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# Utilitarian & Hedonic Drivers of Repurchase Intent in Consumer Electronics: A Study of Mobile Phones

Hilton Madevu

Student Number: 23137496

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# Abstract

This study sought to understand factors driving repurchase intentions for consumer electronics (CE) hardware and in particular mobile phones. The outcome of the study was expected to be of interest in academia and practice because it develops upon existing literature and identifies actionable variables that could be used to optimise market offerings. Based on a literature review it was hypothesised that the intent was driven by hedonic and utilitarian factors. These included conspicuousness and visibility; product bundling; reliability; technological features, usability of the product and the buyers' age.

The study tested these hypotheses using primary data. The method was employed to confirm the postulated drivers as well as to determine the direction of the effects. Data collection was conducted through a cross sectional internet survey enumerated in August 2010. The survey reached a broad sample of 144 responders.

The analysis supported two of the six hypothesised drivers. The supported drivers were conspicuousness and usability. The recommendation was therefore to encourage the CE industry to focus on creating aesthetically appealing, fashionable devices that were intuitively easy to use requiring minimal assistance or product manuals. It also recommends that less emphasis be placed on durability, advanced features, on bundling additional extras and on targeting particular age groups.

## Key Words

Repurchase Intent, Mobile Phone, Cellphone, Consumer Electronics, Conspicuous Consumption, Product Bundling; Reliability; Product Features, Usability, Ease of Use, Functionality.

# Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements of the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria.

It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Hilton Madevu

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Finally to my family and friends who have continued to support this endeavour despite the prolonged absence from their lives that was necessary to pursue it.

# Dedication

To the current & future Madevus around the world.

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# Chapter 1: Introduction & Purpose

## 1.1. Background

Consumers have been observed to engage in the practice of regularly repurchasing or 'upgrading' cellular handsets every twenty four months irrespective of the item's condition. This is in contrast to the practice in other consumer electronics (CE) sectors such as personal computers, satellite television and its associated hardware where repurchasing is not as regular. With the latter CE products, purchases are made in cash or on hire-purchase terms, are purchased separately rather than as a bundle; are retained for longer periods and do not appear to be subject to ritual replacement at predefined intervals.

The casual observer may attribute the behaviour to the mobile phone industry practice of bundling mobile phones into subscription contracts terms that are set by default to a twenty four month period. However customers have the option to opt for less restrictive subscriptions terms or to opt for prepaid facilities that would not include restrictive lock in and renewal periods. Another argument could be that the handsets are marketed as being 'free'. However one would expect customers to see through the marketing rhetoric and notice that the subscription fees and lock in terms more than make up for the so called free hand sets.

It is also possible that consumers perceive mobile phones to be too costly an item to purchase outright. However this argument is also not intuitively sound because other electronics products of similar value to high end cellular handsets and with similar associated subscription services appear to be purchased and repurchase through radically differing means. These

comparable devises and subscriptions include internet access contracts that are bundled with computers or satellite television subscriptions and the associated hardware (the television set, decoders and satellite dish).

Rather than speculate on this atypical consumer behaviour, the current study seeks to empirically test the drivers of replacement behaviour. The findings are expected to be of interest to both the academic marketing and business fraternities for reasons discussed in the following sections. Prior to that justification, the following section will disambiguate some of the key terms used in this research project.

### 1.1.1 Electronics

Electronics is a field of science and technology that is concerned with the use of the controlled motion of electrons through different media (and vacuums) which is applied to information handling or device control. Electronics differs from the electrical science and technology field because the latter field is concerned with the generation, distribution, control and application of electrical power. In its current incarnation electronics technology is applied to devices primarily through semiconductor components. These components then perform the electron control through sets of systems called electronic circuits that form the functional elements of electronic devices. The devices are designed and constructed in the electronics engineering sector and are used to solve a myriad of practical problems (Horowitz & Hill, 1989).

### 1.1.2 Consumer Electronics

Consumer electronics products include electronic equipment and devices intended for regular and everyday use. Consumer electronics (CE) are practically applied to the fields of entertainment, communications and office productivity. Examples of consumer electronics devices include the personal

computer, telephones, mobile (cellular) phone, media players, audio equipment, televisions, calculators, navigation systems, digital cameras and playback and recording of media such as compact discs (CDs), digital video discs (DVDs), and camcorders. Needless to say, consumer electronics products are a prominent feature in multiple facets of modern society (CEA, 2008a). Judging by the examples, these products serve critical needs in the leisure, social, academic as well as business sectors.

### 1.1.3 Consumer Electronics Industry

PricewaterhouseCoopers Limited Liability Partnership (LLP) broadened the consumer electronics industry by defining it as the one engaged in manufacture of electronics products, the creation of services and content for these products, and the distribution of these products, services and content throughout the global economy (CEA, 2008a). In essence they included the entire value chain from product design, to manufacturing, delivery, use, maintenance and eventual disposal. The international Consumer Electronics Association (CEA) estimates that in the USA alone the industry directly employs approximately two million people and is worth US$125 billion. Furthermore a study by the CEA and the GfK Group expected the global spend on consumer electronics in 2009 to reach US$700 billion. This was found to be growing at 10% overall with the bulk of the growth being in middle income countries like South Africa and the BRIC countries (Brazil, Russia, India and China) (CEA, 2008b).

The sheer scale and economic and social clout of the consumer electronics industry justifies not only academic interest but that of business, government and society in general

### 1.1.4 Repurchase Intention

As the word literally implies, repurchasing refers to a repeat acquisition of an identical or similar product. For the purposes of this study CE repurchase refers to situations where consumers buy a subsequent product to fulfil a similar need. The subsequent product does not need to be identical or be from the same manufacturer or brand to the first. It may be an upgrade to the first or merely a replacement. Studying the repurchase of a product would require data observed at the moment of repurchase. For practical reasons this study has opted to use a proxy of repurchasing by eliciting data on consumers' intensions to repurchase. Hence, the term repurchase intention was used with the consciousness that the consumer's intentions may not manifest in reality.

Fernandez (2001) decried the lack of research into repurchase of consumer durables, electronics and other established product classes despite their dominant (up to 75%) role in annual sales volumes. Thus understanding and influencing these repurchase/inter-purchase patterns would improve the accuracy of sales forecasts as well as the management of product life cycles (Huh & Kim, 2006; and Grewal, Mehata & Kardes, 2004). This in turn influences the profitability of current and future product lines and indeed the profitability of the firm and industries in general (Liang, 2008; Reichheld & Teal, 1996).

## 1.2. Research Objectives & Questions

### 1.2.1 Research Objectives

This research aims to identify, analyse and better understand the role played by repurchase intent drivers of consumer electronics and in particular those of mobile phones. This was performed using a quantitative analysis of primary survey data and underpinned by a review academic and popular literature on the CE industry, on repurchase and consumer behaviour.

### 1.2.2 Research Questions

In improving the understanding of CE repurchase intent the research will seek to answer the following questions:

**What are industry specific drivers to repurchase intention in consumer electronics and in particular for mobile phones?**

**Can the drivers prove to be statistically significant as positive or negative drivers to repurchase intention?**

**What are the key consumer characteristics that influence repurchase intent?**

**To what extent do other contextual factors influence the repurchase intention?**

## 1.3. Research Imperative

### 1.3.1 Academic Imperative

Empirical and academic studies in repurchase/inter-purchase (upgrade) behaviour and intent tend to focus on fitting distribution patterns to the time between upgrades (inter-purchase time) for a single product or homogenous classes of products (Jain & Vilcassim 1991, and Huh & Kim, 2006). They note that differences exist between product classes but few explore the drivers of the different patterns between those classes. In some cases there was an implied belief that classes of goods such as durable electronics have homogenous repurchase patterns as depicted in the models developed (Jain & Vilcassim, 1991).

Another recurring limitation in recent repurchase literature (Shukla, 2009; and Roehm & Roehm, 2004) is that they gloss over the potential differences between product categories yet they indicate that financial restraints and level of involvement in the repurchase are important variables in the repurchase

decision. Consumer electronics can become big ticket items especially in the case if cutting edge gadgets. Thus, it is reasonable to deduce that the repurchase behaviour will differ from that of low involvement grocery items as those researched by Shukla (2009) and Wood (2004).

Wood (2004) demonstrated that the relative importance of variables differed widely for different types of products. This lends further credence to the need to investigate the drivers of CE purchase rather than rely on findings from other sectors. Roehm & Roehm (2004) questioned the ability to generalise their buyer behaviour research outside the candy bar context in which they had done theirs. They recommended that futures studies should test consumer repurchase behaviour in other sectors and on other products. Hume (2008) answered the call by investigating the repurchase of the performing arts and the current study proposes to do the same in the consumer electronics market with an emphasis on the mobile cellular phone market.

In addition Lai, Griffin & Babin (2009) researched the repurchase behaviour in China and pointed out that there may be regional behavioural differences thus the need to investigate other regions and discover these nuances. This research will thus contribute to the Southern Africa branch of this knowledge pool.

Spreng, MacKenzie & Olshavsky (1996) on the other hand, noted that although his elaborate experimental design suited his purpose it potentially altered repurchase behaviour that may occur under normal circumstances. He recommends that that future research should rather test the phenomenon in a more natural environment. The study proposed here will steer clear of the more complex designs and thus heeding these authors' recommendations.

It is expected therefore that the academic fraternity would be interested in this study due to the gaps in literature noted here and the exploration of an inconsistency in repurchase behaviour. In addition, since the research does not target a specific brand or company but rather the consumer behaviour in an economic sector therefore it cannot be construed to constitute consultancy work but an academic offering that meets the intended scholarly requirements.

### 1.3.2 Business Imperative

This study will seek to unpack the consumers' processes and the influences in making repurchase decisions. This will highlight the key marketing mix and product life cycles management variables in the CE industry. This information will be of value to second intended audience of this research, namely members of the CE industry's value chain.

The research narrated here expects that the factors that are found to be effective in generating the observed regular repurchase of mobile phones could be replicated in other product categories. For instance the drivers could then be employed to accelerate upgrade behaviour for television sets and for personal computers. By the same token, marketing professionals and business leaders in general would be interested in the insights from this study because of the possibility of employing the strategies and tactics to other products and services.

## 1.4. Report Structure

Following the current introductory and contextualising **Chapter 1** this research report contains a **Chapter 2** which reviews academic and popular literature sources on the CE industry, repurchase intent and consumer behaviour. In so doing a set of hypothesised drivers to repurchase intent were developed. For

clarity these hypotheses are then summarised in **Chapter 3**. **Chapter 4** goes on to outline the method that was employed to test the hypotheses. This is followed by **Chapter 5** where the empirical results of the primary data collection are presented. This is followed by a discussion of the results and key findings in **Chapter 6**. **Chapter 7** then concludes the report by summarising the entire study; discussing some implications drawn from the study as well as recommending areas of future research that were beyond the scope of the current effort.

# Chapter 2: Literature Review

## 2.1. Introduction

The aim of this chapter is establish a context for the research project. This was achieved by evaluating previous documented academic research and popular articles pertaining to the research questions and objectives. By establishing this baseline understanding of the field of study the text will seek to further clarify how this the project expands the frontier of knowledge. The process will also identify the suspected drivers to repurchase intent and thus informs the hypothesis formulation.

## 2.2. Categories of Repurchase Intent Drivers

The theoretical principle of interest this study is the decision-making process that culminates in repurchasing intent. This construct is decomposed in the literature to the related concepts of consumer choice, value for money, quality (Hume, 2008; Okada, 2001; and Bayus, 1991); technology diffusion (Danaher, Hardie & Putsis, 2001); contextual and demographic factors (Sniehotta, Scholz & Schwarzer, 2005).

Scholars in marketing and business argue that products and services are consumed for purposes that extend across a spectrum from fulfilling hedonic to utilitarian needs (Lim & Ang, 2008). At the one extreme, hedonic products are consumed purely for their ability to elicit sensory gratification and for affective purposes (Woods, 1960) or for amusement (Holbrook, 1986). Therefore, hedonic products arouse the emotional elements in people (Mano & Oliver, 1993) and have benefits that are primarily linked to aesthetics, taste, emblematic meaning and sensory experience (Holbrook & Moore, 1981). At the other end of the range, utilitarian products invoke a rational and practical

appeal, are less arousing and provide pragmatic, cognitively justifiable and oriented benefits (Hirshman, 1980; Woods, 1960). Being on a spectrum, products and services concurrently provide both hedonic and utilitarian benefits but will emphasise one of the two. This study will classify the drivers of repurchase intent into these two interacting groups.

Grewal *et al*. (2004), Shukla (2009) and Hume (2008) identified an array of reasons for the replacement and repurchase of goods and services. The hedonic group included visibility in consumption, privacy, styling preferences, and the social-adjustive functions. In general they found that buyers' decisions were influenced by a need to gain social approval and status. The utilitarian reasons identified for repurchase included product features and technology; sales promotions; unreliable performance of the existing unit; as well as demographic factors such as changes in family circumstances; and changes in financial standing.

The next sections delve into the literature surrounding these repurchase drivers, speculates on how they could explain this decision in the consumer electronics sector and develops hypotheses to test the conjecture.

## 2.3. Hedonic Repurchase Drivers

The text here explores the arguments for and against explaining repurchase using factors that appeal to the senses, the subconscious and emotions rather than the pragmatic evaluation. This includes the extent to which the consumption is visible, displayable, conspicuous and knowable (Heffetz, 2004). Visibility and conspicuousness were found to be overlapping concepts. However they are considered separately in the text to enhance conceptual clarity.

### 2.3.1 Public & Private Consumption

Heffetz (2004) describes the difference between private (fundamental) utility and public spectator influenced utility. The former is the self evaluated satisfaction derived from consuming the good or service. The latter is the additional indirect gratification (dissatisfaction) derived from society and spectators' positive (negative) evaluation and thus social approval (disapproval) as well as its effect on the individual's perceived social status. Conspicuous consumption occurs when the latter public gratification overwhelms the former intrinsic value. The relative weighting attached to the two utilities was found to be based on the consumer's perception and influenced by his culture, his nurture, the context, a specific period and his perception of reality (Heffetz, 2004, Ratner & Kahn 2002).

According to Ratner & Kahn (2002) people have vastly differing purchase behaviour in public compared to the private situations. They found numerous factors motivating these differences. The behaviour helps people to express their independence, intellect, and individuality. A case in point was that people were found to purposefully order different items on a restaurant menu from what their table mates had selected. People also purposefully added variety to their consumption when the behaviour was subject to public scrutiny whereas in private they would gravitate toward less diversity and to their favourite items. Consumers were thus observed to sacrifice some of the utility derived directly from consumption of the items in questions in exchange for a favourable public evaluation (Ratner & Kahn, 2002). The current research expects to encounter a similar public scrutiny effect in consumer electronics (CE) and mobile phone repurchasing intent.

This study will therefore elicit the consumer's perception of the extent visibility in the consumption of the CE is important. This self rating will then signal the extent to which the consumer considers this product to be a public versus a private good. Subsequent analysis will reveal the extent to which these factors influence consumer repurchase behaviour.

### 2.3.2 Conspicuous Social Consumption

As early as 1899, Thorstein Veblen identified the tendency of consumers' decisions to be based on the desires for social ascendance rather that necessity. He termed this observation *Conspicuous Consumption* (Veblen, 1899) and is now also termed the Veblen Effect (Rege, 2008).

