15, above is a representation of descriptive statistics associated with IP vigilance and education levels of mobile consumers in Botswana. As denoted in Table 3, the least educated group (junior secondary) was associated with a lower numerical mean of IPvigilance2 (M=3.75) and the most educated group (Graduate school) was associated with a numerically higher mean of IPvigilance2 (M = 4.45). In order to test the stated hypothesis that the level of education a consumer has completed has a statistically significant effect on their level of IPvigilance2, which is explained above, a one-way ANOVA test was performed. All six groups satisfied the assumption of normality as they displayed skewness and Kurtosis of less than |2| and |9|. A Lavene's test for assumption of homogeneity was also satisfied with the following F= (5, 301) = .856 p= .511.

The results from the ANOVA reveal a reveal a statistically significant association between the level of consumers' education and the variable IPvigilance2, f (5, 301) = 2.03, p= 0.074, n^2= .676. This therefore means that we reject the null hypothesis and conclude that the variable IPvigilance tends to increase as a function of education level. 67.6% of the variance in the variable IPvigilance2 was accounted for by the level of education. A post hoc LSD test revealed significance between the group with the highest mean (Graduate school, M = 4.45) and the two groups with the lowest mean (Junior secondary M = 3.75 and Vocational School M = 3.84).

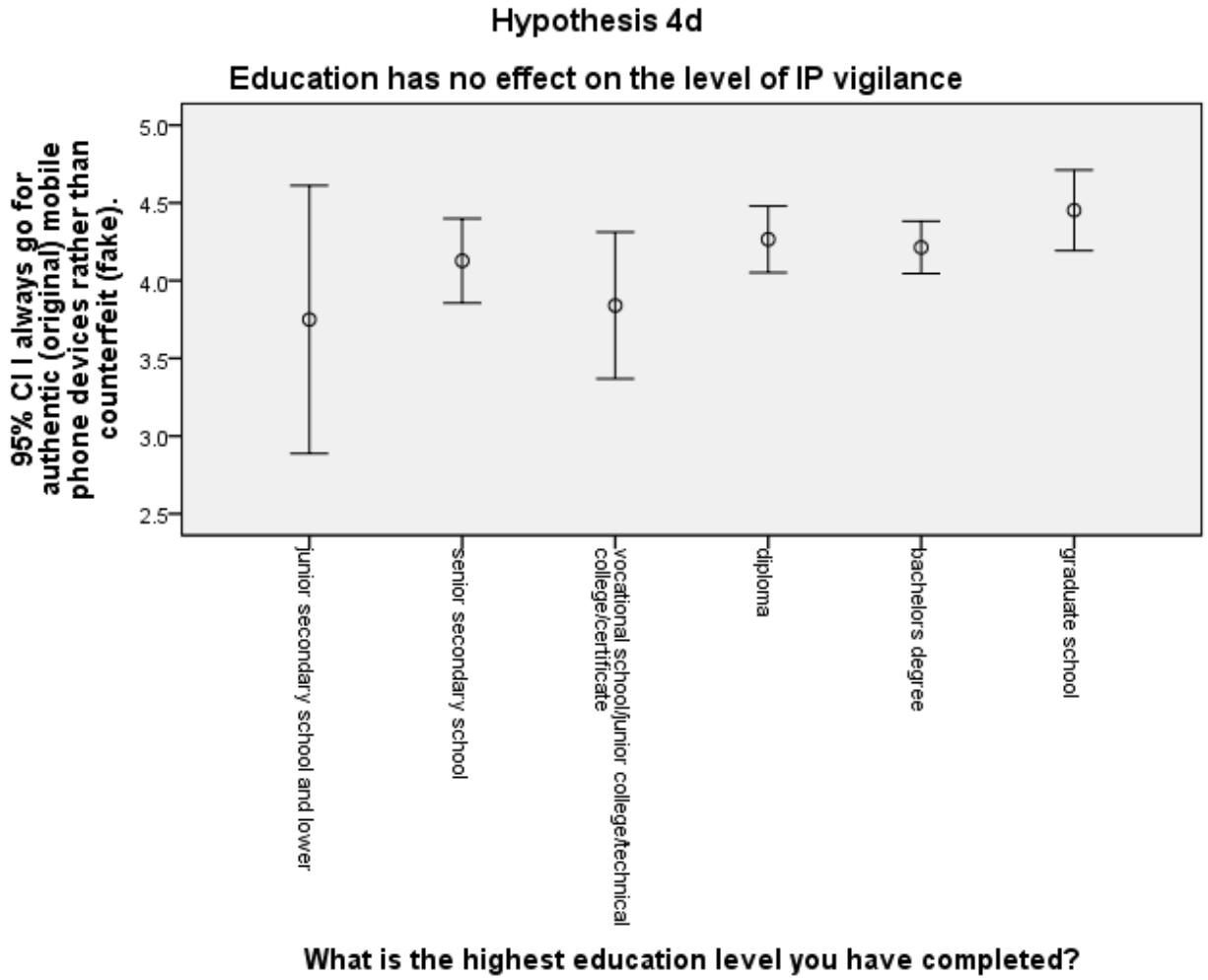


Figure 15 Hypothesis 4D

Source: Author's simulation

4.8.1 Segmentation

Research question 5 was answered through the use of k-means clustering technique, in order to establish the characteristics of urban mobile consumers in Botswana

Table 16 Segmentation Analysis Findings

	Cluster				
	Knowledgeable Consumers	Passive Consumers	Average Consumers	Unsophisticated Consumers	Sophisticated Consumers
Information Orientation	4	4	4	3	4
Brand Consciousness	4	4	4	4	5
Quality Judgement	4	4	3	4	4
IP Vigilance	4	4	4	4	5
New Product Knowledge	3	2	2	2	4
Health Awareness	4	2	3	2	4
Environmental Awareness	4	2	3	2	4
Gender	1	1	1	2	1
Age	1	2	1	2	2
Income	2	4	2	3	6
Education	4	5	2	4	5
Percentage Total	26.4%	15.3%	16.6%	19.9%	21.8%

Source: Author's Drawing

Gender: 1 = male, 2 = female

Age: 1 = 16-25, 2 = 26-35, 3 = 36-45, 4 = 46-55, 5 = over 55

Income: 1 = no income, 2 = 3000, 3 = 6000, 4 = 9000, 5 = 12000, 6 = 15000, 7 = 18000

Education: 1 = Junior secondary, 2 = senior secondary, 3 = Vocational college, 4 = Diploma, 5 = Bachelors' degree, 6 = Graduate School

As the matrix above displays, on the basis of the loadings, 21.8% of the consumers were classified as sophisticated, 26.4% as knowledgeable consumers, 15.3% as passive, 16.6% as average consumers and 19.9% as unsophisticated consumers.