Veblen distinguished between two states of conspicuous consumption namely *Inviduous Comparison* where a member of the rich distinguishes herself through this frivolous consumption and a second state is *Pecuniary Emulation* where an aspirant to the rich emulates their conspicuous consumption so as to be thought of as being a member of that group.

Veblen judged this behaviour to be frivolous, wasteful and detrimental to overall welfare as it induced the misallocation of resources. For instance it encouraged production of luxury goods for the rich at the expense of basic commodities for the poor masses as well as encouraging underinvestment in necessities such as healthcare and education.

Extensions of this idea have included positional, status goods and the study of public versus private consumption (Grewal, Mehata & Kardes, 2004). These authors concurred that this status signalling was a wasteful practice and advocated for policies to discourage the practice including increased use of luxury taxes.

Eaton & Eswaran (2009) also agreed with this negative view of Veblen goods. They argued that the goods destroyed social capital because as developed societies increased their productivity they were found to allocate proportionately more resources towards producing conspicuous goods and services. Concurrently however, the same society was found to become increasingly dissatisfied and unhappy. Thus the increased productivity and wealth was causing a deadweight loss in welfare through increasingly conspicuous and competitive consumption patterns (Eaton & Eswaran, 2009). It is this researcher's view however that the chain of causality in that research was rather tenuous if not spurious and could merely be coincidence. One could make a counter argument that the unequal distribution of the productivity gains and the wealth increase could better explain the reduction in happiness. Unfortunately this argument was not tested in that study.

Auty (2001) elaborated on the concept of conspicuous consumption by distinguished between identity and compliance purchase behaviour. That is, when people made conspicuous purchases they were not attempting to be like or identify with other people but rather, they were trying to be *liked* by some reference group or groups. Therefore they complied with the group's norms and bought similar conspicuous items as the other members of the group in order to be accepted by the group or to be viewed favourably by that group. This author also argued that conspicuous purchases could be used as a tool to separate that same individual's identity from a disliked group or to stress the buyer's individuality and independence. Auty (2001) found this practice to be particularly prevalent among the peer pressure sensitive young adults and teens as they sought to develop their personal and group identity.

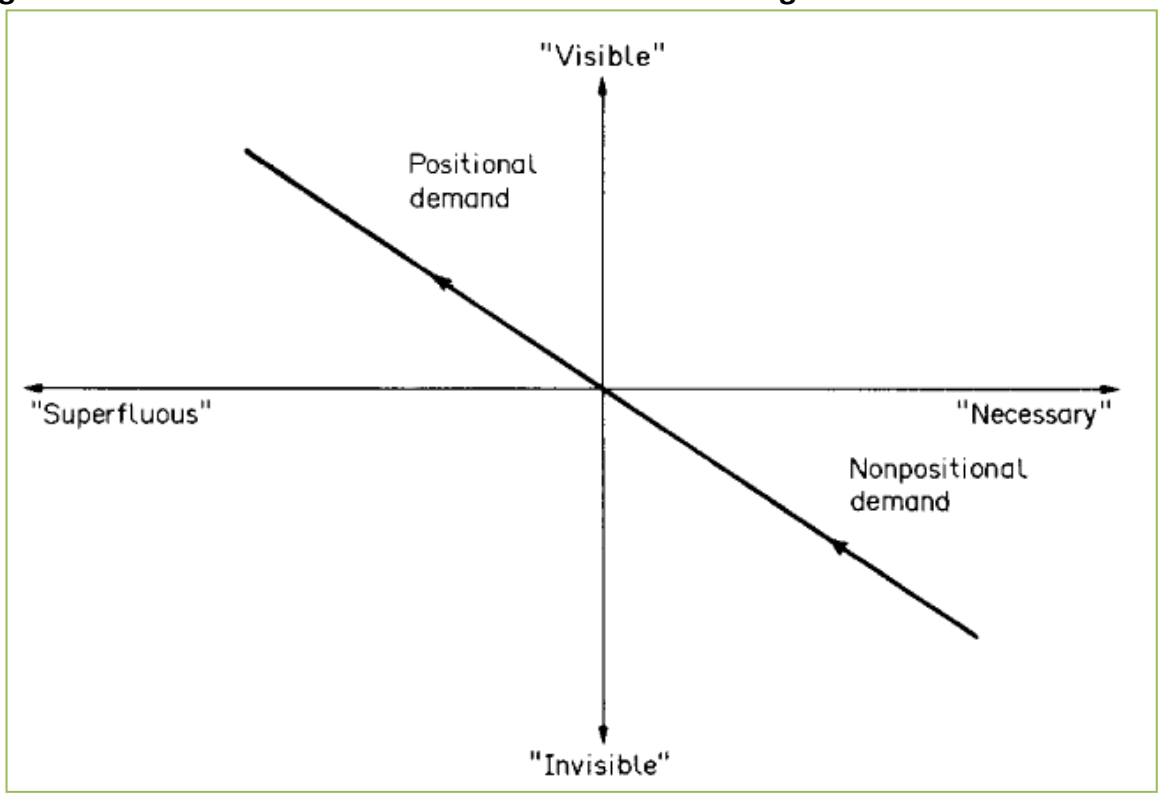
In another extension of this consumption pattern, Rege (2008) developed a mathematical model that showed how conspicuous consumption was useful as

a signal of otherwise unobservable talents and abilities. Similar to Auty (2001), he argued that it served as a tool to identify peers but unlike the earlier Veblen scholars she argued that this effect was welfare enhancing as it could be used as an efficient means to identify opportunities for complementary interactions. For instance business people could use the consumption of conspicuous goods and services as cues to more readily identify counterparts of desired capability levels.

Also, in contrast to convention Rege (2008) argued that tax policies could do precious little to curb this tendency even through luxury taxation and that law makers were ill advised to try because such taxes would merely increase outlay on the Veblen good. A further possible perversion and unintended consequence of taxation is that the increased price of the goods could be interpreted as increased luxury and associated status thus increasing rather than curbing consumption of the good and/or services.

Conspicuous prestige goods (Grewal *et al.,* 2004) are sometimes confused with *Giffen* goods. The latter are low priced and are lower quality goods that the poor consume more of and switch to when they are under increasing budget constraints (James, 1987). **Error! Reference source not found.** illustrates this distinction by showing how status and positional consumption occupying the top left quadrant where visibility and frivolity of consumption are high. This is as opposed to the *Giffen* variety of goods found in the lower right quartile where privacy and necessity of the consumption are high.

**Figure 1: Positional Goods & the Direction of Taste Change**




(Source: James, 1987, p457)

Applying the concept to consumer electronics (CE), this research notes that some CE are mobile in nature and hence can be, and by design are consumed in public while other CE are strictly consumed at a fixed private locations. This could have a significant impact on the customers' purchasing and repurchasing patterns. For instance socialites that frequently entertain guests in their homes could be expected to repurchase home CE such as televisions sets more readily than non-socialites.

Another branch of the *Veblen Effect* was proposed by Solnick & Hemenway (1998) who found that both absolute as well as relative social positions matter. In other words, consumers would value high-end CE as a display of their high social status but that this wealth signal would be eroded over time as other individuals deemed of lower status managed to obtain similar if not higher specification gadgets. This study thus hypothesises that the degree of visibility

in the consumption of CE as well as the relative superiority of the gadget would influence repurchase intentions.

## 2.4. Utilitarian Consumption

This section will discuss the drivers of CE repurchase that have cognitively justifiable (utilitarian) appeal. As mentioned before the factors identified in earlier studies included product features, technology, usability; reliability of the existing units; obsolesce; bundling and sales promotions; as well as demographic factors. Once again the terms were found to overlap depending on the source consulted. It is therefore of importance to explain how the expressions were understood in this study.

### 2.4.1 Features

In addition to image associated with and derived from the consumption of products and services, Wood (2004) and Bayus (1991) listed the desire for enhanced styling, features and ease of use (usability) as a plausible triggers for repurchase. Fernandez (2001) concurred by finding evidence that feature improvements such as increased energy efficiency induced repurchase of heating appliances. Thus one may postulate that innovative features on certain CE, such as cellular phones, evolve at such a fast pace that the devices quickly become dated thus motivating this desire and intent to repurchase.

However the first version of the Apple *iPhone* is an example that appearance and fashionability of a consumer electronics product may be more important than advanced features. The *iPhone* achieved the lofty title of best selling smart-phone in Japan (Softbank, 2009) and number two in the USA (IDC, 2010) despite having one of the lowest hardware feature specifications in its class. The feature shortcomings of this first *iPhone* included a relatively low

resolution three mega-pixel camera, lack of a secondary camera for video calling, failing to support video recording, lack of customisable ring-tones, lack of voice-dialling capabilities, an inability to copy and paste text, inability to handle multimedia messages (MMS), lack of built in navigation system, irreplaceable built in batteries, and a low memory capacity compared to similarly priced smart-phones (GSMArena, 2007). This observation leads the researcher here to question the strength of features as a repurchase intention driver in consumer electronics.

To add to the inconsistency noted above, market research shows that many of the features in advanced mobile phones such as video calling, Bluetooth and Wi-Fi connectivity capability are rarely if ever used by mobile phone consumers (ABI 2009 and World Wide Worx, 2009). In contrast, some consumers display an aversion to improved technology features, software and hardware. They deem these enhancements cumbersome and overly complex (Rice' & Katz, 2003).

Reinforcing this were Thompson, Hamilton & Rust, (2005) who observed what they entitled feature-fatigue. This was observed when certain consumers preferred specialised mobile phones with less features compared to the convergent options available. In fact some consumers saw this preference for seemingly inferior versions of the CE as a means of differentiating themselves and perhaps purposefully establishing retro and thus fashionable appearance. Thompson *et al.* (2005) went on to argue that there was an inverse relationship between the number of features on a CE and its usability. They pointed out that while CE producers tried to increase sales by adding features to the increasingly convergent gadgets these features added complexity to the products in use.

Their recommendation was that CE makers should purposefully limit features added to their CE offerings and rather produce specialised and less complex gadgets serving consumers needs separately and thus also increasing their sales. Needless to say however, CE producers would also be advised to identify the key features sought by their consumers and the optimal assortments of features the buyers would prefer. One could also argue for the provision of customisable CE options where each consumer could choose their ideal bundle of features.

Han, Nunes, & Dreze (2009) argued that price in itself enhances utility and ignites the Veblen Effect discussed earlier. Therefore, high end consumer electronics manufacturers neither need to continuously enhance product feature nor should they pass the gains of improved production efficiencies to consumers. They would be advised to rather maintain price premiums on their CE for as long as possible. Thus, the study encouraged CE producers to engage in market skimming particularly during the product launch phases while the novelty of their product was in play and as a means of recouping research and development costs as soon as possible.

The paradoxes and inconsistencies in the preference for and use of advanced features discussed in this section indicate that the variable needs to be tested to verify whether there is evidence to support the use of product features as a consistent trigger for CE repurchase intent. This study therefore seeks to do just that.

### 2.4.2 Usability

There is considerable overlap between the concepts of CE functionality and the number of features included in the offering as well as the usability of the CE mentioned earlier. For the purposes of this study the CE features are seen to

tie in with the physical aspects of the products while the functionality (usability) more closely refers to the ease or difficulty encountered when using the CE. Features and functions seem to be used interchangeably in the industry (GSMArena, 2007). To avoid ambiguity, this study opted to employ the term 'usability' to denote ease of use.

As mentioned earlier Bayus (1991) found that ease of use as a plausible trigger for repurchase. Some credit the popularity of the Apple *iPhone* despite its feature deficiencies to its superior usability. They find that the series of mobile phones had a superior, customisable and intuitive user interface unlike other smart phones that tend to be complex, buggy and slow to respond (GSMArena, 2007). Simplicity in use was found to be critical given that CE consumers were increasingly averse to consulting lengthy user manuals and preferred products that were so effortless to use that one could operate without instruction (Thompson *et al.*, 2005).

Thus improved usability through simplified human to CE interfaces could be used as a means to bypass the feature fatigue barrier to repurchasing identified by Thompson *et al.* (2005). This study therefore sought to identify the magnitude of the influence of usability as a driver to repurchase intent.

### 2.4.3 Reliability

One would assume that as consumer electronics gadgets begin to break down, requiring repeated repair and become unreliable or permanently cease to function this would form a strong incentive to repurchase a more reliable replacement if the need it served persists.

This effect has been observed in studies by Bayus (1991) and Olsen (2003) albeit in other sectors. Furthermore, it was detected that operation costs increased with the age of appliances and that this inclined the users to

repurchase the good rather than suffer the inconvenience and cost of repairs (Fernandez, 2001).

On the other hand, Strausz (2009) found that reduced durability, impaired reliability and planned obsolesce were of benefit to the buyer. He found that these factors were actually preferred by consumers in some high end electronics markets.

Given the arguments presented above it would appear that reliability is not necessarily a driver to repurchase intent. Interestingly, even where it does influence the intent it is also unclear whether it acts as a deterrent or promoter of repurchase intent. It will therefore be instructive for this study to interrogate the extent and direction of this factor's influence.

### 2.4.4 Obsolescence

On a sinister and related note Anderson (2007) highlighted how manufacturers deliberately shortened product life spans and built obsolescence into their products to guarantee future sales. Although this arguably stimulated economic activity it was also blamed for exacerbating the e-waste problem which generated permanent biological toxins (PBTs) including arsenic, beryllium and cadmium in landfills around the world.

One could speculate that this planned obsolesce explains the disappearance of user serviceable and replicable parts in household appliances such as the replaceable heating elements in kettles, clothing irons and toasters meaning that the whole unit must be scrapped when that component fails.

Encouragingly though, Anderson (2007) also noted that many producers were planning not only for product obsolesce but the subsequent disassembly and recycling of parts of the e-waste generated some of which was used in the upgraded versions of that same or similar CE products. It would be interesting

to observe whether CE users find that their appliances break down soon after the warrantees expired and in the case of cell phones if this occurs by the 24 month anniversary and in time influence the intent to upgrade.

Strastz (2009) argues that built in obsolescence can actually be of benefit to consumers. This is so particularly where quality is multifaceted and experiential; meaning that the product quality can only be observed and evaluated during the post purchase consumption phases. The obsolescence benefit is then realised because the shorter lifespan gives the consumer an earlier opportunity to punish manufacturers for poor quality by refusing to repurchase from that particular brand house. He further explains that if a product only, for instance, lasts half as long then consumers were only willing to purchase at half the price thus negating the economic exploitation argument.

Given the questions surrounding consumer electronics obsolescence these were included in the list of repurchase intent triggers for this investigation.

### 2.4.5 Offer Bundling

Bayus (1988) empirically demonstrated that marketing mix variables and how a product is brought to the markets could be used to shorten the time between repurchases in durable household goods. In an extension of marketing mix investigations Danaher, Hardie & Putsis (2001) emphasised the importance of the subscription services in the first time sale and subsequent purchase of consumer electronic products.

Snoj, Korda & Mumel (2004), showed how value for money and perceived risk were integral factors to the mobile phone purchase decision among consumers in Slovenia. In a separate study (Gupta, Sub & Walter, 2002) it was shown that product bundling could be used to increase sales by reducing the search,

evaluation and risk costs thus giving further credence to the idea that the offering bundle could be a key to increasing the repurchase intention.

This study would therefore seek to extend these discussions by investigating whether this variable influences repurchase intent in combination with the other variables.