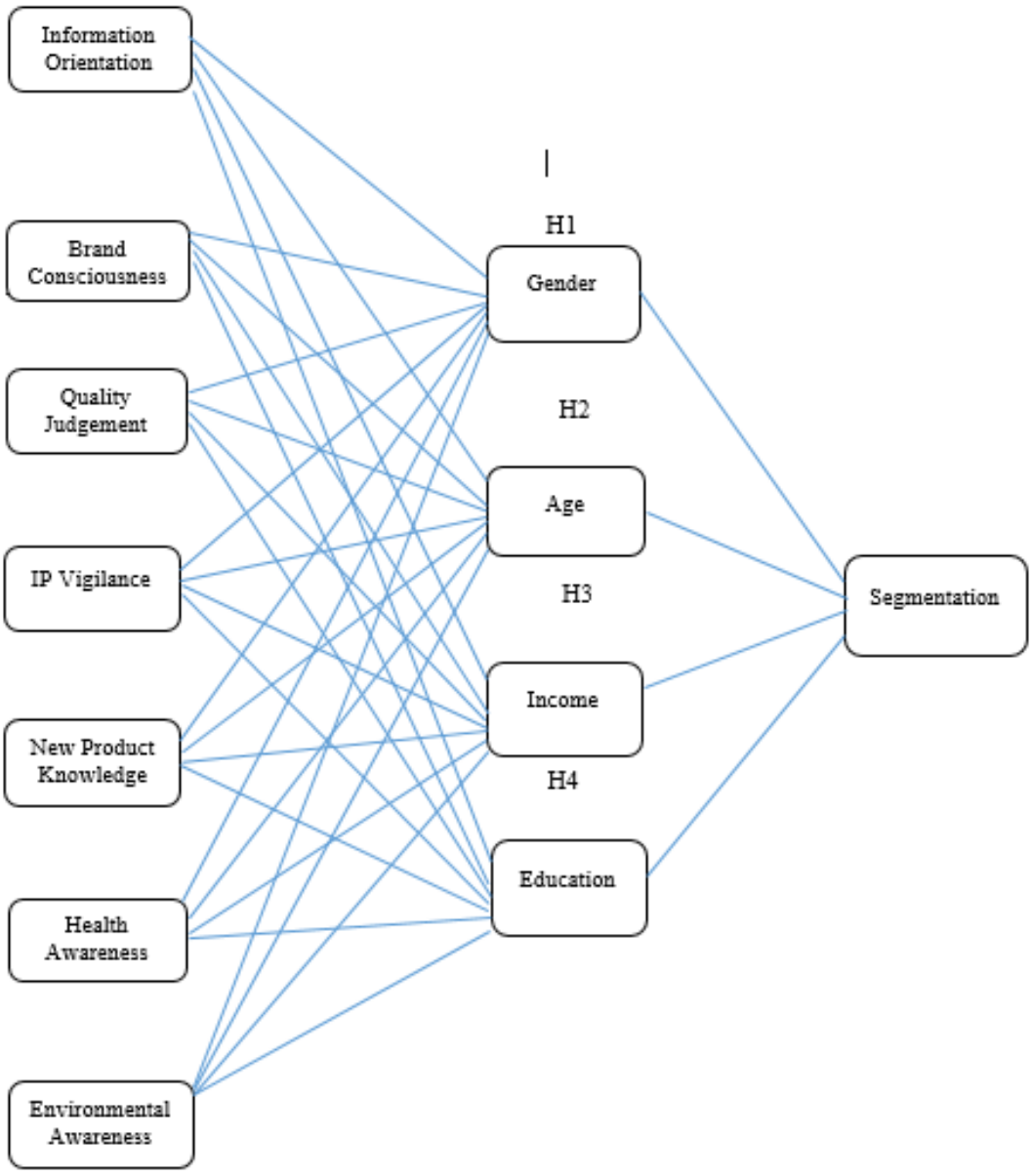


Figure 16 Variable Interaction Model

Source: Author's Drawing

As highlighted in the statement of the problem, the inability of consumers to deal with high ubiquity of mobile phone devices as well as the changing market landscape is the main motivation for carrying out this study. The study seeks to identify those within the consumer base likely to engage in poor consumption decisions, which can have damaging health, environmental and economic implications. The model above presents conceptually the interaction of variables designed to yield answers for the research questions posed. The model demonstrates how consumer sophistication variables namely: their vigilance to intellectual property infringements when making their purchases; environmental and health awareness; information orientation; knowledge of new products; brand consciousness and quality judgement, interact with sociodemographic variables in the form of: Gender; Age; income and education.

4.9 Summary

This chapter presents findings of the relationship between socio-demographic factors and consumer sophistication. It began with a brief introduction of key variables and how they relate to the market segmentation theory, as well as a contextual background of key sociodemographic variables in Botswana. The outcomes of ANOVA and t-test were presented as findings for the relationship between sociodemographic variables and consumer sophistication. These findings answer research questions 1 to 4. The latter part of this chapter presents findings of the k-means cluster analysis which was adopted as a technique to reveal characteristics of mobile technology consumers in urban Botswana and in the process answer research question 5. Multiple hypotheses were tested to analyse the relationship; some null hypotheses were not rejected but some were. The following are hypotheses that were rejected:

H1d. The consumer's Gender has no effect on their level of intellectual property vigilance

H1e. The consumer's Gender has no effect on their level of new product knowledge

H2a. The consumer's Age has no effect on their level of information orientation

H2e. The consumer's Age has no effect on their level of new product knowledge

H3e. The consumer's Income has no effect on their level of new product knowledge

H3f. The consumer's income has no effect on their level of health awareness

H3g. The consumer's income has no effect on their level of environmental awareness

H4c. The consumer's Education has no effect on their level of quality judgement

H4d. The consumer's Education has no effect on their level of intellectual property vigilance

H5a. Urban mobile phone consumers in Botswana possess homogenous characteristics

These results indicate the existence of a relationship between socio-demographic characteristics and consumer sophistication. The subsequent chapter will offer an in-depth discussion of the research findings in relation to the theory of market segmentation. The chapter will also link the findings to marketing strategies and public policy strategy formulation.

CHAPTER V SUMMARY AND CONCLUSIONS

5.0 Introduction

On the basis of the previous chapter (IV), this chapter will present a summary of the study and draw important conclusions from the findings presented. Implications and recommendations for action and further research are discussed later in the chapter. The chapter reviews the problem statement as introduced in the first chapter and proceeds to briefly touch on the implications of this research. The problem overview leads to the questions posed in this study in relation to the consumer sophistication levels of mobile technology consumers in Botswana against sociodemographic variables. The chapter proceeds to discuss findings from research questions one to four whose analysis involved the use of t-test and ANOVA. Research question five findings are then discussed on the basis of the cluster labels in order to present the characteristics of urban mobile technology consumers in Botswana. Based on significant findings, the chapter then discusses recommendations for public as well as corporate policy in terms of interventions that can be designed to tackle the consumption issues presented in this study. In the conclusion to the chapter limitations of this study are discussed extensively and suggestions put forward for future researchers in the same space to potentially explore.

The purpose of a discussion in research studies is to both interpret and describe the significant of the study findings, taking into consideration prior knowledge about the research problem being investigated and linking this with current findings in order to provide new understanding or insight about the problem. In this regard, the discussion connects clearly with the introductory sections through the research questions or hypotheses, and also the literature that has been reviewed. Yet, rather than providing a repetition of the introduction, the discussion is designed to explain how the study has advanced understanding of the phenomena under investigation, and how the reader's understanding and knowledge of the posed research problem has been advanced from the starting point or introduction (Labaree 2009). In other words, this section is designed to demystify the technical aspects covered in the analysis and present a simplified and holistic version of the achievements of the study. This must all be achieved without deviating from the initial objectives of the study. At the same time the section must be able to clarify how research questions were answered, as well

as the significance of those answers to the research in question as well as the broader research field.

5.1 Thesis Summary

Evidence from consumer sophistication research points to the fact that poorly skilled consumers are inclined to make poor consumption decisions. These decisions can have a lasting impact environmentally, economically and even health-wise as explained in earlier chapters. With over 150% mobile phone penetration rate in Botswana, evidence is emerging that such levels of ubiquity are proving a challenge for some of the consumers. These challenges manifest in different forms including poor e-waste management, counterfeiting and economic pitfalls as a result of a generally changing market landscape. Regulators and marketers alike have moved to attempt to curb some of the mentioned challenges. A prime example being Botswana communications Regulatory authority's compliance registry targeting retailers and suppliers of communications equipment. Despite these interventions, it remains clear that the challenges continue unabated. What is clear is that consumers are not aware of implications associated with their consumption decisions before, during and post-consumption. Further to that there is limited effort from both regulators and marketers to explore the consumer base in order to seek solutions. On the research front, the bulk of existing literature is more fixated either on the devices and how to further increase penetration or mobile money transfer solutions. There is a limited body of literature that explores the consumer base in an attempt to derive solutions on the basis of consumption.

The purpose of this study was to identify the relationship between socio-demographic characteristics and level of consumer sophistication among urban mobile consumers in Botswana. This was a demand-side approach designed to identify and profile those within the consumer base likely to contribute to poor e-waste management, facilitate proliferation of illicit mobile phones, poor economic decisions in purchasing and other challenges associated with the changing market landscape. Findings such as these can assist in the formulation of public policy strategies targeted at particular segments of consumers, on the other hand, astute marketers can strengthen their position by bringing marketable solutions in mitigating

these challenges. Most of the time firms prefer exploitable myopic consumers when in truth sophisticated consumers carry long term value for the company (Gabaix and Laibson 2006).

Literature review summary

On the basis of research propositions put forward, this work began with an extensive review of relevant and published literature that touches on consumer sophistication, technology adoption and all related fields. This is a point essential to every research for the fact that it facilitates understanding of different standpoints and therefore assists in the development of hypotheses variables necessary to measure the levels of consumer sophistication. Prior to that, extensive literature was explored in relation to technology and technology adoption.

. Multiple scholars over the past years (Galbraith 1967; DeVore 1987; Frey 1987; Mitcham 1980; Skolimowski 1966) have made attempts to define technology, informed by a host of differentiating variables including ideology and context. According to a previous publication (Choi, 2009), there are two major schools of thought employed in comprehending technology: one is to define in a platonic sense by differentiating technology from science and the other is to provide characterizations of technology. Other scholars (Skolimowski 1996) viewed science as the here and now, while technology was the future, what is to be. He referred to it as a process of creating new realities. An alternative definition also (Galbraith 1967) encapsulates both the systematic and practical aspects of technology. He defines it as the systematic application of scientific or other organized knowledge to other tasks. As one of the major scholars in this area (DeVore 1987) places emphasis on the relationship between technology and social purpose. He contended that technology has always been situated directly in the social milieu and conditioned by values, attitudes and economic factors; thus, the goal of technology is the pursuit of knowledge and know-how for specific social ends (Choi 2009).

Scholars opposed to the platonic definition of technology however argued for a characterization of technology. The leader of this approach being (Frey 1987) who characterized technology as four elements: object, process, knowledge and volition. Technology as object is regarded as the concept of physical embodiments, involving tools, machines, consumer products, instruments, or any objects that have intentionally been created

to extend practical human possibilities (Choi 2009). The efficient development of an object represents technology as process. Based on (Mitcham 1980) assertions, human intentions influence all technology. When, how, and why technology will be used is entirely dependent on the will and intention of humans. He goes further to conclude that, volition as an incorporation of aims, intentions, desires and choices, provides links that tie together the aforementioned elements of technology.

Multiple theoretical models have been formulated, tested and developed, all in an attempt to attain a better understanding, predict and explain technology adoption at both organizational and individual level. Most studies on technology adoption can trace their origins back to the Theory of Reasoned Action (TRA) (Fishbein 1975), which identified two main factors as influential to adoption, being "attitude" and "subjective norm".

From the constructs of the TRA, a more popular and widely cited theory was formulated in the form of Technology Acceptance model (TAM) in 1989 by Davis. In this case, the two major variables detrimental to user behaviour and acceptance of technology were presented as "perceived ease of use" and "perceived usefulness". He (Davis 1989) further defined perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort" while he goes on to explain usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (ibid).

TAM has been criticized as lacking in capturing the social aspect of technology adoption, which led to an extended TAM model or TAM2 by Davis and Venkatesh in 2000. This research (Venkatesh et al. 2003) went further to integrate all the major theories of technology adoption including TRA, TAM, Theory of planned behaviour (TPB), Innovation diffusion theory (IDT), and Social Cognitive Theory (SCT). This gave birth to the Unified Theory of Acceptance and Usage of Technology (UTATU) which has gone on to be used widely in the explanation of technology adoption and acceptance behaviour.

Demand conditions are a component of the diamond model (Porter 1990) that outlines the competitive advantages of nations. The emphasis is largely placed on the consumer's level of

sophistication as a major factor in determining the quality and direction of a country's innovative capacity. Several scholars (Sproles, Geistfeld, and Badenhop 1978; Hirchman 1980; Barnes and McTavish 1983; Titus and Bradford 2005; Seyoum 2009; Jeppesen and Molin 2010) have written on the concept of consumer sophistication to varying degrees and perspectives. Further to that the World Economic Forum has published the "Buyer's sophistication index" as a proxy for home demand conditions in the annual global competitiveness report.

Two major schools of thought have emerged over the years in this area of study. On one aisle of the scholarship (Sproles, Geistfeld and Badenhop, 1978; Barnes and McTavish, 1983) refer to consumer sophistication as the relevant knowledge, education and experience, which facilitate efficient decision making. One Scholar (Hirchman, 1980) prefers to highlight the problem-solving capability of consumers, referring to it as consumer creativity; a factor he considers key in increasing the probability of selecting superior products.

On the other aisle, some researchers (Titus and Bradford, 2005) however posit that alternatively there is a need to expand the focus of the concept beyond the mere possession of knowledge and experience (i.e. potential) in wise purchase practices. In a more recent study (Newell, Wu, Titus and Petroshius 2011) they further argued that; although it is interesting and beneficial to identify sophistication potential it may be argued that it is the actual practice which impacts consumer's wellbeing and that public policy should be behaviour driven rather than ability driven.

One of the arguments (Liu 2010) is that previous studies have placed a considerable amount of attention to the changing role of consumers. A string of studies have reflected the fact that there has been a continuous evolution of the consumer over time, where consumers are better educated (Hirschman 1980), well informed and more knowledgeable (Sproles, Geistfeld and Badenhop 1978; Alba and Hutchison, 1982), experienced in purchase (Sproles, Geistfeld and Badenhop 1978), value driven (Feick and Price 1987), more efficient (Sproles, Geistfeld and Badenhop 1978, Titus and Bradford, 2005), competent in using information and searching

(Feick and Price 1987) and more sophisticated (Titus and Bradford 2005; Saucer 1998; Zhang et al. 2010).

In a marketplace dominated by myopic consumers, firms are more likely to exploit this lack of knowledge among the consumers (Gabaix and Laibson 2006). For example, in the banking sector, banks will advertise all the virtues of their accounts but hide add-on costs such as minimum balance fee, ATM usage fees and insufficient funds (bounced cheque) fees (Cruickshark 2000). Another market that operates in a similar manner is the printer market. The principal cost of ownership in printing is the ink cartridges. While manufacturers and suppliers advertise the low price of the printers, they deliberately omit the fact that ink cartridges cost ten times more than the printer itself over the life of the product (Gabaix and Laibson 2006). An insightful previous study (Hall 2003) revealed that only 3 percent of printer owners knew the true cost of printing.

On one hand (Piatetsky-Shapiro 1995) the belief is that such shrouding by companies cannot survive as competitive firms will educate customers of rival companies and win them over. Opposing scholars (Gaibax and Laibson 2005) however believe that the existence of myopic consumers creates a certain state of equilibrium that is immune to competitive pressure. An aforementioned study (Titus and Bradford 2005) cited a case of "corporate dilemma" where a firm has an information edge over the consumers, and uses the consumer's lack of knowledge to sell a substitute good instead of the stated good. The example used was a company substituting pink salmon which is more premium and in its place selling silver salmon but still passing it as pink salmon and maintaining the same premium price. All the examples above point to product or service providers not finding the incentive to educate consumers, largely because the belief is that knowledgeable consumers are less exploitable and therefore less profitable. The approach from regulators and public policy is to further enhance competition to give consumers a broader range of options, irrespective of whether the consumer is sophisticated enough to make informed choices or not.

The core of sophistication is related to the information search orientation of the consumer. Sophisticated consumers are more proactive in seeking information on products before actual

consumption. Consumers who are more active show a greater level of involvement than those that are passive (Beatty and Smith 1987). Higher search effort is associated with higher purchase involvement. Further to that, more research (Sproles, Geistfeld and Badenhop 1978) associates extensive information search as a behaviour is said to be exhibited by consumers with higher product involvement and motivation. In summary, one could say that sophisticated consumers display a higher level of external information search than just relying on the internal.

As a result of the extensive review of literature on consumer sophistication, several limitations then emerged. The major gap identified in literature was the lack of conceptual framework that guides analysis of consumer sophistication against a technology such as mobile telephony. Another limitation of the literature is the glaring lack of consumer sophistication in the context of developing economies. Third, consumer sophistication literature lacks an all-inclusive measuring tool that brings together sociodemographic factors and consumer sophistication variables. Fourth, as theory, market segmentation analysis generates answers that regulatory and well as marketing policy can derive from. The literature review revealed no use of market segmentation analysis in consumer sophistication designed to inform public policy.

Data Collection

A survey was used as a collection tool for this study. The survey was divided into 2 main parts. The first part consisted of 13 questions/statements adapted from the IPS Consumer Sophistication model, measured on a 5-point Likert scale. The author adapted the model and drafted measuring tools on its basis because it encapsulates consumer sophistication better than other existing literature. Another reason for this adaptation is the fact that its multidimensional nature allows for deeper insight into the level of consumer sophistication. The second part of the survey contained questions about demographic data including the respondent's age, gender and income.

The survey was attempted in total by 320 individuals. However, some of the respondents did not complete the whole set of questions which generated missing values during the data

coding process. After cleaning up the data including outliers we were left with 307 completed surveys. The following provides a basic overview of the study sample: 55.9% were male while 44.1% were female; 36.9% of the respondents were between the ages of 16-25, 47.8% were between the ages of 26-35, 10% were between 36-45, 3.4% were between 46-55 and only 1.9% were over the age of 56; 11.5% of the respondents reported no income while 6.3% said they were unemployed; 42% were regular employees whilst 12% reported as self-employed.

Through a primary analysis of data gathered in a survey, the following questions were arrived at:

1. What is the relationship between age and the level of consumer sophistication among urban mobile consumers in Botswana?
2. What is the relationship between gender and the level of consumer sophistication among urban mobile phone consumers in Botswana?
3. What is the relationship between level of income and the level of consumer sophistication among urban mobile phone consumers in Botswana?
4. What is the relationship between level of education and the level of consumer sophistication among urban mobile consumers in Botswana?
5. What are the characteristics of urban mobile phone consumers in Botswana?

Analyses summary

Following careful consideration of other methods of analyses, to test the hypotheses, both the t-test and one-way analysis of variance were conducted to establish the differences in mean differences between the independent and dependent variable. As an interpretation of whether the relationship between variables existed or not, a conclusion was drawn on the basis of the resulting significance value. A relationship indicates the difference in means are not because of chance (Stockburger 2008).

Clustering as one of the most useful tasks in the data mining process for the discovery of groups and identification of distributions and patterns in the underlying data. The clustering problem is about classifying a data set into groups or cluster in a manner that data points in a cluster a more similar to each other than data points in other clusters (Guha, Rastogi and Shim 1998). A K-means clustering was run on the data to identify major clusters with the consumer population. A classification/segmentation model of consumer sophistication levels was developed on the basis of the algorithm generated. The model also generates segments within the clusters, which are useful in deepening and revealing the characteristics of urban mobile consumers in Botswana.

Both descriptive and inferential statistics were analysed in order to describe respondents as well as establish the relationship between the variables. The independent variables in this study are gender, age, income and education. The dependent variables are Information orientation, Brand consciousness, Quality judgement, IP vigilance, new product Knowledge, Health awareness and Environmental awareness. The first part of analysis employed t-tests and ANOVA to compare means and confirm whether a relationship existed between dependent and independent variables.

5.2 Significant findings

A review of the major research hypotheses and results is provided to frame the summary of this study

H1d: Gender has no effect on the level of IP vigilance

H1d outcome shows a statistically significant association between gender and the commitment to purchase authentic mobile phones. Male consumers ($M = 4.33$; $p = 0.06$) are associated with a higher commitment to purchase authentic mobile phones as compared to their female counterparts ($M = 4.03$; $p = 0.06$). This is an interesting outcome in that it goes against pre-existing research which had reported male consumers as the more likely to behave unethically including the purchase of counterfeit products. This could once again be linked to the income dynamics of a developing economy setting, where there is an income disparity in favour of males and therefore the purchasing power lies predominantly with them. Another view of it could be the way the statement was structured. If one is faced with a

control statement such as the one used for H1d, and they don't have total confidence in their ability to tell apart authentic and counterfeit products, there could be an apprehension in fully affirming one's consumption of authentic products. Or it could simply be a case of objective counterfeiting from the female segment of consumers in comparison with the male consumers. On the basis of these findings, the null hypothesis was rejected.