### 2.4.6 Consumer Demographics

A recent study by World Wide Worx (2009) showed glaring differences in the technology adoption, preference, uses and attitude of older CE consumers compared to their younger counterparts. Other researchers found similar results and attributed it to the diminishing learning capability as well as resistance to change that increases with age (Rice & Katz 2003; and Huh & Kim 2006).

Kuo, Wub and Deng (2009) added impetus to considering age as a variable when they highlighted the need for future to research to include demographics when investigating purchase decisions. They argued that as consumers progressed through different life stages their family circumstances and financial standing also changed. This would be expected to coincide with changes in needs including the needs associated with consumer electronics.

Researchers such as Snoj *et al.* (2004), Roehm & Roehm (2004), Shukla (2009) and Wood (2004) used the convenience of student samples in their studies. They all went on to point out the need to explore other age groups in order to improve the ability to generalise findings to other markets.

Fernandez (2001) also alluded to a marginal impact of demographics on appliance repurchase but he did not investigate it explicitly. In addition, and as mentioned in the conspicuous consumption discussion, young adults and teens

displayed a tendency to be more susceptible to reference group influences than the general buying population (Auty, 2001).

Given the repeated citing of demographics as a contributing factor to technology use, the purchase and repurchase decision as well as intentions thereof, this group of factors were included as variables for further investigation in this study.

It is recognised that age is highly correlated with changes in family circumstances and income therefore adding the latter variables would be redundant. Instead age will serve as a proxy for demographic characteristics. However, the corresponding demographic data were collected in case age alone proved to be insufficient as an explaining variable.

## 2.5. Summation

This literature review has uncovered a number of drivers of repurchase intent in consumer electronics. These driver were classified into the hedonic (emotive) and utilitarian (cognitive) camps. Among the hedonic variables was the extent of visibility in consumption, extent to which consumption was observable, as well as the product's ability to indicate social status. The utilitarian drivers included CE features, usability and reliability, obsolesce and offer bundling as well as the consumer's life stages and demographics. The next chapter will distil these findings into testable research hypotheses.

# Chapter 3: Research Hypotheses

## 3.1. Hypothesised Repurchase Drivers

This brief chapter serves to crystallise and summarise the findings of the literature review and observations in consumer electronics repurchasing intent knowledge base. To do this study puts forward the six hypotheses below. In each case the alternative hypothesis was that the nominated driver had no bearing on repurchase intent.

Firstly, the intention to repurchase publicly consumed and observable consumer electronics is higher than that of privately consumed consumer electronics because the former helps to indicate the buyers' status (Rege, 2008 and Heffetz, 2004) thus:

**$H_1$: Repurchase intention is higher for CE that are consumed visibly relative to those that are consumed inconspicuously.**

Secondly, perceived innovation including obsolesce of features increases repurchase intentions as buyers seek to keep up with the innovations (Wood, 2004, Fernandez, 2001 and Bayus, 1991). In other words:

**$H_2$: Repurchase intention is higher where CEs are perceived to have new additional product features than for CEs that are not seen to have added features.**

Thirdly, the perceived improvements in usability increases repurchase intentions because consumers prefer CE with intuitive interfaces (Bayus, 1991 and Thompson *et al.*, 2005) so that:

**$H_3$: Repurchase intention is higher when consumers perceive a high level of CE usability than when consumers find usability to be relatively low.**

Also, unreliability or product deterioration increases repurchase intention (Fernandez, 2001and Strausz, 2009). Thus buyers seek reliability in consumer electronics and will be less likely to repurchase if the current gadget is reliable therefore:

**$H_4$: Repurchase intention is higher for CE with low reliability than it is for CEs have relatively high reliability.**

Consumer electronics that are purchased as part of an offering bundle feature higher repurchase intent than those that are not because their value is easier to evaluate and are perceived as being of greater value (Gupta *et al.*, 2002) so:

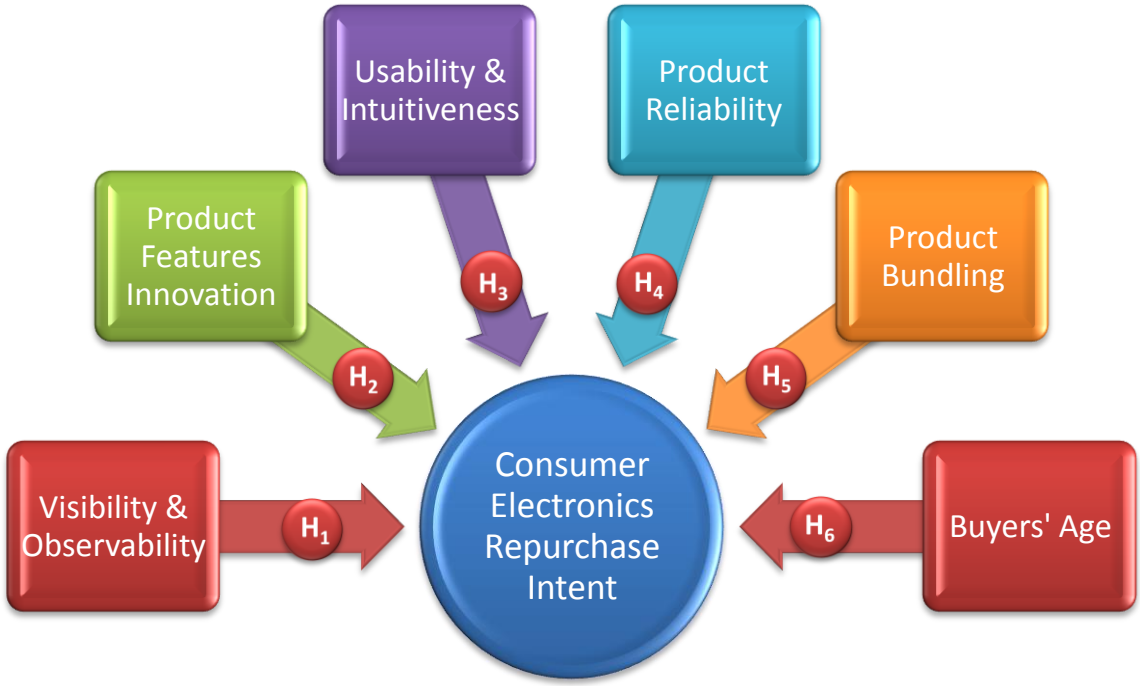
**$H_5$: Repurchase intention is higher where the CE offer bundles are expanded than where the CE offer bundles are comparatively narrow.**

Lastly, younger consumer electronics consumers show higher repurchase intention than their older counterparts because they prefer to be on the cutting edge of technology (World Wide Worx, 2009, Rice & Katz, 2003 and Huh & Kim, 2006) thus:

**$H_6$: Repurchase intention is higher for younger CE consumers than it is for older CE consumers.**

The six hypotheses may be diagrammatically summarised as shown below (Figure 2).

**Figure 2: Conceptual View of Repurchase Decision Drivers**




## 3.2. Summation

The current chapter delineated the six research hypotheses that were tested in this study. The next chapter presents the research methods, tools and designs that were applied to test these hypotheses.

# Chapter 4: Research Method

## 4.1. Introduction

This chapter begins with an overview of the chosen quantitative and descriptive research method. This is followed by an outline the population of interest and the sampling method employed. Subsequent to this is a discussion of the survey instrument, its design and pilot testing. The penultimate section contains a description of the means by which the research hypotheses were operationalised into questions to repurchasers of consumer electronics (CE). The chapter is then concluded with a synopsis of the preceding text.

## 4.2. Overview of the Research Method

Following the findings from the literature review this research project employed quantitative and descriptive statistics method. The descriptive section examined the data for anomalies then the quantitative analysis (ANOVA) was used to test the six hypotheses generated earlier.

Choosing the research method was guided by a process of elimination suggested in Zikmund, (2003). Firstly the exploratory research method proved inappropriate because, as shown in the literature review (Chapter 2:), some knowledge of the phenomenon already existed and could be formulated into a set of the hypotheses (Chapter 3:). However the hypothesised repurchase drivers and their directionality were not confirmed. Hence the phenomenon was not ready for causal research. In addition repurchase intent was an intangible variable composed of attitudes, perceptions and numerous situational conditions. Thus the causal research method was ruled out.

Quantitative and descriptive research proved to be best suited for this study because a set of plausible drivers had been identified and the techniques could

then be used to measure the validity, directionality and magnitude of these hypothesised drivers. In addition the method would provide the diagnostic information to inform future causal research.

The primary data collection tool was an internet based survey featuring context setting questions including inquiries into the respondent's demographical circumstances. This was followed by a series of Lickert Scaled questions used rate the respondents' preferences in relation to the six hypotheses.

The order of the questionnaire sections was randomised so as to reduce none response to any one section that could occur if it were consistently last to be posed. In addition, sifting questions were posed early on so that respondents only encounter relevant questions. For instance if one did not own a cell phone contract, no further contract related questions would be posed. This method was expected to result in each respondent encountering a smaller set of relevant questions which in turn would reduce fatigue and improve the response and completion rates (Vincente & Reis, 2010; Zikmund, 2003).

## 4.3. Electronic Surveys

Like other research tools, electronic surveys have positive and negative implications. The following text reviews these pros and cons.

Lai *et al*. (2009) only managed achieved an 11.8% response rate in a post mail survey of consumer behaviours in the telecommunications sector. One of their main recommendations for future research such as the present study was to rather use other, more contemporary survey tools such as email and internet based surveys to improve response rates.

Global internet connectivity grew exponentially in 1995-6 and doubled annually for the rest of the decade particularly in the developed economies (Department of Commerce, 1999). South Africa was not far behind. The Internet first became publicly available to South Africans in 1994 shortly after the first democratic elections (Brown, Collins, Malika, Morrison, Muganda & Speight, 2007). According to that report it took off with similar fervour to international trends at growth rates of over 90% annually until 1998. By 2004 connectivity could be classified as firmly established (Table 1).

**Table 1: Assessment of Status of Internet Connectivity in 2004**

| Dimension | Level | Comment |
|---|---|---|
| **Pervasiveness** | Level 3: Established | Approximately 3,4 million users |
| **Geographic Dispersion** | Level 3.5: Highly Dispersed | Points of Presence (PoPs) in over 100 cities & in all 9 provinces, but rural access was still scant |
| **Sectorial Absorption** | Level 3: Common | Across all sectors there was leased line connectivity, but below 90% except for higher education |
| **Connectivity Infrastructure** | Level 3: Broad | Slow broadband uptake & the closing of South Africa's second Internet exchange were troubling |
| **Organisational Infrastructure** | Level 3: Competitive | Healthy Internet Service Provider (ISP) industry, but a *de facto* monopoly on fixed line provision |
| **Sophistication of Use** | Level 3: Transforming | SA successfully embraced the Internet Liberalisation policies & should help spur innovation |

Adapted from: Brown *et al.* (2007)

These authors' research found that the internet had been taken up in all sectors and particularly so in education, health, government and in commercial sectors respectively. The infrastructure for internet connectivity was considered broad and the organisational infrastructure competitive (Brown *et al.* 2007). The phenomenal uptake of the internet in South Africa and abroad spurred its first use as a survey channel.

One of the earlier electronic survey analysts, Cobanoglu, Warde & Moroe (2000), found that web based surveys increased response rates by at least 160% among hospitality professionals compared to the post, and increase the target's reaction by 55% compared to the fax route. Other researchers found similarly encouraging results in a variety of populations (McMahon, Iwamoto, Masoudi, Yusuf, Sevenson, David, Chu & Pickering, 2003; Duffy, 2002 and Andrews Nonnecke & Preece 2003). In addition, these researchers found that the method reduced processing costs, increased response speeds and improved questionnaire completion rates. They however also cautioned that validity of the results was dependent on a considered selection of the sample, potential externalities, privacy and security concerns (Duffy, 2002).

The population of concern in this study are users of high end consumer electronics devices. One can deduce that a significant proportion of this population would also be internet users on those and other electronic devices (Brown *et al.* 2007). Thus, using a web based survey tool is not expected to introduce significant sampling bias.

Other potential errors were extremity bias associated with Likert scales and social desirability bias as responders try to appear unique and/or considered in their repurchase intent decision making. These will be ameliorated as far as possible through pre-testing the survey tool, indirectly posing some of the questions and including some triangulation questions.

## 4.4. Population

The population of interest here were consumers who intended to repurchase cellular phones. This product served as a proxy for the consumer electronics sector. Given the temporal and budgetary limits, this study focused on subjects within metropolitan areas of South Africa with an internet connection. Despite

this limitation the study was set in the economic hub of the African continent wherein Brown *et al.* (2007) found resided the most highly internet connected population on the continent. Thus the research findings and implications thereof are expected to resonate with other cosmopolitan settings of the world.

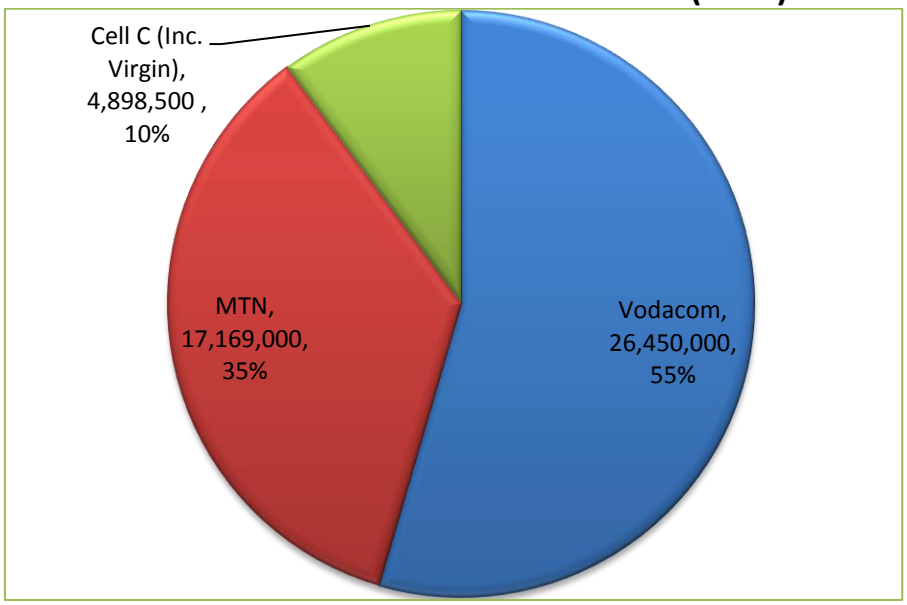
## 4.5. Sampling Method

In the absence of access to a database of consumer electronics repurchasers from which to draw the ideal random sample, a respondent driven "snowball" sampling (RDS) procedure was used in this study. According to Heckathorn (2007) peer recruitment methods such as RDS can produce asymptotically unbiased population estimates under certain assumptions. In other words when RDS based surveys achieve large sample sizes the probability of a sampling and response bias tend toward zero (Heckathorn, 2007).

A large sample size also enables the required cross comparisons and statistical testing needed to answer the research questions. At the bare minimum however, at least 30 qualifying respondents were required to test each of the hypotheses (Zikmund, 2003). However, this was not to say that 180 (6 X 30) respondents were the required minimum sample size because the hypotheses overlapped. Thus a respondent could qualify to test multiple hypotheses (Vicente & Reis, 2010).