H1e: Gender has no effect on the level of new product knowledge

The analysis in this case revealed that male consumers (M = 2.92; p = 0.068) are associated with a higher level of new product knowledge in comparison with their female counterparts (M = 2.68; p = 0.068). When mobile technology companies release new product ranges it decreases substantially the value of the immediate past products. This therefore means the trade-in value of a particular device is dependent upon its release date. This outcome therefore means that men as compared to women are likely to make better economic choices in anticipation of upcoming releases. The economic choices can be in relation to trading in their current devices or planning financially for upcoming devices. Such planning means the consumer avoids the aforementioned pitfall of financing "private consumption" through debt, a development that is on the rise in Botswana and has caught the attention of the IMF. One of the greater challenges for consumers in the ever-changing market landscape of mobile technologies is increased product complexity. This outcome would imply that men due to their knowledge of upcoming products are less likely to encounter such challenges. We therefore reject the null hypothesis on the basis of these findings.

H2a: Age has no effect on the level of information orientation.

The analysis revealed that the level of information orientation among the various age groups is not homogenous. The consumers in age group 46-55 are associated with higher levels of information orientation (M = 4.09; p = 0.087) whilst consumers from age group over 55 are associated with the lowest levels of information orientation (M = 2.47; 0.087). A post hoc LSD test was performed to establish the difference between the various means. What

emerged was statistically significant differences between the over 55 age group and the rest of the groups 16-25($p = 0.02$); 26-35($p = 0.011$); 36-45 ($p = 0.086$) and 46-55 ($p = 0.036$). A conclusion that can be drawn in this regard is that consumers over 55 are the least concerned about product information when making their mobile phone purchases. This brings in a lot of possible scenarios that may arise as a result of this. This outcome means consumers over the age of 55 are more at risk of purchasing counterfeit devices. It also means they are likely to overpay for devices due to their lack of vigilance. Having information about a product means a consumer understands the functionality of the product, the terms and conditions of purchase and can therefore come to a conclusion regarding the value proposition of the product. On the basis of these finding we reject the null hypothesis.

H2e: Age has no effect on the level of new product Knowledge

In testing this hypothesis, the findings revealed that consumers in the 26-35 age group were associated with the highest level of new product knowledge ($M = 2.99$; $p = 0.026$) whilst consumers in the 46-55 age group were associated with the lowest level of new product knowledge ($M = 2.27$; $p = 0.026$). A post hoc LSD test was performed to determine the difference between the various means. The difference between the oldest group (over 55) and the three youngest age groups was statistically significant. Age group 16-25 ($p = 0.082$), 26-35 ($p = 0.018$) and 36-45 ($p = 0.049$). A conclusion that can be drawn is that younger consumers have a higher level of new product knowledge. These consumers are what are often referred to as “Market Mavens” (Clark, 2005). These are consumers who are alert to developments in a particular market and often times act as experts and reference points for other consumers. This finding suggests that younger consumers are more likely to manoeuvre the market terrain better than older consumers on the basis of the knowledge they possess, which in turn reinforces the potential threat faced by the older consumers due to their lack of knowledge. We therefore reject the null hypothesis on the basis of this finding

H3e: Income has no effect on the level new product knowledge

The analysis reveals that consumers with no income are associated with the lowest level of new product knowledge (M = 2.56; p = 0.043) and the consumers in the P9000 – P 12000 income category are associated with the highest level of new product knowledge (M = 3.44; p = 0.043). A post Hoc LSD test was performed to determine the difference between the various means. The difference between the income group 9000-12000 all the other income groups was statistically significant, no income (p = 0.001), 1-3000 (p = 0.001), 3000-6000 (p = 0.004), 6000-9000 (p = 0.026), 12000-15000 (p = 0.048), 15000-18000 (p = 0.070) and more than 18000 (p = 0.069) which is quite interesting. All the income groups below the 9000-12000 group display lesser product knowledge than all the groups above, which confirms that consumers in the lower income bracket have less knowledge about new products as compared to consumers in the higher income bracket. On the basis of this we reject the null hypothesis and confirm that income has an effect on the level of new product knowledge.

H3f: Income has no effect on the level of health awareness

After testing this hypothesis, the finding was that consumers in the income group P12000-P15000 were associated with the highest level of health awareness (M = 3.29; p = 0.034), whilst consumers in the income bracket P3000- P6000 were associated with the lowest level of health awareness (M = 2.48; p = 0.034). To determine the difference between various means a post hoc LSD test was undertaken. The group 3000-6000 with the lowest level of health awareness yielded a statistically significant mean difference with most of the income groups. The results were as follows; no income (p = 0.017), 1-3000 (p = 0.002), 9000-12000 (p = 0.017) and 12000-15000 (p = 0.015). One explanation for this finding could be that first-time income earners from tertiary education would fall within that bracket and therefore health concerns don't take priority in that context (Gustman and Statford 1972). This result means we reject the null hypothesis and conclude that income has an effect on the level of health awareness.

H3g: Income has no effect on the level of environmental awareness

The analysis reveals that consumers in the income group P12000-P15000 are associated with the highest level of environmental awareness (M = 3.29; p = 0.05) whilst the consumers in the income group P3000-P6000 were associated with the lowest level of environmental awareness (M = 2.36; p = 0.05). A post hoc LSD was performed to determine the difference between the means. The result yields a statistically significant difference between the mean of income group 3000-6000 and means of five other income groups as follows; no income (p = 0.001), 1-3000 (p = 0.001), 6000-9000 (p = 0.026), 9000-12000 (p = 0.004) and 15000-18000 (p = 0.002). As with the previous hypothesis on health, this income group displays significant disregard for the environment in their consumption decisions. We therefore reject the null hypothesis and conclude that Income has an effect on the level of environmental awareness.

H4c: Education has no effect on the level of quality judgement

The results of the analysis reveal that consumers who have gone as far as junior secondary school (M = 3.75; p = 0.014) and senior secondary school (M = 3.74; p = 0.014) were associated with the lowest levels of quality judgement, whilst consumers who have completed a bachelor's degree (M = 4.25; p = 0.014) and those who have completed some form of Graduate school (M = 4.21; p = 0.014) were associated with the highest levels of quality judgement. A post hoc LSD test was performed to determine the difference between the various means. This test revealed a statistically significant difference between the mean of bachelors' degree holders and junior secondary school completers (p = 0.056) as well as senior secondary school completers (p = 0.01). The ability to judge quality in consumers means they are less likely to fall for counterfeit products or they are less likely to suffer economic costs of constantly changing devices. This result reveals that people who are less educated are more at risk of consuming poor quality products non-objectively. On the basis of this result we reject the null hypothesis and conclude that education has an effect on the level of quality judgement.

H4d: Education has no effect on the level of Intellectual property vigilance

The six education groups did not display homogeneity when it comes to levels of IP vigilance. Consumers who have only completed junior secondary school were associated with the lowest levels of IP vigilance (M = 2.75; p = 0.074) whilst people who have completed some form of Graduate school were associated with the highest levels of IP vigilance (M = 4.45; p = 0.074). A post hoc LSD analysis revealed a statistically significant difference between the mean of junior secondary school completers and Graduate school completers (p =0.022). The result means people with only junior secondary education are engaging in both passive and active counterfeiting. This result also means we reject the null hypothesis and conclude that the level of education has an effect on the consumer's level of intellectual property vigilance.

5.3 Insignificant Findings

Of the remaining hypotheses, only H1c proved marginally significant (p = 0.097) but failed to satisfy both the assumption of normality and the assumption of homogeneity of variance. H1b, H1d, H2c, H2d, H3a, H3b, H3c, H4a, H4c and H4d did not prove any statistical significance despite their numerically varying means. It is interesting that Income as a variable isn't more influential on disregard for pricing despite this being a developing country context. Another interesting outcome that proved insignificant is the association between age and brand awareness. The expectation on the basis of past research was that the younger consumers would report a higher level of brand awareness than their older counterparts.

In further exploring the insignificant hypotheses, the most surprising but interesting outcome was the lack of association between health awareness and age. On the basis of existing studies, the assumption was that a variable like age would vary greatly between consumers who are environmentally aware and those that aren't. Another surprise was on the basis of the mobile phone being a technological product, normally as in previous studies gender always comes across as significant in issues related. A lot of the numerical data exhibited means that supported the hypothesis but statistically insignificant

5.4 Segmentation Matrix

Table 17 Summary of Characteristics of Urban Mobile Phone Consumers in Botswana

	Cluster				
	Knowledgeable Consumers	Passive Consumers	Average Consumers	Unsophisticated Consumers	Sophisticated Consumers
Information Orientation	Mid to High	Mid to High	Mid to High	Mid	Mid to High
Brand Consciousness	Mid to High	Mid to High	Mid to High	Mid to High	High
Quality Judgement	Mid to High	Mid to High	Mid	Mid to High	Mid to High
IP Vigilance	Mid to High	Mid to High	Mid to high	Mid to High	High
New Product Knowledge	Mid	Low to Mid	Low to Mid	Low to Mid	Mid to High
Health Awareness	Mid to High	Low to Mid	Mid	Low to Mid	Mid to High
Environmental Awareness	Mid to High	Low to Mid	Mid	Low to Mid	Mid to High
Gender	Male	Male	Male	Female	Male
Age	16-25	26-35	16-25	26-35	26-35
Income	1-3000	9000-12000	1-3000	3000-6000	15000-18000
Education	Diploma	Bachelors' Degree	Senior Secondary	Diploma	Bachelors' Degree
Percentage Total	26.4%	15.3%	16.6%	19.9%	21.8%

Source: Author's Simulation

The matrix above answers research question 5." What are the characteristics of urban mobile phone consumers in Botswana?"