In addition to the large sample size which ensured statistical significance of the sample, this study sought to reach a representative set of cellphone networks. It therefore sought to reach network users in a similar proportion to the prevailing market shares in South Africa. According to BMI-Techknowledge (2009) three mobile operators, Vodacom, MTN and Cell C served the South African market (Figure 3).

**Figure 3: SA Mobile Telecoms Provider Market Shares (2009)**




Source: BMI-Techknowledge (2009)

As at 31 December 2008, there were 48,517,500 subscribers in the country this represented an increase of 10.6% compared to the previous year. Therefore it would be ideal to reach a similar market share distribution among the responders.

## 4.6. Maximising Response Rates

Vicente & Reis (2010) conducted a literature review of electronic survey design and synthesised six key considerations to minimising non response and improving completion rates. These six include structure, disclosure of survey progress, visual presentation, interactivity, format of responses and survey length.

The cardinal guide to web survey design was that the tool should be easy and motivating for respondents to understand and complete (Vicente & Reis, 2010). The following text reflects on this design guidance and illustrates how the recommended mix of features was incorporated into the survey tool for the current study.

Vicente & Reis' (2010) review found no significant difference in response or completion rates between the single page scroll questionnaire, screen by screen version and hybrids of the two versions. However, the risk of unintended item omission was higher in the scroll questionnaire version where numerous questions appeared on the same page. Thus this research opted for a design that favoured a screen by screen questionnaire rather than scroll version.

While employing forced responses and showing error pages where questions were missed was shown to reduce non response it also increased abandonment rates by annoying respondents that had intentionally omitted questions. Thus, this study did not use the mandatory or forced response tools but rather highlight omitted responses yet still allowing the responder to ignore the reminder and proceed to the next screens.

It was also found that email attachment surveys were had an eight percent (8%) higher response rate than website links because the former did not require downloading and uploading of foreign files hence had minimal risk of computer viruses (Dommey & Moriarty, 2000). However these results were from a 10 year old survey and advances in antivirus technology may have altered respondents' perceptions towards internet viruses (Vicente & Reis, 2010). To mitigate this response dampening risk this research used a highly rated survey website that provided guarantees of privacy and that had up to date internet security certification.

Vicente & Reis (2010) also advised that interactive questionnaires that showed completion progress resulted in improved response rates but this was only true for short and moderately long questionnaires. For long questionnaires it was advised that the enumerator rather use intermittent progress updates.

Unfortunately there was no standard measure of the length of a survey questionnaire. The studies reviewed in Vicente & Reis (2010) found that length metrics included number of questions, number of pages, completion time as well as length of the individual questions. A subjective means was therefore used to deem this research's instrument as 'long' because it took more than ten minutes to complete. As a consequence the researcher opted to use intermittent progress updates.

Research surveys by their very nature impose an encumbrance on respondent by consuming their time and effort. It therefore stands to reason that quicker, shorter and simpler the survey instruments have higher response and completion rates (Vicente & Reis, 2010). An important design criterion was therefore to ensure that the tool was optimally accessible and minimised its impact on respondent's time and effort. This required a tool that was flexible, to contain skip logic, allowed piping, question randomisation and was certified as secure (Leland, 2008).

## 4.7. Web Survey Vendor Selection

Leland (2008) defined the key criteria for selecting web survey as follows:

1. Flexible survey look and feel:

- Tools and functions that allow the surveyor to customise their questionnaire graphics and branding

2. Skip Logic:

- This refers to the facility that allows for survey complexity automatically skip sections of questions that do not apply to a respondent. For instance respondents that answered "no" to having a contract mobile phone a question could skip all other related questions.

3. Piping:

- This facility allowed the researcher to pull answers from earlier parts of the survey into later related fields. For instance, where a respondent mentioned that they owned a Samsung mobile device; a follow-up question would be, "How would you rate the ease of using your Samsung?" thus filling in the name of the CE from the previous question.

4. Randomisation:

- The order of a set of questions, or the set of answers to a given question, has been found to affect survey responses and thus the quality of the data (Vicente & Reis, 2010). Thus the chosen survey tool contained a tool to randomise the order of questions and answers in order to minimise this error (Leland, 2008).

Ideal as the above mentioned points may be, these requirements needed to be balanced with the associated subscription costs. According to Leland (2008), software targeted at corporate entities could easily be priced in the hundreds of thousands of United States dollars. He therefore recommended that the best tool meeting this criterion for academic research was provided by SurveyGizmo (www.surveygizmo.com). In addition differential pricing, a key differentiator offered by this website was its ability to randomise questions which was typically only available on enterprise specific software. This was the chosen vendor for the web survey tool used in this research project.

## 4.8. Designing the Survey Instrument

Where possible this research attempted to borrow measuring systems for repurchase intent from previous studies in this and other fields of study. The following text discusses the sections of the survey tool pertaining to each of the research hypotheses that were tested. In so doing the section motivates the selected mode of probing. Prior to that however the paper outlines some

overall survey design nuances that were observed in relevant earlier studies and how they were employed in the present research.

### 4.8.1 General Considerations

There appears to be no definitive number of questions required to test each hypothesis. In fact researchers describe the process of choosing the number of questions as an art rather than a science (Vicente & Reis, 2010). The number of questions is driven by the complexity of the constructs involved and the overall length of the survey tool. In general the concepts were tested using a minimum of three triangulating questions but this could be increase to 10 questions (Auty, 2001; Ratner & Kahn, 2002; Snoj *et al.*, 2004; Thompson *et al.*, 2005; Lim & Ang, 2008; Lai, 2009; Kuo *et al.*, 2009; Roehm & Roehm, 2005; Shukla, 2009).

Wiggins & Bowers (2008) advised that questionnaire design involves considering how the data will be analyzed, as well as the financial and time constraints. Thus the questions in this study were based on the research hypotheses. They also used seven point Likert scaled questions to attach weights to the respondents perceived the repurchase intent drivers (Shukla, 2009). As seen in the literature review the direction of the drivers is contentious thus the Likert scales will range from negative three to a positive three with zero as the midpoint. The demographic the questions were asked outright. The use of a web survey addressed the financial and time constraints since, as discussed earlier; they were a relatively cheap method that could achieve rapid responses within a short time.

Wiggins & Bowers (2008) also advised that the questions should help respondent recall by explicitly defining the period in question, giving specific cues such as who, what, when, where as well as avoiding long question. They

proceed to recommend that one avoid using jargon, to avoid ambiguous terms (such as usually, average, you and often) and to avoid asking for judgmental estimates. All these considerations were employed in developing the questionnaire (Appendix 3).

### 4.8.2 Questionnaire Structure

Siniscalco & Auriat (2005) offered six key considerations to the questionnaire structure that were employed in this study. These are:

1. Non-sensitive demographic questions should be asked first because they are easy to answer, non-threatening and help put the respondent at ease. Thus the demographics sections were set to appear first and were not part of the randomised question ordering.

2. Key items to answering the research questions should be next since there is greater probability of the respondent completing the first section. In this case however all six hypotheses are considered important thus their order was be randomised.

3. Sensitive items that cover controversial topics should be placed last so that the potential resentment incited did not influence responses to other questions. The use of categories rather than specifics also helps to increase responses (Wiggins & Bowers, 2008). This advice did not apply to the current study because none of the issues here were considered inflammatory.

4. Although related issues should be grouped care should be taken to ensure that earlier questions do not influencing responses to later items. Thus the questionnaire for this study was organised into sections addressing each of the research hypotheses.

5. Items with similar response formats should be (and were) grouped together when different response formats were being used within a questionnaire.

6. Section titles should be used to help the respondent focus on the area of interest.

These six structural recommendations were also duly incorporated into the survey design.

### 4.8.3 Scale of Measurement

This section outlines the metrics and scales used to operationalise the hypotheses into questions to be posed. The scales were a combination of those found in literature as well as custom metrics developed specifically for this study.

#### *4.8.3.1 Demographics and Context*

This section will simply include questions about the respondents' age, sex, income bracket, marital status, number of children. This section also included context and sifting questions including whether the respondent has contract or prepaid service and if they have ever changed handsets. Some of the questions were not directly linked to the hypotheses being tested but were included to help explain any possible anomalies that could emerge in the subsequent data analysis.

#### *4.8.3.2 Conspicuousness*

Heffetz (2004) developed a visibility index (Vindex) to determine consumers' perceptions about the relative visibility and conspicuousness of various goods and services. He suggested that one ask how easy it was for people to notice the item in question. Auty (2001) recommended the inclusion of questions about fashionability, trendy-ness, being envied, being an individual and the importance of being liked. In addition to these suggested issues, this study

included questions about how socially outgoing the respondent is, appearance (aesthetics) of the CE good, deterioration of the goods appearance and importance of its uniqueness.

#### *4.8.3.3 Innovation in Features*

Wood (2004) simply asked about the relative Importance of the list of features provided when selecting a cellphone. Over and above the basic telephony and text messaging capabilities, GSMArena (2007) provided a comprehensive list of features to consider when purchasing a cellphone. However they highlighted that the important ones included battery life, onboard memory, removable memory, camera quality, video calling, video recording, ring-tones, voice-dialling, multimedia messaging (MMS), built in navigation system and sound quality. The importance of each of these important cellphone features was tested along with extent of the feature use, frequency of use and the user's expertise at using the features.

#### *4.8.3.4 Usability*

This study included a rating of the importance of ease of using a cellphone (Wood, 2004). Thompson *et al.* (2005) suggest asking how important the ability to use the good without consulting the owner manual was. The study included these scales and also checked if customers preferred the challenge of a complex gadget over simple devices.

#### *4.8.3.5 Reliability*

Bayus (1991) and Olsen (2003) measured the reliability concept by counting the number of repairs to the good, the frequency of repairs and time to product failure in months. This report will also include the replacement of parts such as batteries and accessories (charger, hands free sets, pouches and covers).

#### *4.8.3.6 Bundling*

To test the influence of the product bundles, consumers were asked if, given the choice and at similar prices, they preferred a pre-set bundle as compared to assembling the components themselves (Gupta *et al*., 2002). In addition the report tested whether handset repurchase periods would increase or decrease if they were supplied separately. This was also checked by comparing the repurchase intentions of consumers that held cellphone contract to their prepaid counterparts.

## 4.9. Pilot Test

As recommended by professional researchers the survey tool was pilot tested before being deployed (Vicente & Reis, 2010, Zikmund, 2003). The emphasis of the exercise was to remove ambiguity, eliminate superfluous questions, to check ease of using the survey tool, time taken to complete the survey, logical flow of questions, as well as to check for software defects in the skip logic and piping tools. Prior to the pilot testing the tool was also subjected to expert reviews by the research supervisor and the consulting statistician. Recommendations and findings from these reviews were used to develop the final version of the survey website.

## 4.10.Data Analysis

The primary data analysis tool was Statistical Analysis Software (SAS) and was used in combination with Microsoft Excel. SAS was used to perform the reliability and validity tests, the descriptive tests, as well as the hypothesis tests. The hypothesis tests were performed using correlation tests within the General Least Squares function of the SAS program (SAS Institute, 2008).

The Microsoft (MS) Excel program was used to perform the preliminary data cleaning to find, amend incorrect entries and remove capturing errors. MS

Excel was also used to generate charts used to present the data in graphical forms particularly in the descriptive data analysis procedures.

## 4.11.Reliability Tests

Cronbach alpha reliability tests (in the SAS toolset) were used to evaluate whether groups of scale variables testing the same construct were internally consistent and thus reliable for use in the subsequent hypothesis testing procedures (Santos, 1999). This was only relevant for scale variables that involved using multiple questions to eliciting responders' opinions on a single construct (Devellis, 1991). As such this procedure was relevant only to questions 12, 16 18 and 26. In these four instances the component questions were rolled up into four groups.

To be deemed to be stable and reliable the group of responses would need to achieve a Cronbach alpha value of between 0.60 and 0.95 but ideally above 0.70 (Cortina, 1993). In cases where the critical alpha values were not achieved the variables were considered for transformation. However the transformations were only performed where this was theoretically justified (Santos, 1999). If the signs of unreliability persisted or there was no theoretical justification for transforming the raw responses the variables were deemed to be genuinely unstable and thus omitted from the subsequent hypothesis testing.

## 4.12.Consistency Matrix

The following array (Table 2) matches the research hypothesis to the relevant literature, indicators used to operationalise the hypotheses, and the statistical tool used to test the hypotheses. As mentioned earlier, all primary data was collected using an internet based cross sectional survey. The table therefore links Chapters 2, 3 and the current Chapter 4.

**Table 2: Research Consistency Matrix**

| Hypothesis | Literature | Construct definition | Testing |
|---|---|---|---|
| **$H_1$: Repurchase intention is higher for CE that are consumed visibly relative to those that are consumed inconspicuously** | Grewal, Mehata & Kardes, (2004); Auty (2001); Rege (2008); Veblen (1899); and Solnick & Hemenway (1998) | Visibility indicators including: fashionability, being trendy, enviable, individuality, public use occasions & attracting amorous social appeal | ANOVA |
| **$H_2$: Repurchase intention is higher where CEs are perceived to have new additional product features than for CEs that are not seen to have added features** | Wood (2004); Fernandez (2001); Rice, & Katz (2003); and Han, Nunes, & Dreze (2009) | Ranking the relative importance and levels of use of both basic & advanced cellphone features | ANOVA |
| **$H_3$: Repurchase intention is higher when consumers perceive a high level of CE usability than when consumers find usability to be relatively low** | Bayus (1991); (GSMArena, 2007); (Thompson *et al.*, 2005). | Rating importance of ease of use, user manual usage, & preference for complexity | ANOVA |
| **$H_4$: Repurchase intention is higher for CE with low reliability than it is for CEs have relatively high reliability** | Olsen (2003); Strausz (2009); Fernandez (2001); and Anderson (2007) | Expected & actual time to product failure; number & frequency of repairs to handset, batteries and accessories & preference about these variables | ANOVA |
| **$H_5$: Repurchase intention is higher where the CE offer bundles are expanded than where the CE offer bundles are comparatively narrow** | Danaher, Hardie & Putsis (2001); Snoj et al. (2004); and Gupta, Sub & Walter, 2002) | Preferences for bundled extras, service quality, & service charges and their influence on repurchase intent | ANOVA |
| **$H_6$: Repurchase intention is higher for younger CE consumers than it is for older CE consumers** | Rice & Katz (2003); Huh & Kim (2006); Kuo, Wub & Deng (2009); Roehm & Roehm, (2004); Shukla (2009); and Fernandez (2001) | Demographics | ANOVA |

All primary data will be collected using an Internet based cross sectional survey.

## 4.13.Conclusions

This chapter delineated the details surrounding the chosen research method. This included a description of the target population, the sampling method employed and how the survey was deployed over the internet. This was followed by a discussion about design of the survey instrument, the expert review processes, the pilot testing and the data analysis and testing tools.

# Chapter 5: Results Presentation

## 5.1. Introduction

As the title implies, this chapter presents the survey findings. It begins with a description of the data gathered from responders using descriptive statistics. This is performed to ensure that the data was sufficient to answer the research hypothesis. That section was followed by analysis of mean findings to check if the findings stood up to intuitive reason. The reliability and validity tests followed but these tests only applied to grouped variables that were designed to test a single construct. The final section then tested the hypothesised differences in means using correlations (ANOVA).

The section was then closed with a summary focused on the results of the hypotheses testing. This listed and interpreted the hypotheses statistically supported by the data as well as those that were not supported.