5.4.1 Sophisticated Consumers

The loadings for sophisticated consumers reveal high levels for both Brand consciousness and IP vigilance. The rest of the loadings are in the mid to high range which represents high levels of consumer sophistication in general. As far as socio-demographic characteristics are concerned, sophisticated consumers in urban Botswana are likely to be male, with a bachelors' degree and earning between P15000-P18000. These loadings correspond with the individual ANOVA analyses because income, education and gender displayed greater influence on levels of consumer sophistication. Of the 307 participants in the study, 21.8% can be classified as falling in this category. Most characteristics about this category of consumer's points to knowledgeable consumption, be it pre-consumption, during consumption or post-consumption. When developing targeted marketing strategies, premium products can be targeted at this batch of consumers as they represent the highest return on investment. In terms of developing intervention strategies for public policy, a lot can be learned by observing the consumption behaviour of this group of consumers and utilize it to educate those engaging in poor consumption decisions. This group of consumers represent to a certain extent the aforementioned Market Mavens. The chart the path for most consumers and indeed should shape both private and public policy discussions

5.4.2 Knowledgeable Consumers

Consumers in this category display a mid to high level of consumer sophistication. They are neither average nor fully sophisticated as demonstrated by the loadings, hence the tag knowledgeable consumers. Socio-demographic loadings reveal age range of 16-25 and income of 1-3000 Pula, which could be explained by a possible high presence of students from tertiary institutions in this category. This represents the largest categorization of consumers with 26.4% of the total sample population. This category of consumers is an interesting finding in that they belong to much lower income category as compared to sophisticated consumers, as well as a lower education level, but in terms of the characteristics they demonstrate a very high aptitude in consumption behaviour. They are most likely to be male and are a category younger than sophisticated consumers. They are slightly less conscious about brands perhaps due to their limited experience and are less knowledgeable about upcoming products. As aforementioned they are the largest consumer categorization and most likely to consist largely of student population. With the income category, they fall

in, they are unlikely to possess much purchasing power but when building marketing strategies, it is important to consider all characteristics they possess including a higher propensity to consumer counterfeit if priced out of products and services. As far as public policy to combat poor consumption choices is concerned, they represent a high aptitude in both environmental and health awareness, which bodes well as they are still very much in the youth category. A major factor for concern would be poor economic choices on the basis of their inexperience and limited purchasing power.

5.4.3 Average Consumers

Apart from the low to mid loading in new product and knowledge variable. These consumers are average in most of the other loadings. They have mid loadings in both the key variables of health and environmental awareness, which confirms their status as average consumers. What the matrix also reveals is relatively low levels of both income and education, which correlates with findings of the ANOVA analysis. 16.6% of the respondents belong to this category. Due to the fact that education has proven influential in determining the levels of consumer sophistication, the lowest education loading by this category of consumers points to generally low loading in other categories. They don't represent the lowest aptitude in consumer sophistication variables, in fact the score quite high on information orientation and brand awareness. Perhaps other lower loadings are a result of their limited education as well as limited income. This is another insight worth noting, that despite low education levels and low income, there is still a batch of consumers who display the curiosity to be informed about the products and brands they consume in the mobile telephony space. This insight warrants a further probe on the motivation of this particular sub-segment of consumers. It is essential for both marketers and policy formulators to be aware of the existence of such sub-groups within the generalised consumer groups.

5.4.4 Passive consumers

The passivity of this category of consumers is largely on the basis of their education and income levels. Every consumer category loads well enough from information orientation to IP vigilance, but it is interesting that this group despite high education and income levels display low levels of new product knowledge, environmental awareness and health awareness.

This finding reveals the fact that despite the confirmed effect of education and income on consumer sophistication, there is still a constituency of consumers who lie outside that description among urban mobile phone consumers in Botswana. This category is formed by 15.3% of the total sample population. Even among the most educated there are still some passive elements within and this consumer category is a prime example of that. This presents another great insight for both public and corporate policy in that, to assume all educated people engage in efficient consumer behaviour will be an inaccurate interpretation of the situation. This category of consumers loads equally on education levels with sophisticated consumers but loads at par with the least sophisticated consumers on New Product Knowledge, Environmental awareness as well as health awareness. It provides interesting insight due to the unpredictability of its outcomes as well as the need it generates for an in-depth look beyond the surface. The educated and high-earning yet passive consumers could be studied as a constituency on their own in order to establish the cause of this unique type of behaviour.

5.4.5 Unsophisticated Consumers

This category displayed the lowest loadings of all the 5 consumer categories. Consumers in this category have the lowest information orientation level of all the five groups. As far as the Socio-demographic characteristics are concerned it interestingly is the only group that reflects the highest loading of female consumers. The income category of this group (3000-6000) corresponds with the individual ANOVA analysis since it displayed the lowest level of both environmental and health awareness. 19.9% of the total survey participants fall into this category. This category of consumers is neither the least educated nor the least rewarded income-wise, however, as aforementioned they load lowest on most consumer sophistication variables including environment and health awareness. In terms of public policy interventions, strategies should be formulated targeting this category and on the basis of the characteristics they possess. This consumer category is also likely to facilitate the proliferation of counterfeit devices as well as engage in poor e-waste management practices and therefore it's the duty of both regulators and PTOs alike to facilitate the education of this consumer category such that the aforementioned issues are combated. The advantage of this demand-side analysis is that it readily reveals problem areas and categories that can be targeted instead of the scatter-gun approach of the supply side.

5.5 Summary of Major research findings

Research question 1

6. What is the relationship between age and the level of consumer sophistication among urban mobile consumers in Botswana?

Two hypotheses were rejected under this question, thereby confirming an existence of a relationship between age and the level of consumer sophistication. In this case the consumer's gender can be used as a predictor of their level of intellectual property vigilance. Gender can also be used as a predictor of New Product Knowledge. In summary, male consumers display a higher level of sophistication on both variables in comparison with their female counterparts.

Research Question 2

7. What is the relationship between age and the level of consumer sophistication among urban mobile phone consumers in Botswana?

Under this research question, two hypotheses were also rejected, emphasizing the existence of a relationship between age and the level of consumer sophistication. Results show a relationship between age and the level of information orientation in consumers. Age can also be used as a predictor when it comes to the consumers' level of New Product Knowledge. In summary, it could be stated that older consumers display a lesser level of both characteristics in comparison with their younger counterparts.

Research Question 3

8. What is the relationship between level of income and the level of consumer sophistication among urban mobile phone consumers in Botswana?

Income has proven to be the most influential sociodemographic variable with rejection of three null hypotheses. The results indicate the existence of a relationship between income and

the level of New product knowledge. There is also a statistically significant relationship between income and the level of health awareness. Income can also be used to predict the level of environmental awareness among mobile technology consumers in urban Botswana. As a closing statement, it is imperative to point out that consumers with higher levels of income scored higher in the aforementioned variables of consumer sophistication in comparison with lower income consumers.

Research Question 4

9. What is the relationship between level of education and the level of consumer sophistication among urban mobile consumers in Botswana?

Two hypotheses were rejected under the sociodemographic variable of Education. The results showed a statistically significant relationship between education and the level of quality judgement. Education can also be used as a predictor of the level of intellectual property vigilance among urban mobile technology consumers in Botswana. In general, it could be summarized that consumers with higher levels of education displayed higher levels of IP vigilance and quality judgement as compared to those with lower levels of education.

Research Question 5

10. What are the characteristics of urban mobile phone consumers in Botswana?

The results on this question reveal a mixture characteristic among urban mobile consumers in Botswana. From the cluster analysis a ranking could be made from those that displayed the highest levels of consumer sophistication to those that demonstrated the lowest levels of sophistication. Interesting discoveries within these consumer segments is the existence of highly educated but passive consumers. Another interesting discovery is of young, low income but highly knowledgeable consumers. In summary, the results of this question point to a melting pot of characteristics as far as urban mobile technology consumers in Botswana are concerned.

5.5.1 Findings in relation to market segmentation theory

The market segmentation theory was used to explain the probable relationship between socio-demographic characteristics and consumer sophistication among urban mobile phone consumers in Botswana. Kotler (2003) believe there are two major parts to market segmentation theory: (1) Who are the customers, and (2) How are we going to serve them? Further to that, there are four factors that can be used to achieve effective market segmentation as demonstrated in this study. Kotler (2003) believe demographic factors (Age, Gender, Income and Education), psychographic and behavioural factors (information orientation, environmental awareness, IP vigilance, Brand consciousness, Quality judgement, New product knowledge and Health Awareness), as well as geographical factors (urban mobile phone consumers) form the foundation for market segmentation. They further make the claim that whatever segmentation approach is taken, there is a need to understand the demographic dynamic of a particular market because socio-demographic factors are not only easy to measure but they also carry more definitive power in segmentation. Many factors may affect consumer sophistication levels of consumers and eventually the poor decision-making in consumption but being able to identify the multiple segments according to their level of sophistication is a good starting point to address the challenges at hand as well as to identify potential economic value in mitigating these challenges.

5.6 Contribution of study

5.6.1 Theoretical Contribution

This study makes a theoretical contribution developing a conceptual framework for the analysis of factors influential in the sophistication levels of mobile telephony consumers in Botswana. The study uses the sociodemographic aspect of the market segmentation theory to help identify levels of consumer sophistication among subgroups within the consumer base. The concept of consumer sophistication was used to develop 7 major variables aimed at providing answers to the research questions posed herein. The researcher is not aware of any study that has fused the concept of consumer sophistication with the market segmentation theory to reveal consumption practices among mobile telephony consumers. Prior research (Wu, Titus, Newell and Petroshius, 2011) used ‘regret’ as a measure of sophistication among home buyers in the US. They assert that a sophisticated purchase is systematic, thoughtful,

and goal—directed throughout the entire purchase process, undertaken with knowledge of the consequences associated with its performance. On the basis of this statement they believe post-purchase regret is a sign of unsophisticated consumption, and therefore they measured regret levels of home buyers after they made their purchase, to determine those with higher levels of regret and therefore a lesser sophistication in consumption. The Segmentation Matrix generated by the author offers a new tool that can be used to make evidence based assumption about the consumers of mobile telephony in Urban Botswana. The five segments offer a range in levels of sophistication and using socio-demographic predictors to achieve that.