## 5.2. Responders' Profile

The internet based survey was launched on the tenth of August 2010 with the objective of achieving at least 100 wholly completed questionnaires. Upon termination of the survey four weeks after launch on the third of September it had reached 144 unique responders. Of these responders 103 had completed the entire survey. In addition there were 41 usable partial responses. The usable partial responses were defined as people who had not reached the last page of the website but had answered enough of the questionnaire to be included in the testing of at least one of the research hypotheses. In addition a total of 83 responses were recorded as having been abandoned. However these were mostly composed of responders that read the introductory

message and opted to return later to complete the survey. Thus they were not added to the usable sample.

Lastly the internet provider (IP) address logging feature in the SurveyGizmo tool ensured that repeat responders were identified and merged into single responses.

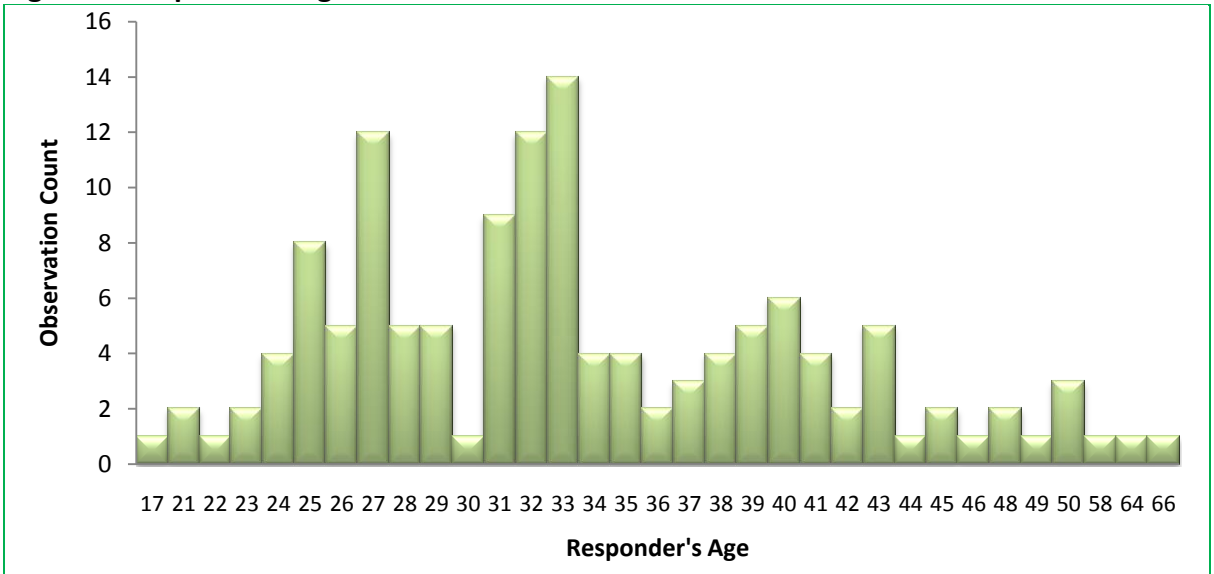
## 5.3. Descriptive Statistics

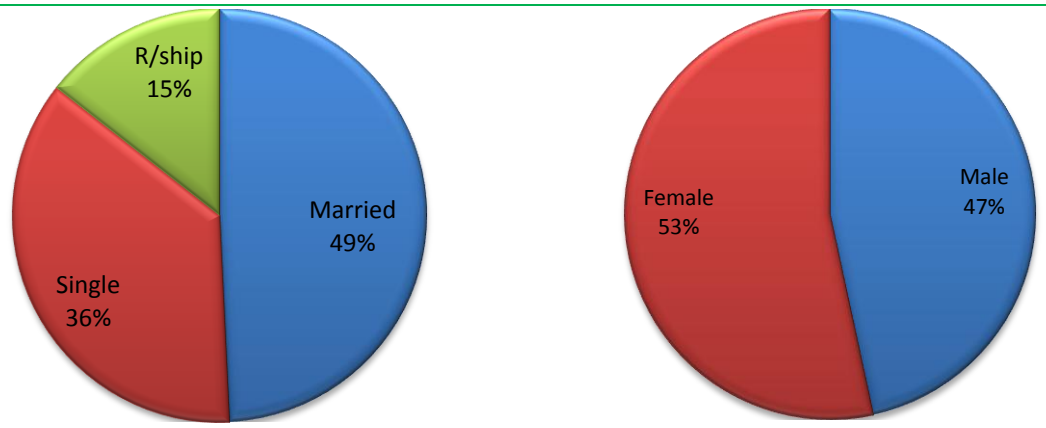
This section is divided into the six major themes of this study which were also subsections of the survey instrument. These themes were firstly the demographic profile of the responders; the corresponding cellphone ownership and patterns of use; preference for and use of device features; perceived reliability of the devices; and lastly an analysis of product bundling preferences.

### 5.3.1 Responders' Profile

As mapped out in Figure 4 the responders' ages ranged from 17 to 66 years with a standard deviation of 8.2 years and a mean age of 33.8 years. The modal age was also 33 years but three main groups could be observed (Figure 4) the first being the mid-twenties, the early thirties and the early forties.

**Figure 4: Responder's Age Distribution**

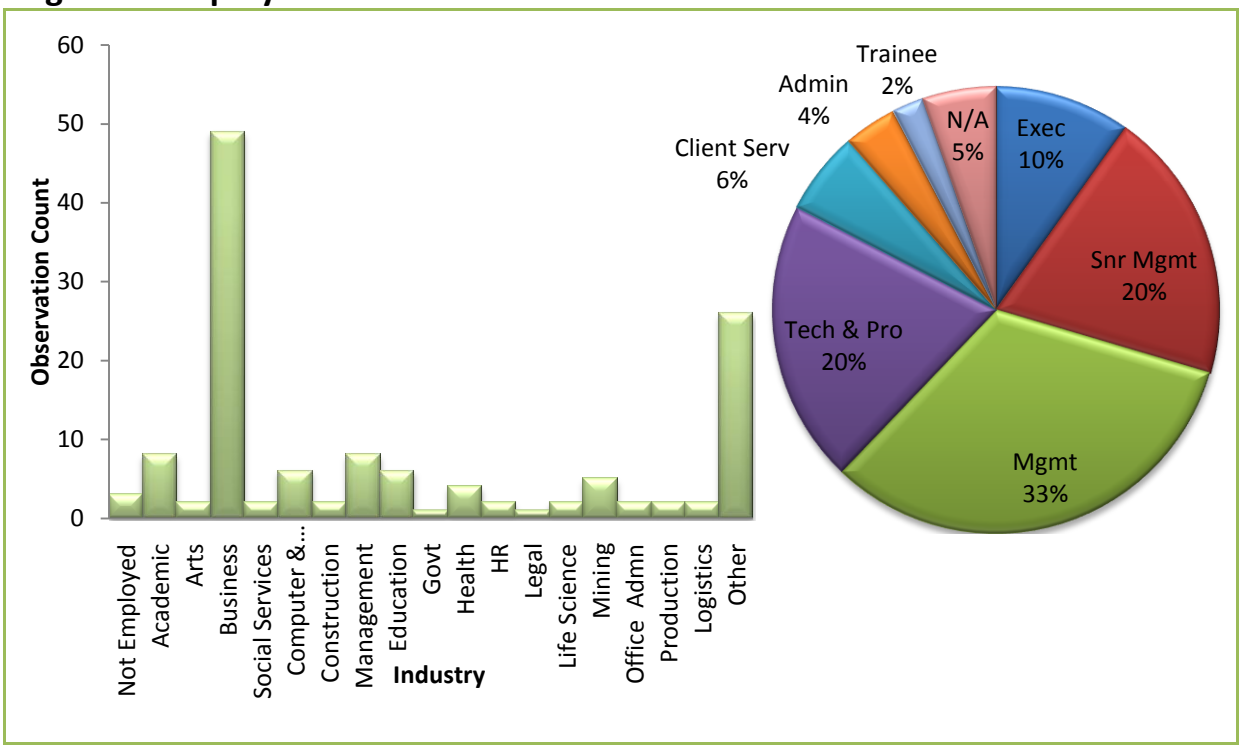



| Responses (N) | Mean | Std Dev | Minimum | Maximum |
|---|---|---|---|---|
| 133 | 33.7518797 | 8.242909 | 17 | 66 |

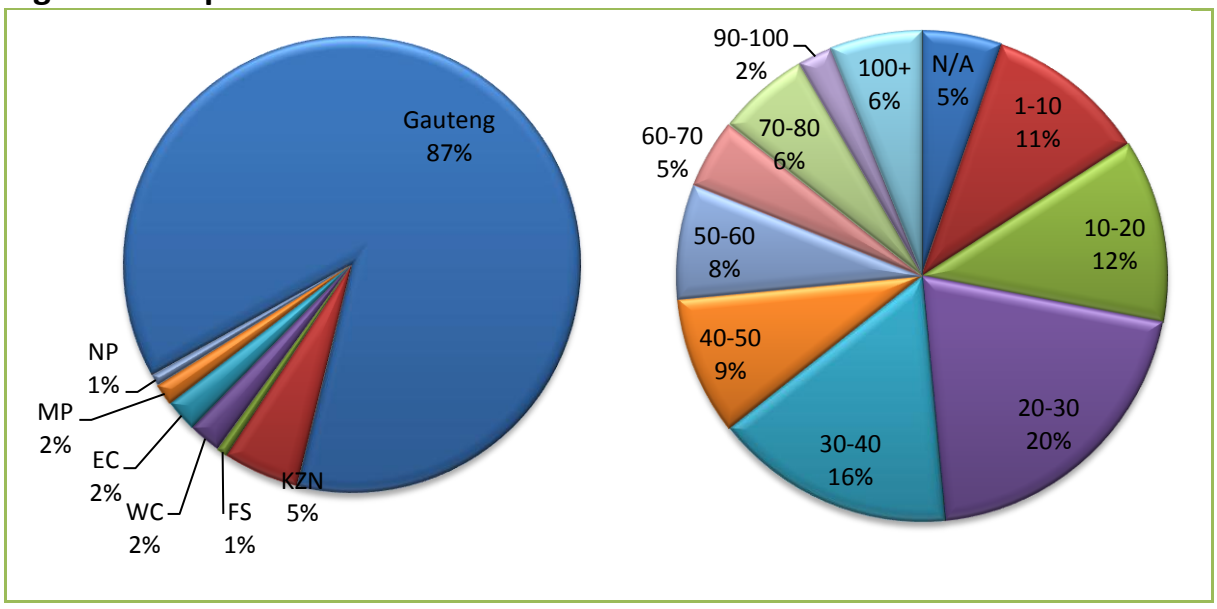
The gender profile was almost even with 53% of responders being female. Almost half the sampled mobile phone users were married with 15% classifying themselves as being in a relationship. Figure 5 shows the employment profile of the responders. It shows that most responders were in business and other unspecified categories.

**Figure 5: Employment Profile**




Responses were heavily weighted towards the most populous and technologically advanced Gauteng province. There were no responders from the sparsely populated Northern Cape and North West (Figure 6).

**Figure 6: Responder's Location & Income Profile**




Also shown in Figure 6 is that almost half the sampled population earned incomes between R10,000 and R30,000 per month. However the sample also

covered a wide spectrum of incomes from the low earners (R0 to R10 per month) to very high income groups (more than R100,000 per month).

### 5.3.2 Cellphone Consumption

The majority (80%) of the private phone owners that participated in this study were on a cellphone service contracts with the remainder on a prepaid service and only one responder was not sure what service type they were using for their private mobile phone. Concurrently over 70% of business mobile phones were on contract with 9% on prepaid and 21% were not sure what kind of service they were on. The relatively high unknown service types for business users was due to the service having been established and paid for by the businesses rather than personally.

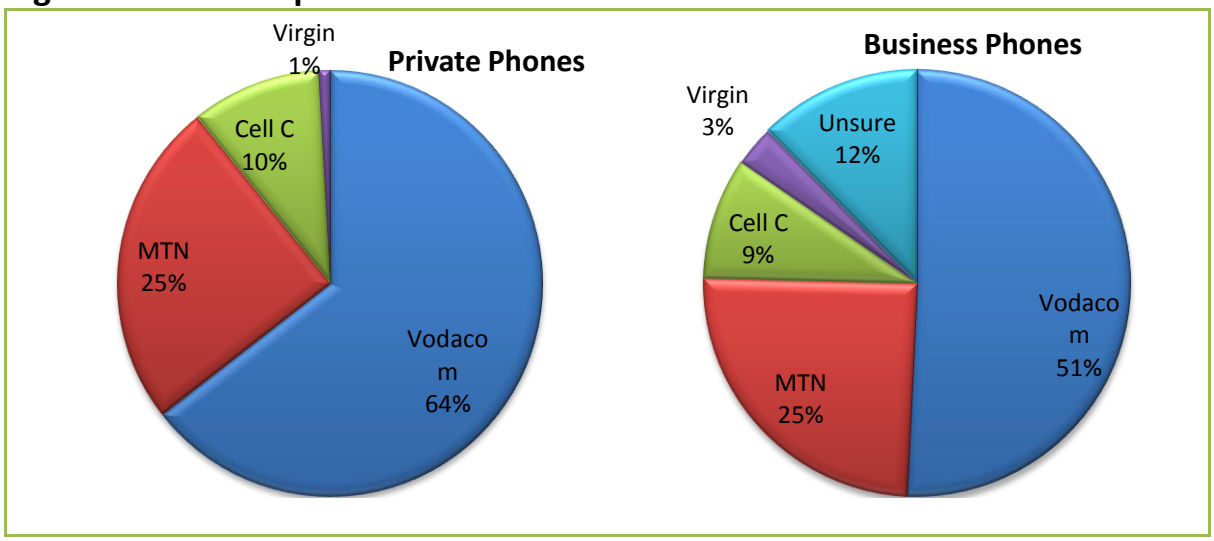
Table 3 shows that the responders' cellphone repurchase period could be categorised into 3 groups namely one year and less (0 to 12 months), one to two years (13-24 months) and two to three years (25-72 months). The number of private and business cellphones owned ranged from zero to three. Each of the participants needed to own at least one cellphone in order to be considered as valid responders.

**Table 3: Distribution of Cellphone Consumption Means**

| | Responses (N) | Mean | Std Dev | Minimum | Maximum |
|---|---|---|---|---|---|
| **Repurchase Period** | 117 | 23.6324786 | 7.261849 | 12 | 72 |
| **Count of Private Phones** | 122 | 0.9672131 | 0.444143 | 0 | 3 |
| **Count of Business Phones** | 111 | 0.4324324 | 0.549738 | 0 | 3 |

Figure 7 shows that Vodacom was the dominant service provider for both private and business cellphone users sampled at 64% and 51% respectively. The second place was taken by MTN followed by CellC and lastly Virgin Mobile.

**Figure 7: Network providers for Private and Business Phones**

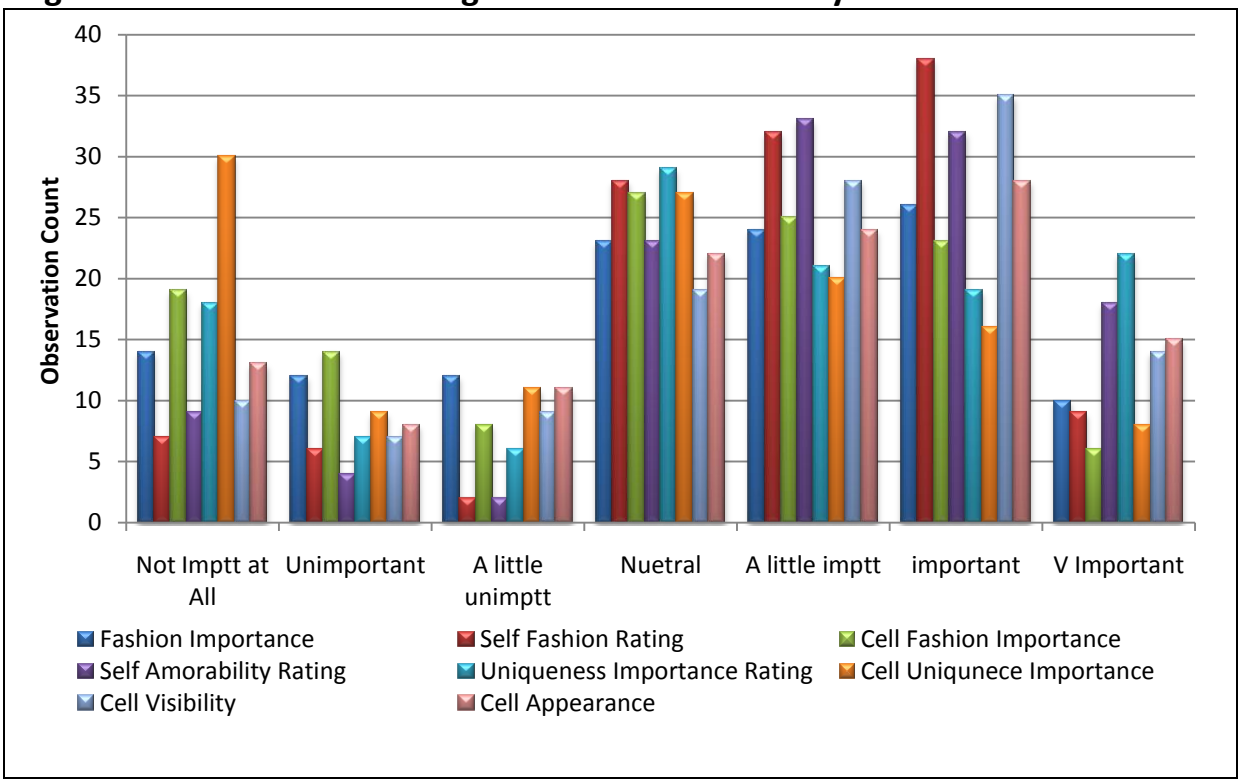



The consistent market share proportions were a reflection of the order in which the providers had commenced operations in the country. It also mirrored the prevailing market shares in South Africa (BMI-Techknowledge, 2009).

### 5.3.3 Conspicuousness & Fashion Sense

As seen in Figure 8, responders ratings of the importance of fashion, their fashion self rating and the importance of mobile phone fashion were generally aligned save for a few variables. They also showed that the people generally assigned some importance to these considerations when repurchasing the devises.

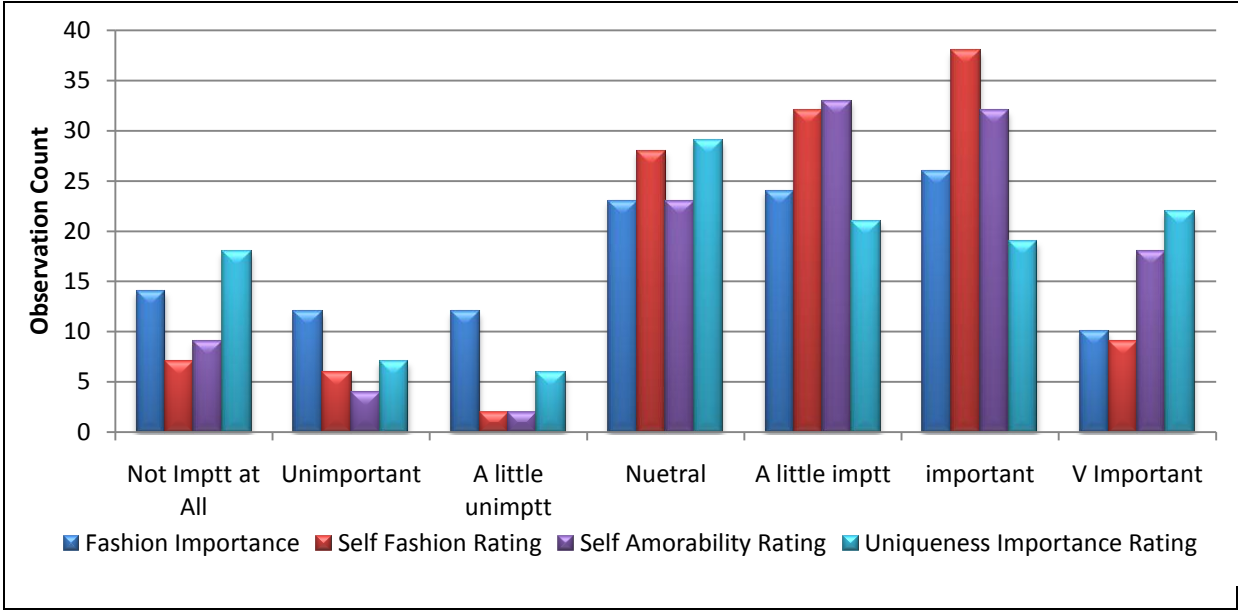
**Figure 8: Self & Mobile Ratings on Fashion & Visibility**




These findings could indicate that cellphone choice was related to fashion preferences. This result was statistically tested in the subsequent section (5.5.1) of this report.

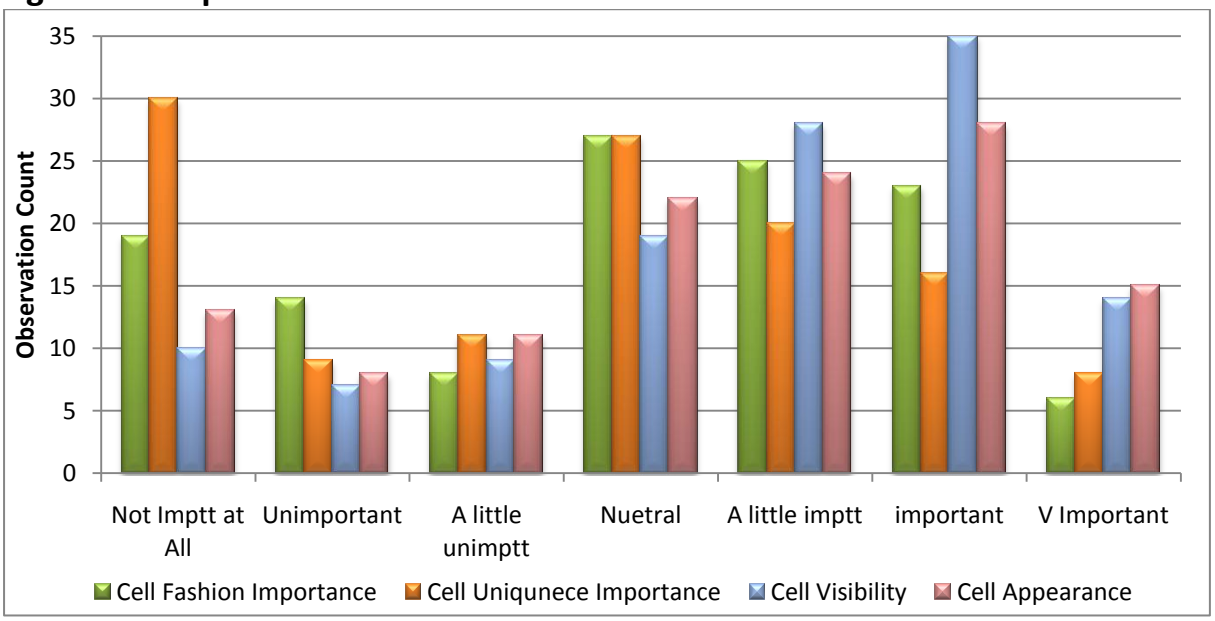
The fashionability ratings also appeared to be stronger in self ratings (Figure 9) compared to that of cellphones choice (Figure 10). This difference could indicate that although cellphones were considered in fashion decisions they were not the primary vehicle for demonstrating individual's fashion sense.

**Figure 9: Fashion Importance & Fashion Self Rating**




It is also notable that people found individuality to be important on a personal level (Figure 9) but most responders did not require their cellular devices to be unique (Figure 10). The responses also confirmed that cellphones were considered to be a visible form of consumption with 63% giving this variable a greater than neutral rating.

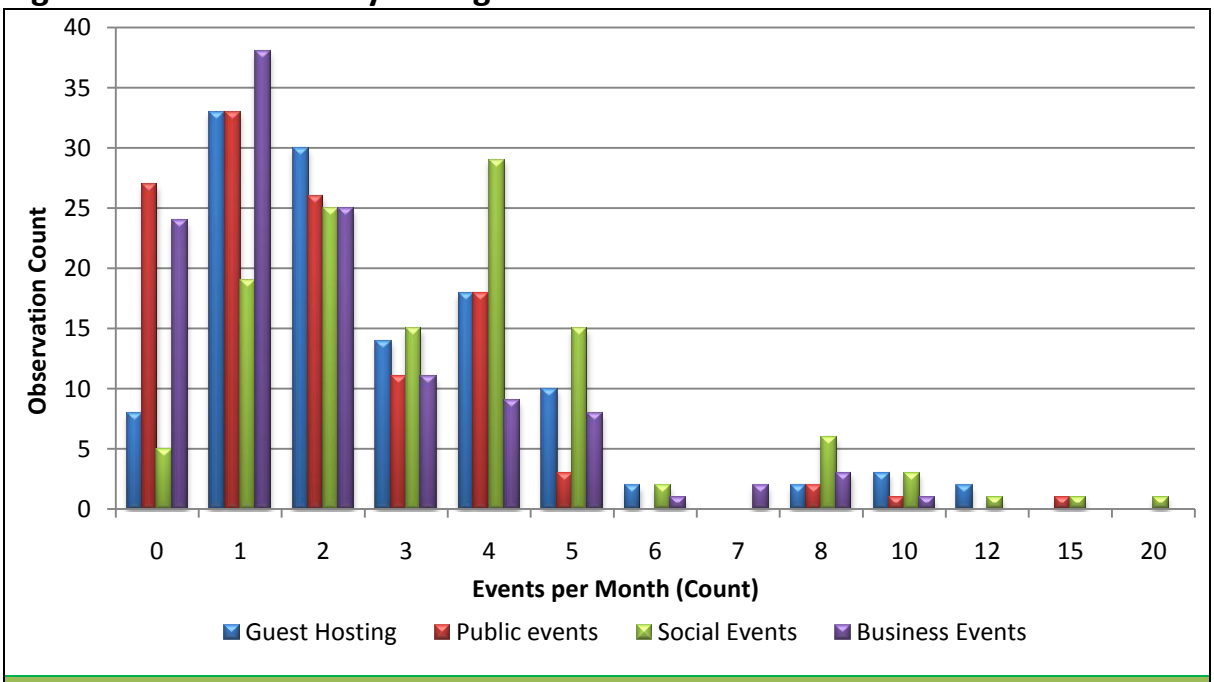
**Figure 10: Importance of Device Fashion**



### 5.3.4 Cellphone Use Occasions

The rating of the reported incidence of social activity was another measure used to evaluate conspicuousness in consumption. As shown in Figure 11 most (80%) of responders attended between one and four of each type of the four types of public and social interactions in a month. This could imply an average of one type of event attended per week (or weekend) for responders in the modal, one event category.

**Figure 11: Social Activity Ratings**

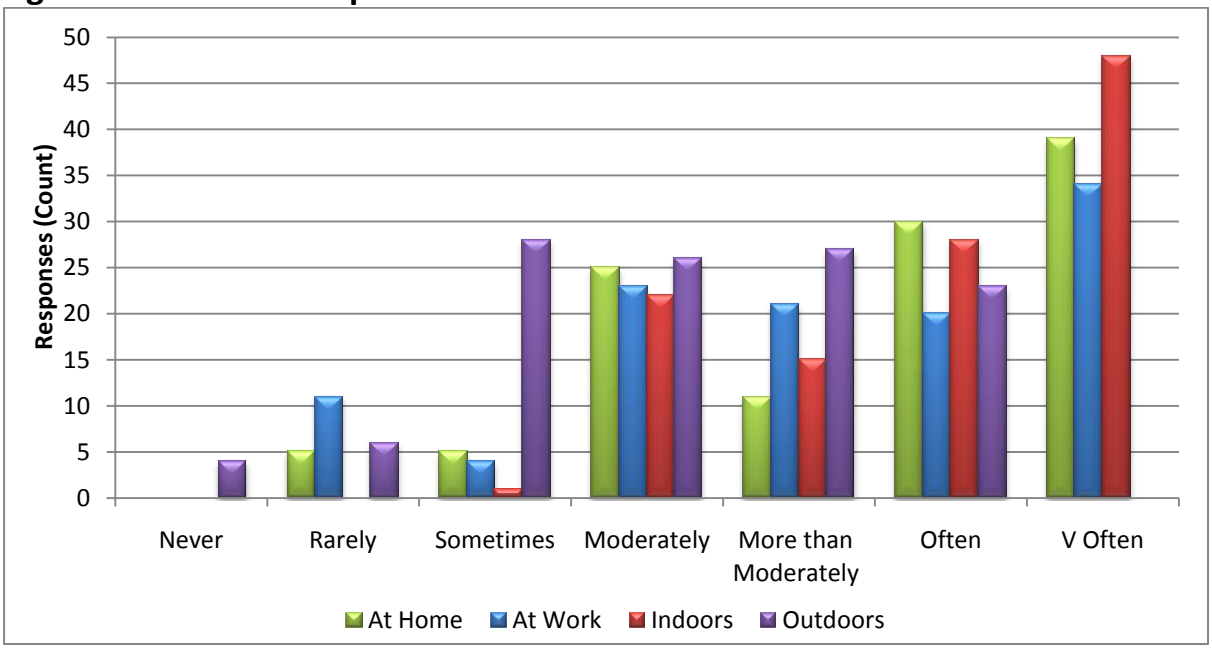



| | Responses (N) | Mean | Std Dev | Minimum | Maximum |
|---|---|---|---|---|---|
| **Incidence of Guest Hosting** | 122 | 2.7786885 | 2.340842 | 0 | 12 |
| **Incidence of Public Events** | 122 | 2.0163934 | 2.143542 | 0 | 15 |
| **Incidence of Social Events** | 122 | 3.6229508 | 2.89864 | 0 | 20 |
| **Incidence of Business Events** | 122 | 2.057377 | 2.013587 | 0 | 10 |

For the purposes of this study, these social events could be interpreted as opportunities to be observed publicly consuming and using a mobile phone. Furthermore when participants were asked about the locations where the mobile phones are used the neutral or moderate category was the modal response in all location cases. However there was a positive skew indicating high device use indoors and outdoors as well as at home and at work (Figure

12). In other words cellphones use was neither restricted to private or public locations.