5.6.2 Methodological contribution

As aforementioned, this study adopted a Positivist Paradigm, which in turn leans against quantitative research approach. Because of the rigid control of variables, findings are generalizable, which means the findings from participants under this study can be extended to a wider population. In the positivist paradigm, there is emphasis on a strict application of scientific methods as well as control of variables. This therefore means that findings are viewed as valid and able to be replicated by others. Studies targeting consumer constituencies or communities in Botswana tend to lean towards an ethnographic approach which in turn draws conclusions on the basis of qualitative data. This study provides proof that a different approach in the study of consumers can be executed.

5.7 Ethical Considerations Revisited

As aforementioned, the three key principles of research ethics come in the form of, autonomy, beneficence and justice. The researcher took these principles aboard during both the collection and the analysis of data throughout this study. All these considerations were made during the course of this study in an attempt to provide a humane research environment as well as to strengthen the validity of the results. There were a number of ethical issues that had a bearing on research participants in this study. These issues include socio-demographic characteristics, behavioural as well as psychographic factors. Ethical consideration must also be extended to the methods employed in both data collection and data analysis. Even though strides have been made on equality, Botswana still remains a largely patriarchal society (URL

30). The patriarchy is also elaborated on by the researcher in the previous chapter prior to the presentation of findings. For example, even though men and women have equal opportunities to join politics and be voted into positions of power, only a few women get to these positions and in general Batswana would still predominantly vote for a man than a woman. The primary researcher for this study is male and therefore, even though the study was voluntary, such deep seated bias might have played a role in influencing the respondent's choice to participate. This issue was counter-balanced by the presence of female research assistants whenever possible.

Another issue is in relation to the level of education. The researcher elaborates on the complexity of this factor in the opening section of the previous chapter, as well as highlighting its centrality to the society of Botswana. As a developing country, the level of education one has attained is still viewed as an indicator of social class and is very much associated with the economic status of an individual. In a pen and paper setting the participant would have felt under pressure to note down their accurate level of education in the presence of the researcher, or having to hand in the paper after completion would have been difficult as the element of anonymity is erased. In anticipation of this, and to mitigate the problem, the researcher employed the assigned device approach. With the tablet the respondent could stand a few feet away from the researcher as they completed the survey and only call for attention if they sought clarity. Upon completion, they clicked "submit survey" and the application then returned to the home page, which meant they did not have to attempt concealing any information for fear of their anonymity being compromised.

Another issue taken into consideration was that of Power Distance in relation to socio-economic status. Power Distance is defined as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" (Hofstede 1993:28). Applying this to the context of the research, the power distance can be viewed or described by the extent to which respondents believed that those who are more educated have disproportionate amount of power. In this case both research assistants and the researcher were graduate school students. Care was taken in this regard to explain thoroughly the aims of the study and its voluntary nature with the issue of power distance in mind. In this scenario, the power distance between the researcher and the

respondent had the ability to influence their answer. The greater worry was a scenario where the respondent issues answers that they believe would be appealing to the research assistant rather than an honest reflection of their thoughts.

Respondents as mentioned were from varying socio-demographic backgrounds and those were taken into consideration in data handling. For example, in the case of outliers, when cleaning up the data, the researcher was mindful of the diversity so as to not mistakenly eliminate valid entries as outliers. Research question 5 and the subsequent segment analysis bring to the fore the multiple backgrounds and characteristics of urban mobile technology consumers in Botswana. It was therefore essentially to be mindful of such factors during data collection as well as data management phases of this research.

5.8 Recommendations

The results of this study confirms that higher income mobile consumers in Botswana are more environmentally aware than lower income consumers. There are several possible scenarios that can be used to explain this finding. One could be that people with higher levels of income are faced with more options when purchasing a mobile device, as result they are always on the look-out for products that are differentiated hence their environmental awareness. Another explanation could be that, even though education levels did not prove statistically significant in relation to environmental awareness, the high-income earners have relatively higher levels of education and therefore are more likely to be exposed to environmental discourse than lesser income consumers. As already indicated, the environmentally aware consumers represent a base constituency of the growth in this particular market. Issues of sustainability are often referred to as first world problems, meaning developing countries have more pressing basic needs than sustainability. Similarly, and contextually in the case of a developing economy such as Botswana, the idea of sustainability is largely sellable to those in the higher income bracket as they have lesser pressing needs than it is to low income people who struggle with basic necessities of everyday life.

Such an outcome is important with regards to relevant policy formation. As mentioned before, awareness alone is a basis for consuming sustainably, therefore the task then becomes elevating those that are aware into practically consuming in a sustainable manner. It is also about identifying those that are still unexposed to the discourse of the environment and sustainable consumption and devising effective ways of bringing them into the debate. In fact, strategies to sensitize those that are unaware can be built around environmentally aware consumers to act as agents of change and educate fellow consumers. It is a matter of intervening creatively armed with the knowledge that subgroups like these do exist.

From a marketing perspective the above finding is interesting in that a segment of environmentally aware consumers bring with it other connected aspects of sophisticated consumption including brand awareness and a penchant for new things. The fact that the most environmentally aware mobile technology consumers are statistically the ones carrying the purchasing power should act as motivation for both operators and retailers to continue to be innovative in bringing in both products and services that are sustainable and environmentally friendly. In previous studies, environmentally conscious consumers have demonstrated a willingness to pay extra for products if they believe by doing so they add to the environmental conservation cause. It is therefore in the best interest of the marketers to act in a manner that reflects an appreciation of the change in consumption trends, for the sake of their own relevance.

Variable IP vigilance was measured using the statement, 'I always go for authentic rather than counterfeit mobile phone devices'. Hypothesis H4d reveals a statistically significant link between the level of IP vigilance and the level of education the consumer has completed. People with lower education demonstrated lower levels of IP vigilance. There are multiple ways of looking at this outcome. One of the reasons could be that the purchase of counterfeit mobile phone devices is both deceptive counterfeiting and non-deceptive. People with lower levels of education tend to belong to the lower income groups as well, therefore the consumption of counterfeit products could be a result of economic challenges and the inability to afford authentic brands. This counts as deceptive counterfeiting since they do so knowingly. Another possible explanation behind this consumption could be a genuine inability to tell the difference between the bogus devices and the authentic brands, which in turn is a form of non-deceptive counterfeiting.

As mentioned earlier in this study, counterfeiting is driven by consumption therefore this study calls for both public and corporate strategies to be formulated on the basis of evidence from the demand-side. The finding above identifies a subgroup that engages in 'non-deceptive counterfeiting', therefore taking into account the fact that this trend increases inversely with education, what would be the best way to sensitise this group of consumers - and enhance their vigilance when it comes to their purchase decisions? An example of a strategy by retailers of authentic products could be to give customers if possible and on the basis of their level of education, whenever they come for a purchase, a full explanation of where to locate the International Mobile Equipment Identity (IMEI) number in order to authenticate their mobile phone device. A strategy like that would mean they are well equipped for their next purchase, especially with the continued shortening life span of mobile phone devices.

H4c reveals a statistically significant association between the level of education and the level of quality judgement. This outcome is linked with the outcome of H4d that reveals a link between higher IP vigilance and a higher level of education. Functionality and affordability may be issues that people with lower education levels are primarily concerned with, especially in a developing country setting. Awareness about branding and brand value are issues associated with those with a certain level of education. Another interesting perspective is regarding the authenticity of the said brands. Counterfeit devices are increasingly appearing more authentic, therefore if judgement of quality is based solely on the brand then that judgment should be accompanied by the ability to authenticate the brand in the first place. If not, then it is a case of misplaced brand trust by the consumer. In summary, quality and brand are sub-factors of knowledge and experience, therefore it does not come as a surprise that people with a higher level of education are more equipped to judge quality on the basis of brand.

In addressing the outcome of H4c and H4d, a good number of authentic smartphones are starting to come into the market at around the $50 retail price point, and the pricing is slowly becoming less of an issue. For public policy, this again is a subgroup within the consumer constituency that is defined by levels of education. The group readily admits to objective counterfeiting by admitting they do not always go for authentic products. Strategies formulated should aim to sensitise this group of consumers about the possible price they are

likely to pay in terms of the health risks and economic losses accruing to them as a result of the objective counterfeiting. Ideally the strategy should also point them in the direction of alternative solutions in the form of cheaper, type-tested solutions in the market. The first step however involves identifying them demographically as this study advocates, and packaging the information to go with the defining demographic variable.

In relation to gender, there is a clear disparity between males and females in terms of Knowledge about New products as well as levels of IP vigilance. Current marketing and public policy strategies do not take such disparities into consideration. What this finding is communicating is a need to tailor strategies to the female consumer and bring them at par with their male counterparts. For public policy and regulators in particular, such strategies would represent a step forward in the fight against the proliferation of counterfeit mobile devices which not only clog up the spectrum allocations but also pose great health risks to the consumer. From a marketing perspective, it is a chance to educate and empower a consumer who will now be lost to the black market by buying authentic and thus becomes a long-term investment for the company. To the consumer this equips them with the necessary skills to avoid pitfalls of exploitation, encounter unnecessary health risks and make sound economic decisions using the knowledge they have acquired.

Stakeholders in the business community have noted the limited opportunity afforded to consumers as co-developers or as recognised partners from whom a lot can be learned by Marketers. The statement below by Unilever Africa CEO Frank Braeken captures the reality of the current marketing strategies, especially in developing economies.

"We also need to break the perception of Africa as a single unsophisticated market best served by basic products. I believe the African consumer has been underestimated and underserved for far too long. This makes no business sense. It is the soft tyranny of low expectations on a coordinated scale. Too much business has been based on blunt assumptions of what people need and well-meaning but unsustainable business models which simply do not take the African people seriously as consumers" (Braeken, 2013)

Amid all the concerns and challenges that lie ahead in terms of the inadequacies that hinder progress as well as challenges that arise as a result of economic transformation, the demand factors and by extension the consumer has been largely overlooked in the reformulation of corporate and public policy. The consumer has been left out both in terms of what they could bring to the table in aid of the transition as well as the hurdles they are likely to face as a result of the changing market landscape.

5.9 Implications for Corporate Policy

The results of this study confirm that higher income mobile consumers in Botswana are more environmentally aware than lower income consumers. There are several possible scenarios that can be used to explain this finding. As already indicated, the environmentally aware consumers represent a base constituency of the growth in this particular market. Issues of sustainability are often referred to as first world problems, meaning developing countries have more pressing basic needs than sustainability. Similarly, and contextually in the case of a developing economy such as Botswana, the idea of sustainability is largely sellable to those in the higher income bracket as they have lesser pressing needs than it is to low income people who struggle with basic necessities of everyday life.

In previous studies, environmentally conscious consumers have demonstrated a willingness to pay extra for products if they believe by doing so they add to the environmental conservation cause. It is therefore in the best interest of the marketers to act in a manner that reflects an appreciation of the change in consumption trends, for the sake of their own relevance.

As mentioned earlier in this study, counterfeiting is driven by consumption therefore this study calls for both public and corporate strategies to be formulated on the basis of evidence from the demand-side. The finding above identifies a subgroup that engages in 'non-deceptive counterfeiting', therefore taking into account the fact that this trend increases with age, what would be the best way to sensitise this group of consumers - and enhance their vigilance when it comes to their purchase decisions? An example of a strategy by retailers of authentic products could be to give customers from a certain age category, whenever they come for a purchase, a full explanation of where to locate the International Mobile Equipment Identity (IMEI) number in order to authenticate their mobile phone device. A

strategy like that would mean they are well equipped for their next purchase, especially with the continued shortening life span of mobile phone devices.

What the gender based outcomes above reveal is an inability by current marketing strategies to reach the female population. Existing marketing strategies are gender blind in that they fail to recognise the difference in preferences or consumer needs based on gender. This demonstrates a clear need to formulate strategies geared towards enhancing awareness among the female consumer group. Particular attention needs to be paid to the female consumers in the lower income bracket since that is where more demand and consumption is recorded.

5.9.1 Implications for Public Policy

A good number of authentic smartphones are starting to come into the market at around the $50 retail mark, and the pricing is slowly becoming less of an issue. For public policy, this again is a subgroup within the consumer constituency that is defined by levels of education. The group readily admits to objective counterfeiting by admitting they do not always go for authentic products. Strategies formulated should aim to sensitise this group of consumers about the possible price they are likely to pay in terms of the health risks and economic losses accruing to them as a result of the objective counterfeiting. Ideally the strategy should also point them in the direction of alternative solutions in the form of cheaper, type-tested solutions in the market. The first step however involves identifying them demographically as this study advocates, and packaging the information to go with the defining demographic variable.

Drawing from a perspective of public policy, especially regarding the aforementioned e-waste management strategies, this finding points us to the subgroups where most of the waste is likely generated. In an attempt to formulate strategies to manage e-waste in the face of ubiquitous technological devices like mobile phones, it's important to understand consumer behaviour and profile consumers as a way of establishing a starting point in the strategy. The education levels will first determine the intervention tool, if its information that needs to be disseminated how do we package it – for each particular group, so that it yields results? What such findings reveal is that blanket interventions targeting high school leavers all the way to consumers with post graduate education are unlikely to yield the desired outcome. It's

imperative for public policy to be informed by facts, therefore evidence such as this should help shape the narrative in this area.

5.10 Limitations

"The limitations of the study are those characteristics of design or methodology that impacted or influenced the interpretation of the findings from your research. They are the constraints on generalizability, applications to practice, and/or utility of findings that are the result of the ways in which you initially chose to design the study and/or the method used to establish internal and external validity" (Labaree, 2009:61). Ideally in the pursuit of research the aim is always to employ methodology that offers the best possible chance of obtaining the set objectives, and by extension answer the research questions.

The sample size for this study was adequate to perform statistical analyses of the data, however a much broader sample size would have generated more depth and allowed for more generalisability. Despite shopping malls offering better diversity than other public spaces, there is still a likelihood of bias in the data as a result of the mall intercept approach.

Another limitation of this study is the instrument used to measure consumer sophistication. The single item measure is not adequate as it does not factor in other facets of a variable. A structural equation modelling (SEM) approach using multi-item constructs would be most effective in establishing consumer sophistication levels of the participants.

Another potential limitation of the study is the wording and clarity of some of the questions in the survey, especially for participants who are not readily aware of some of the references in the mobile technology sector. Some respondents may have proceeded to complete the questions even when they didn't fully understand the question. Some of the evidence of this potential limitation was eliminated as outliers.

A notable limitation of the study is its inability to fully address the "debt financing" problem within the mobile telephony industry. The model constructs employed in the study were rigorous enough to generate data useful in capturing and measure other issues stated in the

research problem, including counterfeiting and e-waste. The same cannot be said about the issue of Batswana financing private consumption through debt.

5.11 Recommendations for future Research

The study does not take into consideration the role of the family and its specific influence on the consumer's level of consumer sophistication. Variables like marital status and number of people in the household were not incorporated in this study, and they have proven influential in socio-demographic analyses before. Further to that this study was only limited to urban mobile phone consumers and future research can look to incorporate a more holistic sample population in order to be able to draw differences in consumer sophistication levels on the basis of geographic location. That is necessary because the household composition of urban dwellers in vastly different from that of rural dwellers in terms of the economics, education, gender, marital status of household heads and many other socio-economic factors. Therefore, due to the fact that a select group of socio-demographic factors utilised in this study have proven to have an effect on the level of consumer sophistication, it would be interesting to further analyse the effect of more socio-demographic factors.

"The conclusion is intended to help the reader understand why your research should matter to them after they have finished reading the paper. A conclusion is not merely a summary of the main topics covered or a re-statement of your research problem but a synthesis of key points and, if applicable, where you recommend new areas for future research. For most essays, one well-developed paragraph is sufficient for a conclusion, although in some cases, a two or three paragraph conclusion may be required" (Labaree 2009:63).

i. Reflection on Experience of research

The study was an exploration of the relationship between sociodemographic factors and the level of consumer sophistication. The researcher's interaction with every day consumers of mobile telephony services in urban Botswana has been a rewarding experience. Apart from the insights generated in the analysis as well as the methodological learnings throughout the entire process, the researcher takes away a greater appreciation of the everyday challenges faced by consumers following the mall intercept approach in the data collection phase. This study was undertaken amid budgetary and time constraints but with a determination by the

researcher to bring it to life in the form of this full written report, without compromising the quality of its findings. Botswana is a small landlocked country with limited bodies of work, and this work represents a tiny step forward for research in general both globally and in the context of Botswana. It is the researchers hope that future research can use this study as some kind of base when it comes to issues of Consumer sophistication, mobile telephony, technology adoption and market segmentation analysis.

5.12 Summary

Low levels of consumer sophistication can lead to poor decision making when it comes to consumption. Amid the rapid mobile uptake and changing market landscape, emerging evidence in Botswana had pointed to issues such as counterfeiting, poor e-waste management and debt financing of private consumption, issues directly linked to poor consumption decisions. This study sought to understand the effects of socio-demographic characteristics on levels of consumer sophistication among urban mobile consumers in Botswana. Gender, Age, Income and Education were found to have a relationship with Consumer Sophistication. To better understand these relationships, the market segmentation theory was used. This chapter started off by briefly restating the problem statement as revealed in the first chapter. The flow then naturally leads into the significance of the study. The segmentation matrix was also explained more extensively than in the previous chapter where it was just a basic presentation of results. The characteristics of all five consumer segments were thoroughly explained. The chapter then went on to present a summary of major findings of the relationship between sociodemographic variables and consumer sophistication. Findings were also explored in relation to the market segmentation theory. Contribution of study to knowledge was explained both in terms of theoretical contribution as well as methodological contribution. After revisiting of ethical considerations, recommendations were made on the basis of findings. The chapter also presented implications for corporate policy and well as public policy. No study is complete without the acknowledgement of shortcomings and therefore the latter part of the chapter recognized the limitations of the study.

(48, 260 Words)

APPENDICES

Appendix A Invitation Letter

Dear Respondent,

You are invited to complete and share further a short survey for a study attempting to understand purchase decisions in mobile technology adoption in Botswana, targeting mobile consumers over the age of sixteen. The study is undertaken in partial fulfilment of the requirements for my doctoral degree at Doshisha University in Kyoto, Japan.
It will take you approximately 4 to 5 minutes to complete the survey. There are no known risks or discomfort associated with participating in this study. You may not directly benefit from this study but the information gathered may provide benefits to society as a whole which includes understanding factors informing current purchase patterns.
Simply click on the link below, or cut and paste the entire URL into your browser to access the survey

http://questionpro.com/t/ALCJFZRWrS

I would appreciate your response at your earliest convenience.
Your input is very important and kindly note that the survey is anonymous and voluntary. Responses to the study will be used only for purposes of research for this project. The research has been endorsed by the ministry of local government by way of issuing a research permit.