**Figure 12: Place of Cellphone Use**




A similar finding was observed with regards to the time of day and cellphone use (Figure 13). This indicated high device use irrespective of times of the day (mornings, afternoons or at night). However the afternoon emerged as the highest use phase of the day.

**Figure 13: Time of day & Cellphone Use**

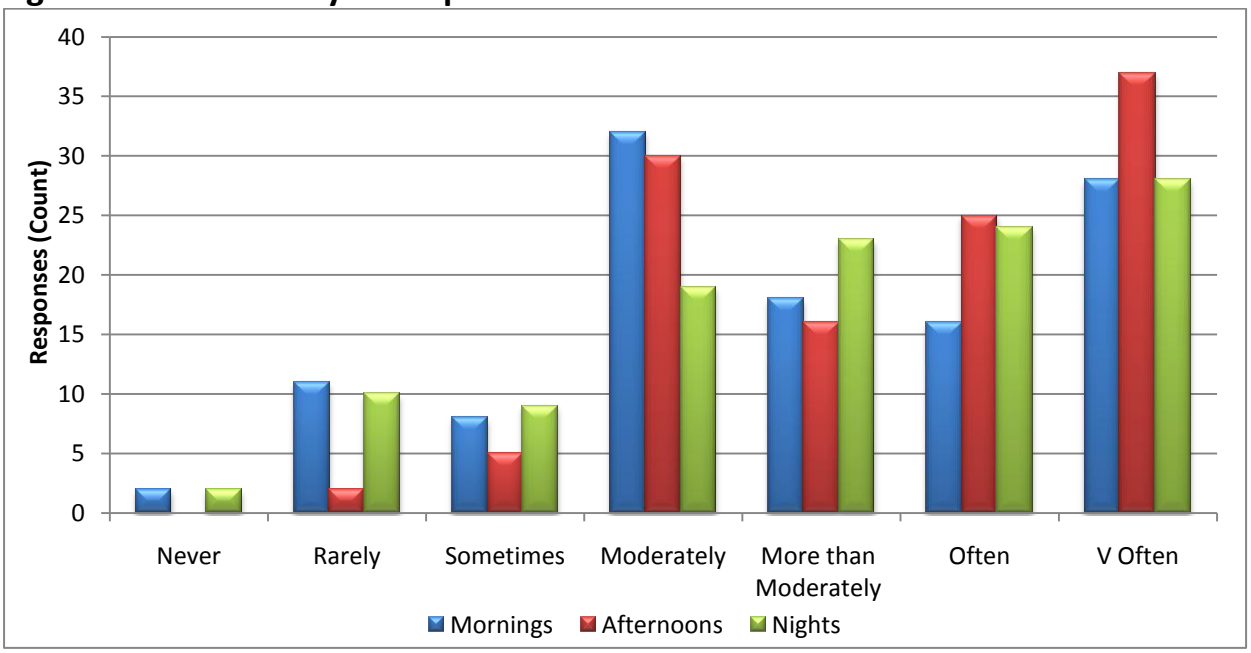
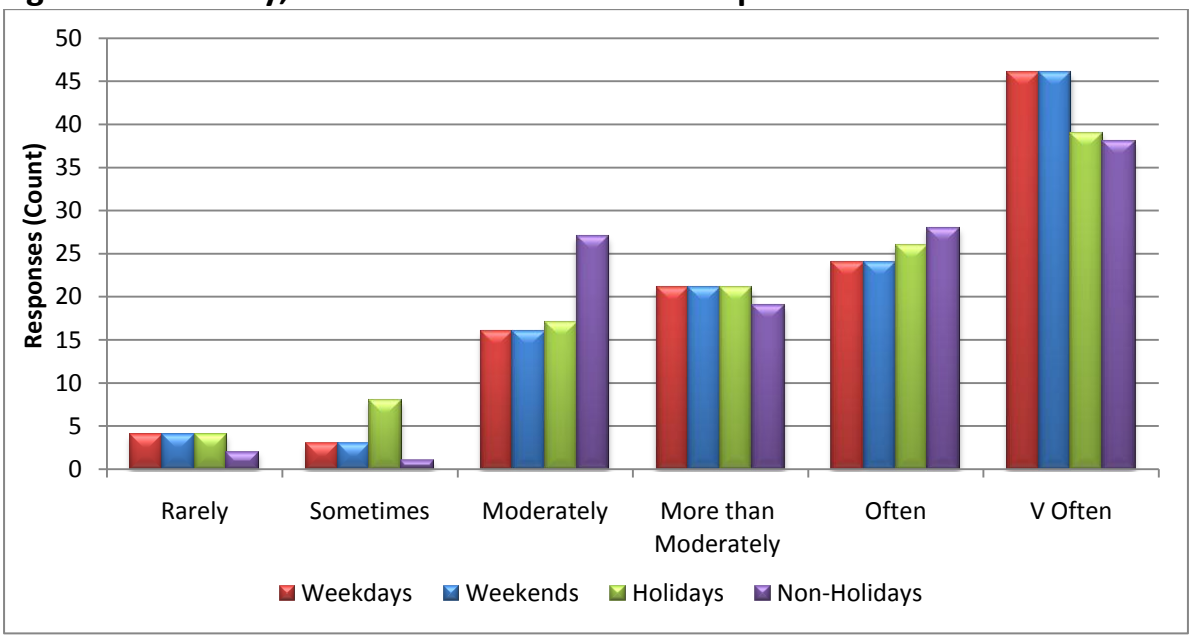


Figure 14 shows the same use pattern was also true between holidays, non-holidays weekend and during the working week. This indicated that responders did not restrict or increase cellphone use according to these periods either.

**Figure 14: Holiday, Weekend & Work Week Cellphone Use**




The survey also investigated the cross usage of private phones for business and the reverse occurrences (Table 4). It was observed that 75.1% of the 181 responders to this question used less than 35.0% their phones interchangeably for business and private purposes. This suggests a relatively low incidence of cross usage.

**Table 4: Cross Use of Private and Business Cellphones**

| | Count (N) | Mean | Std Dev | Minimum | Maximum |
|---|---|---|---|---|---|
| **% Business for Private** | 80 | 17.7625 | 22.6756 | 0 | 90 |
| **% Private for Business** | 101 | 25.8317 | 23.8450 | 0 | 100 |

Business cellphone users were comparatively strict in demarcating business from personal cellphone use with 46% of the responders reporting that they never use the business cellphone for private matters.

### 5.3.5 Device Features

This section delves into responders' perceptions about the significance of mobile phone features and capabilities. First among the inquiries was a comparison of the importance of owning the latest cellphone for its novelty appeal as opposed to a desire to access the latest available capabilities. The results in Figure 15 show that 46% of responders were more than neutral rating to owning the latest cellular device.

The modal group among these responses was neutral to novelty as a repurchase driver. With regards to capabilities, 67% of the responses were positively inclined. For the latter question the mode was at the first positive scale above neutral indicating that although capabilities were a positive influence they were not strongly so.

**Figure 15: Preferences for Latest Devices & Latest Capabilities**

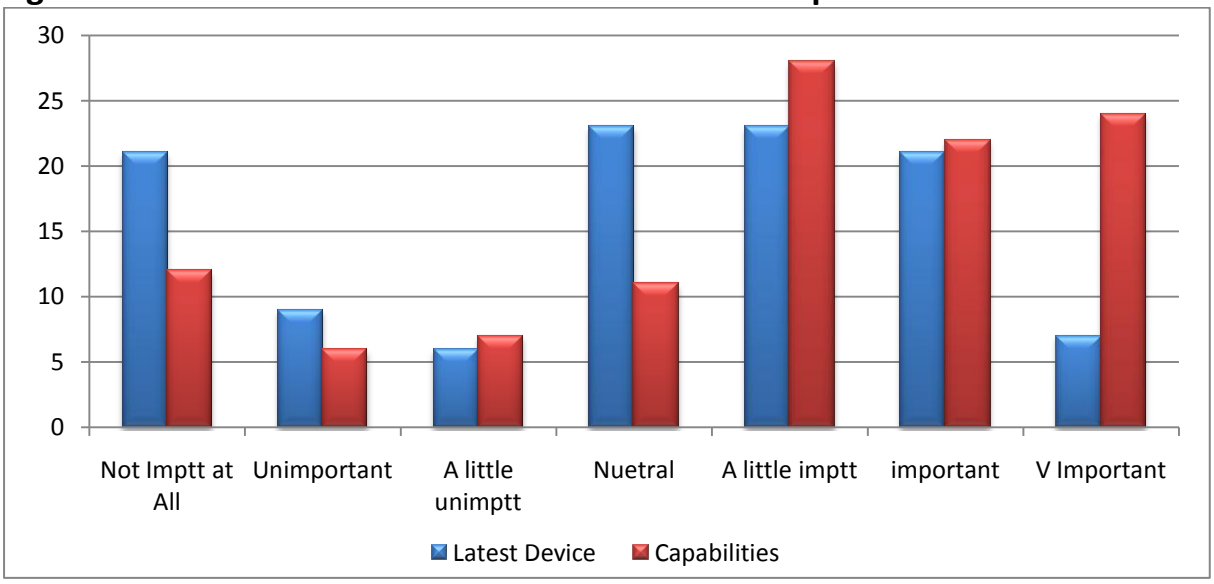
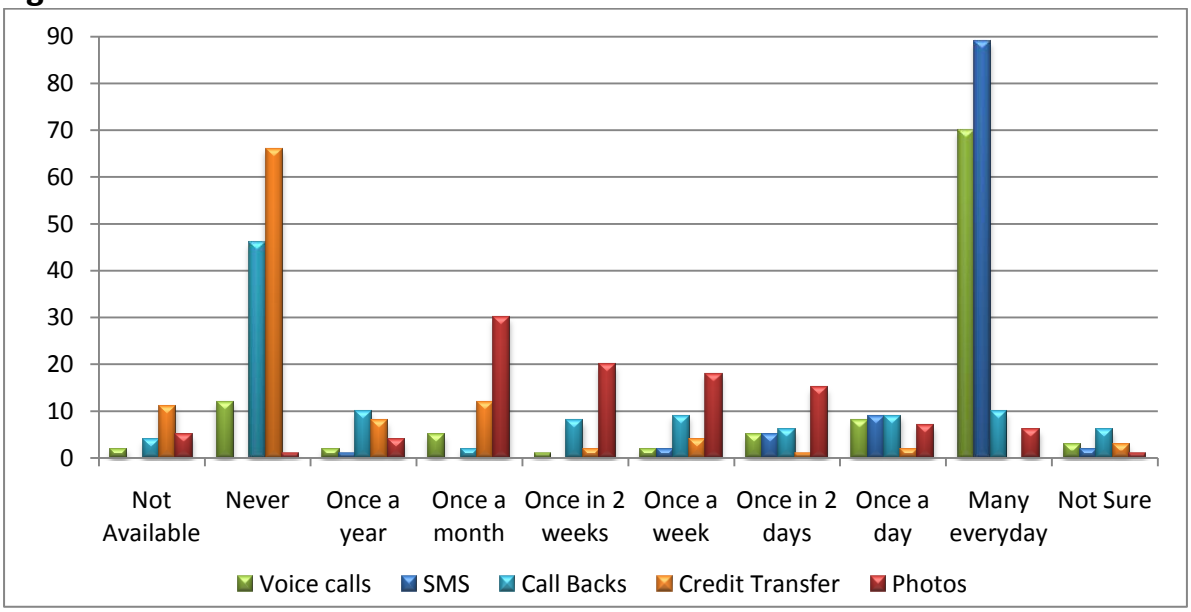



Figure 16 reviews the use of mobile phone features that may be regarded as standard and available on the simplest of the devices. Voice calls and text messaging were the most heavily used features with their modal usage being many times per day.

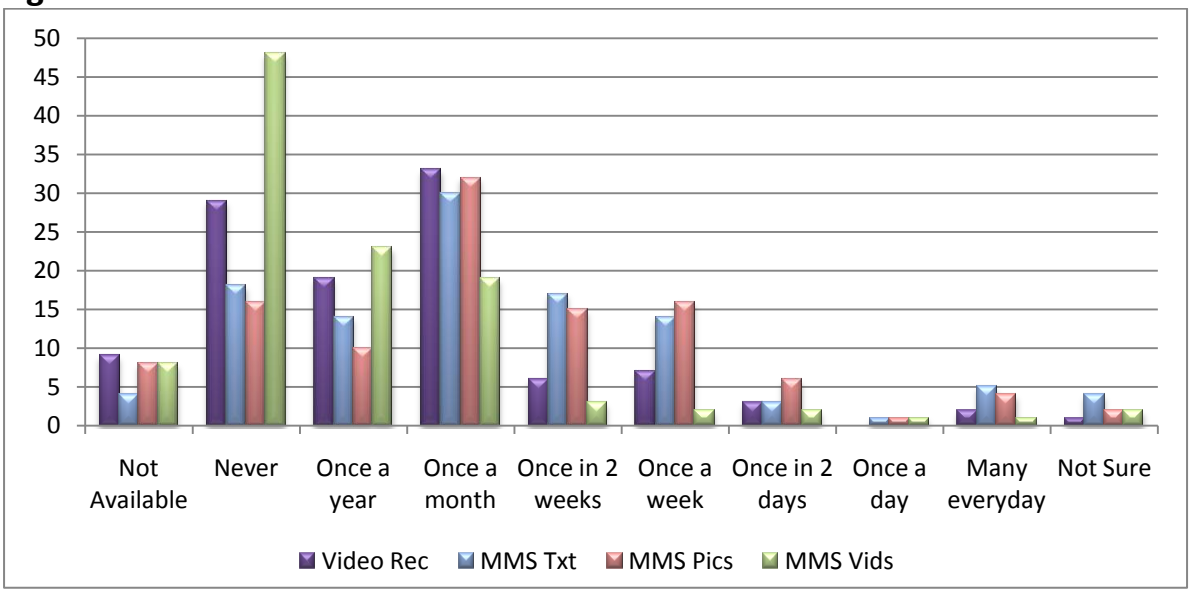
**Figure 16: Use of Standard Mobile Phone Features**




In addition, 95.4% and 75.5% of responders used text messaging and voice calls respectively at least once in two days. The use of the photography feature was comparatively low with the majority of responders (63.5%) clustered between the use once a week to the modal 'once a month' category. In addition, most responders reported having never used the call back (41.8%) and credit transfer (60.6%) features despite these features being relatively standard to mobile devices.

Use of advanced cellphone features can be generalised as being very low and in many cases not at all despite being available no the devices (Figure 17). More specifically, for video recording 26.6% had never used the feature and most used it either once a month (30.3%) or once a year (17.4%). Only 8.2% of responders did not have this feature on their device. This meant that availability of the feature was not the limiting factor to usage.