NB: If you wish to enter a random draw for five P200 airtime vouchers from the service provider of your choice the survey will prompt you to provide your email details, if you are not interested kindly proceed to submit your survey responses.

If you have any questions, please call me at 76209360 or email me at kbk1052@mail3.doshisha.ac.jp

Sincerely,

Tirelo Modise Moepswa
Doshisha University
Graduate School of Policy and Management
(Division of Technology and Innovative Management)
647-20 Karasuma Street, Kyoto City, JAPAN

Appendix B Data Tables

I seek Information on mobile phone products before making a decision to purchase

Disagree Strongly	10	3.12%
Disagree	26	8.10%

Neither agree nor disagree	20	6.23%
Agree	**169**	**52.65%**
Agree Strongly	96	29.91%
Total	**321**	

Mean	3.98
Standard Dev.	0.98
Variance	0.97

Q13-C25

Without full product information I am unlikely to purchase a mobile phone device

Disagree Strongly	22	6.88%
Disagree	69	21.56%
Neither agree nor disagree	34	10.63%
Agree	**134**	**41.88%**
Agree Strongly	61	19.06%
Total	**320**	

Mean	3.45
Standard Dev.	1.22
Variance	1.48

Q27

Mobile phone retailers currently provide enough information on products

Disagree Strongly	16	5.05%
Disagree	99	31.23%
Neither agree nor disagree	58	18.30%
Agree	**122**	**38.49%**
Agree Strongly	22	6.94%
Total	**317**	

Mean	3.11	
Standard Dev.	1.08	
Variance	1.17	

Q14

Mobile Phone brand is very important to me		
Disagree Strongly	2	0.63%
Disagree	15	4.69%
Neither agree nor disagree	20	6.25%
Agree	**152**	**47.50%**
Agree Strongly	131	40.94%
Total	**320**	

Mean	4.23
Standard Dev.	0.81
Variance	0.66

Q15

I use brand to judge the quality of my mobile phone		
Disagree Strongly	5	1.56%
Disagree	20	6.25%
Neither agree nor disagree	22	6.88%
Agree	**171**	**53.44%**
Agree Strongly	102	31.88%
Total	**320**	

Mean	4.08
Standard Dev.	0.88
Variance	0.77

Q16

I react favourably to advertised mobile phone brands

Disagree Strongly	6	1.88%
Disagree	57	17.81 %
Neither agree nor disagree	77	24.06 %
Agree	**132**	**41.25%**
Agree Strongly	48	15.00 %
Total	**320**	

Mean	3.50
Standard Dev.	1.01
Variance	1.02

Q17

When I want a certain phone brand I don't worry much about the price

Disagree Strongly	21	6.56%
Disagree	107	33.44 %
Neither agree nor disagree	39	12.19 %
Agree	**113**	**35.31%**
Agree Strongly	40	12.50 %
Total	**320**	

Mean	3.14
Standard Dev.	1.20
Variance	1.44

Q19

I can immediately tell the difference between authentic (original) and counterfeit (fake) mobile phone products

Disagree Strongly	22	6.88%

Disagree	66	20.63 %
Neither agree nor disagree	30	9.38%
Agree	**135**	**42.19%**
Agree Strongly	67	20.94 %
Total	**320**	

Mean	3.50
Standard Dev.	1.22
Variance	1.50

Q18

I always go for authentic products rather than counterfeit (fake) products

Disagree Strongly	4	1.25%
Disagree	24	7.50%
Neither agree nor disagree	19	5.94%
Agree	132	41.25 %
Agree Strongly	**141**	**44.06%**
Total	**320**	

Mean	4.19
Standard Dev.	0.94
Variance	0.88

Q22

I always know about new mobile phone products before they reach the market

Disagree Strongly	36	11.25 %
Disagree	**117**	**36.56%**
Neither agree nor disagree	60	18.75 %
Agree	79	24.69 %
Agree Strongly	28	8.75%

Total	**320**	

Mean	2.83
Standard Dev.	1.18
Variance	1.39

Q23

Friends/Family seek my opinion before purchasing new mobile phone products

Disagree Strongly	27	8.44%
Disagree	92	28.75 %
Neither agree nor disagree	63	19.69 %
Agree	**124**	**38.75%**
Agree Strongly	14	4.38%
Total	**320**	

Mean	3.02
Standard Dev.	1.09
Variance	1.19

Q21

I am aware of the health implications of my mobile phone

Disagree Strongly	34	10.63 %
Disagree	99	30.94 %
Neither agree nor disagree	41	12.81 %
Agree	**120**	**37.50%**
Agree Strongly	26	8.13%
Total	**320**	

Mean	3.02
Standard Dev.	1.20
Variance	1.44

Q20

I'm aware of the environmental impact of my mobile phone

Disagree Strongly	26	8.13%
Disagree	103	32.19 %
Neither agree nor disagree	56	17.50 %
Agree	**119**	**37.19%**
Agree Strongly	16	5.00%
Total	**320**	

Mean	2.99
Standard Dev.	1.11
Variance	1.22

Q1

What is your gender?

Male	**179**	**55.94%**
Female	141	44.06 %
Total	**320**	

Mean	1.44
Standard Dev.	0.50
Variance	0.25

Q2

What is your age range?

16-25	118	36.88 %
26-35	**153**	**47.8**

		1%
36-45	32	10.00 %
46-55	11	3.44%
over 55	6	1.88%
Total	**320**	

Mean	1.86
Standard Dev.	0.87
Variance	0.76

Q3

What is the highest education level you have completed?

Junior secondary School and lower	12	3.75%
Senior Secondary School	49	15.31 %
Vocational School/Junior college/Technical college/certificate	26	8.13%
Diploma	69	21.56 %
Bachelor's degree	**119**	**37.19%**
Graduate school	45	14.06 %
Total	**320**	

Mean	4.15
Standard Dev.	1.40
Variance	1.95

Q4

What is your current type of employment?

Regular employee	**134**	**41.88%**
Non regular employee (part-timer, contract employee, temporary worker etc)	21	6.56%
Self-employed	41	12.81 %
Student	95	29.69 %
Unemployed	20	6.25%

Other	9	2.81%
Total	**320**	

Mean	2.60
Standard Dev.	1.55
Variance	2.39

Other Option [Other]

Intern
Banker
Pubisher
Office cleaner
I'm administrative officer
Intern
Masters degree
Pensioner
Diamond sorter

Q5

What is your current job type?

Production/Skilled work	16	7.96%
Managerial work	28	13.93%
Sales	24	11.94%
Retail	8	3.98%
Executive/Managing director	5	2.49%
Clerical work (including admin & accounting)	16	7.96%
Technical work/R&D	22	10.95%
Professional Work(Lawyer, doctor, teacher etc)	**52**	**25.87%**
Other	30	14.93%
Total	**201**	

Mean	5.66
Standard Dev.	2.81
Variance	7.89

Other Option [Other]

Student
Technical work and Supplies (Tendering)
TV producer
urban planner
urban planner
Client experience analyst
Research assistant
Beauty therapist
public relations officer
Middle Management
Logistics
Security
Driver
Electriction
Cleaner
Business woman
Slots host
77514275
Office cleaner
Administration
Hairdresser
Research consultant
Cleaner
Health educator
Public relations officer
Program facilitator
Supplies
Pensioner
Cleaner
Security guard
Loans Officer

Q6

What is your monthly income from all sources?

No Income	36	11.58 %
1 -3,000 Pula	**98**	**31.5**

		1%
3,001 -6,000 Pula	33	10.61 %
6,001- 9,000 Pula	31	9.97%
9,001- 12,000 Pula	37	11.90 %
12,001- 15,000 Pula	21	6.75%
15,001 - 18,000 Pula	18	5.79%
More than 18,000 Pula	37	11.90 %
Total	**311**	

Mean	3.82
Standard Dev.	2.28
Variance	5.21

Q7

Who is your primary mobile network service provider?

BeMobile	16	5.16%
Mascom	**176**	**56.77%**
Orange	118	38.06 %
Total	**310**	

Mean	2.33
Standard Dev.	0.57
Variance	0.33

Q8

What is your subscription type?

Prepaid	**283**	**91.29%**
Postpaid	27	8.71%
Total	**310**	

Mean	1.09
Standard Dev.	0.28

Variance	0.08	

Q9

What type of mobile phone do you currently use as your primary device?

Feature Phone	64	20.65 %
Smartphone	**246**	**79.35%**
Total	**310**	

Mean	1.79
Standard Dev.	0.41
Variance	0.16

Q10

What is the estimated retail value of your primary mobile phone?

Less than P2000	**136**	**43.87%**
P2001-P4000	80	25.81 %
P4001-P6000	55	17.74 %
P6001-P8000	28	9.03%
More than P8000	11	3.55%
Total	**310**	

Mean	2.03
Standard Dev.	1.14
Variance	1.30

Q11

When did you purchase your current mobile phone?

Within the past month	61	19.68 %

Within the past year	**142**	**45.81%**
Within the past 2 years	72	23.23%
Within the past 3 years	20	6.45%
Within the past 4 years	10	3.23%
More than 4 years ago	5	1.61%
Total	**310**	

Mean	2.33
Standard Dev.	1.06
Variance	1.13

Q12

What is your average monthly expenditure on mobile services? (airtime and data)

P200 or less	**112**	**36.13%**
P201-P400	112	36.13%
P401-P600	51	16.45%
P601-P800	20	6.45%
More than P800	15	4.84%
Total	**310**	

Mean	2.08
Standard Dev.	1.10
Variance	1.22

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