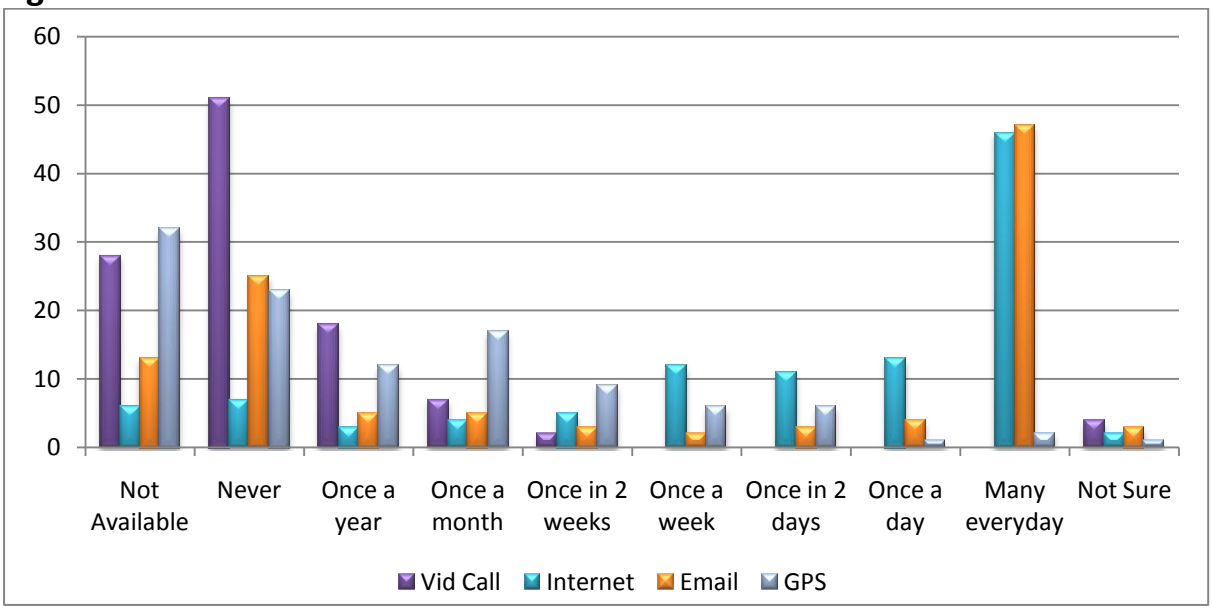
**Figure 17: Use of Advanced Mobile Phone Features**




Use of the multimedia services (MMS) showed a similar pattern to the video calling feature use. The modal MMS use for the text and picture sending options was once a month for 27.3% and 29.1% of responders respectively. MMS video use was much lower with only 46.8% of responders having ever used the feature. Interestingly 7.3% of responders believed MMS videos and text were not available on their device while the result was lower 3.6% for MMS text messaging. This could indicate the existence of devices with partial MMS capability or the users' inability to use the full MMS functionality.

The use of premium mobile phone features showed a differing pattern to that of the previous two groups (Figure 18). Internet use was high with 54.1% reporting their frequency as once and many everyday. The same frequency of email use was reported in 46.3% of the responses. In addition 86.2% of responders reported having accessed the internet on their mobile phones, if one includes the 6.4% who had never used the feature this implied that 92.7% of responders had internet access though their cellular device.

**Figure 18: Use of Premium Mobile Features**

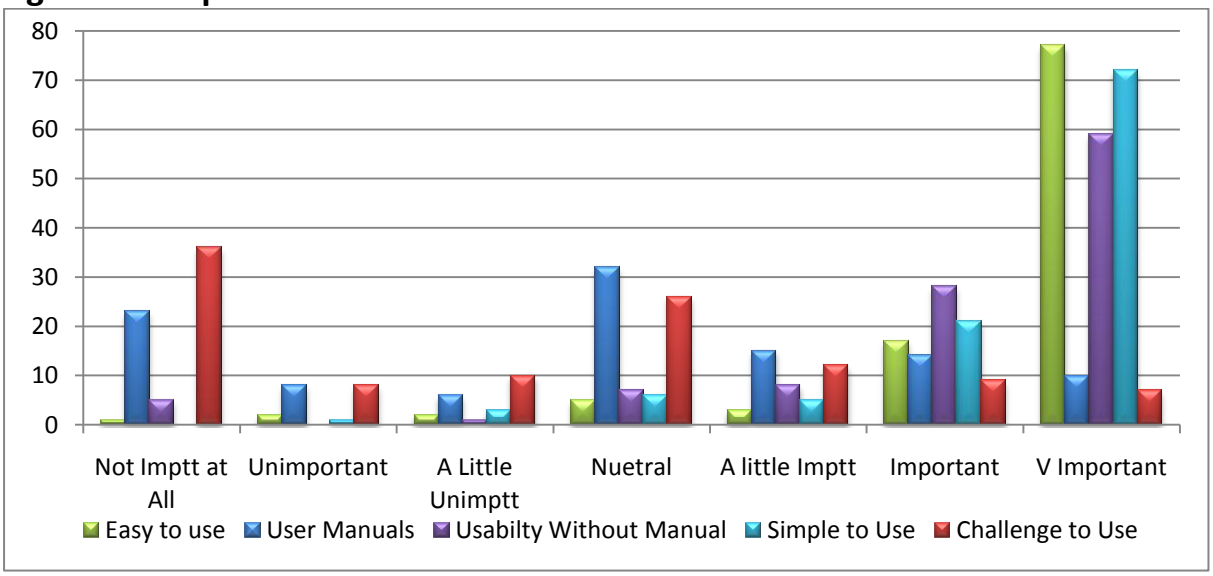



Email access was comparably high at 85.5% of responders. Interestingly, there were a relatively high number of responders who had never used the facility (22.7%) despite it being available on their device. With regards to the Global Positioning System (GPS) the modal response was that the feature was not available (29.4%). The next largest group were non users despite the feature being available. Among the remaining 48.6% of responders that had ever used the feature over half of the group (54.7%) used the feature between once a month and once a year. Thus acquiring the relatively costly premium features, the majority of its owners rarely employed them.

### 5.3.6 Ease of Use (Functionality)

This section analyses the responses to the series of questions designed to triangulate the perceptions toward the ease of use and usability as drivers for mobile phone repurchase intent (Figure 19). When asked outright how important ease of use was, 87.9% of the responses were either important or very important. Only 4.8% of responders were less than neutral thus indicating an overwhelming positive sentiment towards ease of use.

**Figure 19: Importance of Ease of Use**




A similarly high 88.0% of responders were above neutral in their preference for intuitive devices that did not need user manuals. In addition 90.7% of the sample preferred devices that were simple to use (at above a neutral rating).

When this scale was reversed to detect whether responders enjoyed a challenging device to learn, 25.9% responded positively and were above neutral in their rating. In addition 24.1% were indifferent to this scale but the majority (50.1%) were consistent scales and preferred not to be challenged in device use. The modal group of 33.3% were at the extreme of the scale meaning that they were totally against a challenging user experience. Although the responders were generally consistent in their preference for simplicity and ease of use there was a notable few that did require stimulation in the experience. Thus extreme simplicity may be interpreted as boring among that portion (25.9%) of the sample.

### 5.3.7 Reliability

With regards to reliability as a driver for repurchase intent, the average survey responder experienced breakdowns 23.4 months from the purchase date (Table 5). His or her mean expected breakdown time had fallen from 28.7

months for the past devices to 27.4 months in the future. This was a negative indictment on device producers because it indicated a perceived decline in product reliability. It was also notable that the standard deviation for both breakdown related questions was a wide range from 17.2 to 17.9 months. This indicated widely varying and thus inconsistent user experiences.

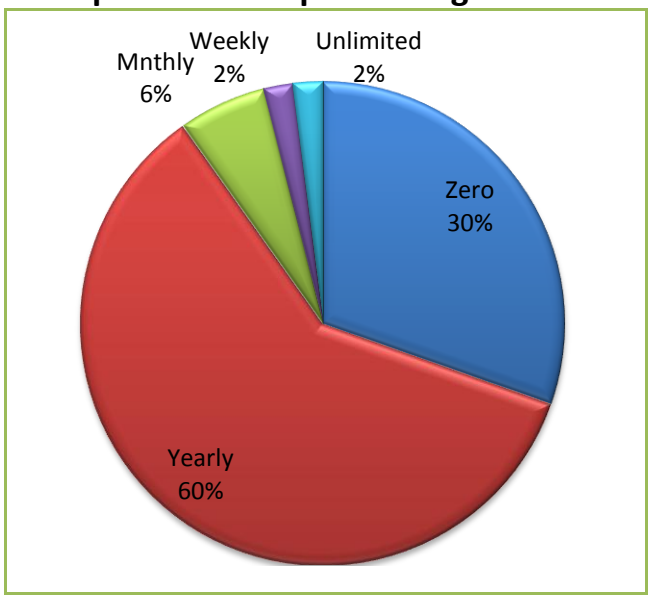
**Table 5: Mean Actual and Desired Cellphone Reliability**

| Variable | Count (N) | Mean | Std Dev | Min | Max |
|---|---|---|---|---|---|
| **Actual Breakdown Time** | 89 | 23.4269663 | 17.28563 | 1 | 99 |
| **Past Expected Breakdown Time** | 95 | 28.7368421 | 17.89699 | 1 | 123 |
| **Demanded Breakdown Time** | 99 | 38.0606061 | 19.57238 | 2 | 100 |
| **Future Expected Breakdown Time** | 99 | 27.3636364 | 17.42825 | 1 | 100 |
| **Count of Repair of Private Phones** | 97 | 1.7216495 | 1.552835 | 0 | 12 |
| **Count of Repair of Business Phones** | 75 | 0.9466667 | 1.218033 | 0 | 5 |

It was also clear that the current durability of the products was falling short of the desired levels which averaged at 38.1 months compared to the current levels of between 20.2 and 20.9 months before breakdown.

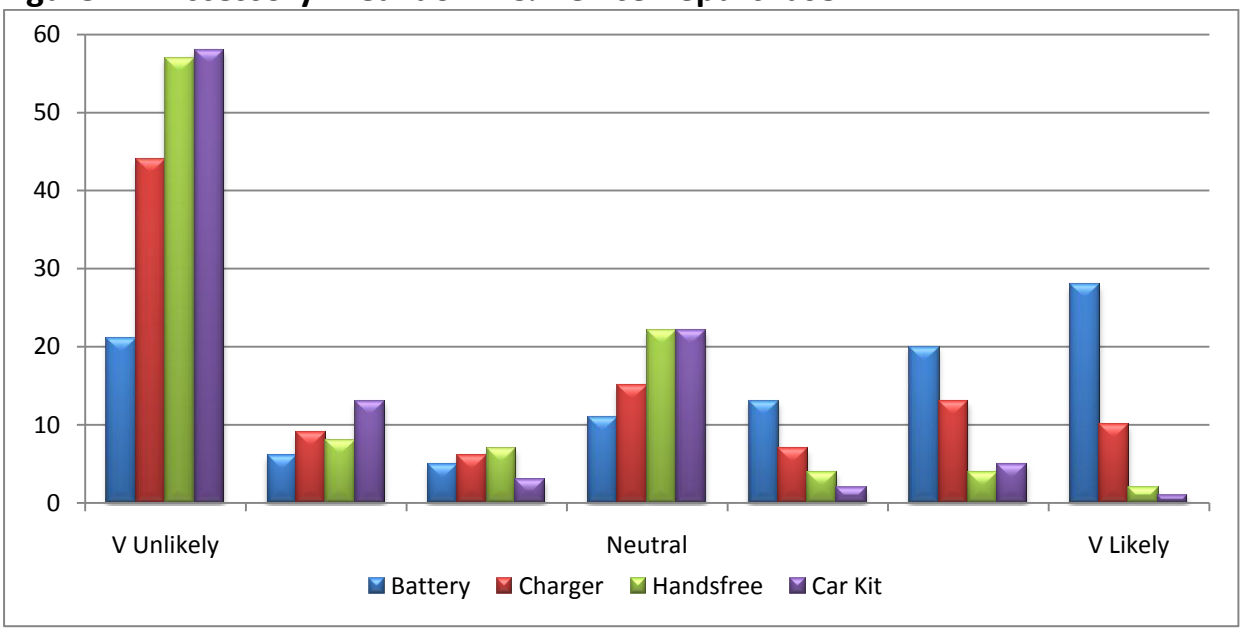
The majority of cellphone users (60%) would only consider repairing their cellphones once in a year. This modal group would discard the device if it they experienced any further breakdowns (Figure 20). The second largest group (30%) would not consider ever repairing their cellphones. The remaining categories were relatively small and included 6% of the responders who would repair their handsets once a month, 2% weekly and another 2% willing to repair an unlimited number of times.

**Figure 20: Repair Attempts before Repurchasing**



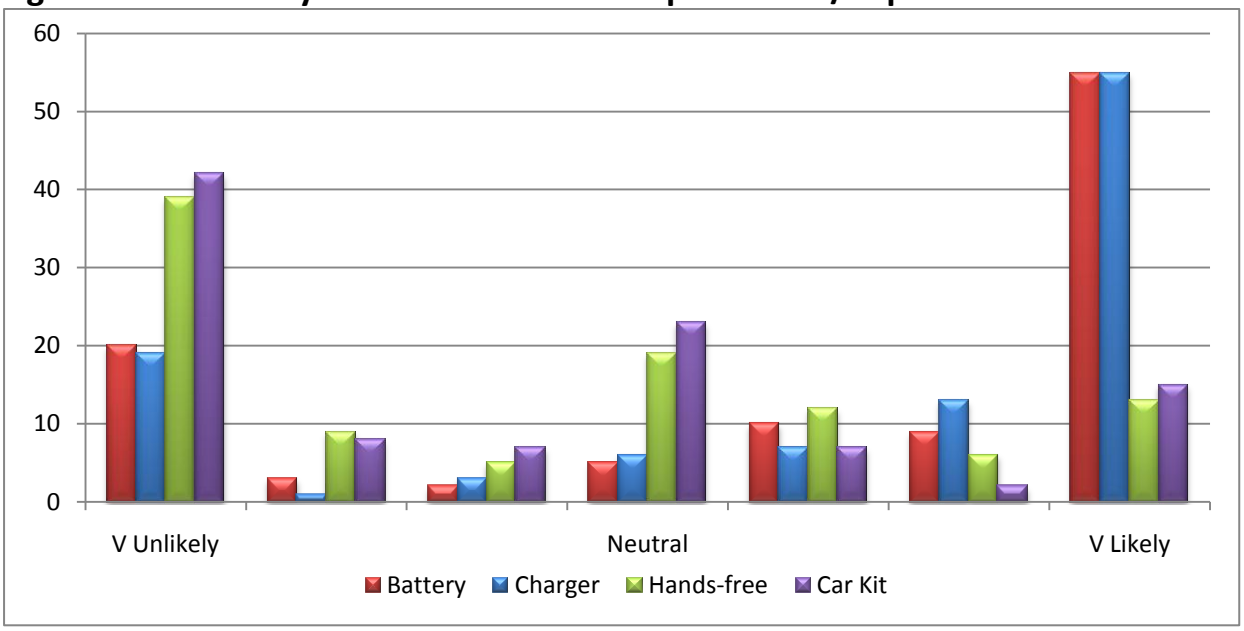

Approximately 50% of responders indicated that they were very unlikely to replace their cellular device due to the breakdown of its charger, hands-free set and car-kits (Figure 21). Cellphone batteries contradicted this trend with 58.7% of responders indicating that there were more than neutral in their likelihood to replace the device when that accessory broke down. This could indicate that the battery was considered a component rather than an accessory despite the fact that it usually could be replaced.

**Figure 21: Accessory Breakdown & Device Repurchase**



As seen in (Figure 22) users were highly likely to replace or repair their cellphone batteries and chargers. They rated these accessories a greater than neutral rating in 71.2% and 72.1% of the cases respectively. The response with regards to hands-free and car-kit sets was evenly spread on either side of the neutral rating.

**Figure 22: Accessory Breakdown & their Replacement/Repair**

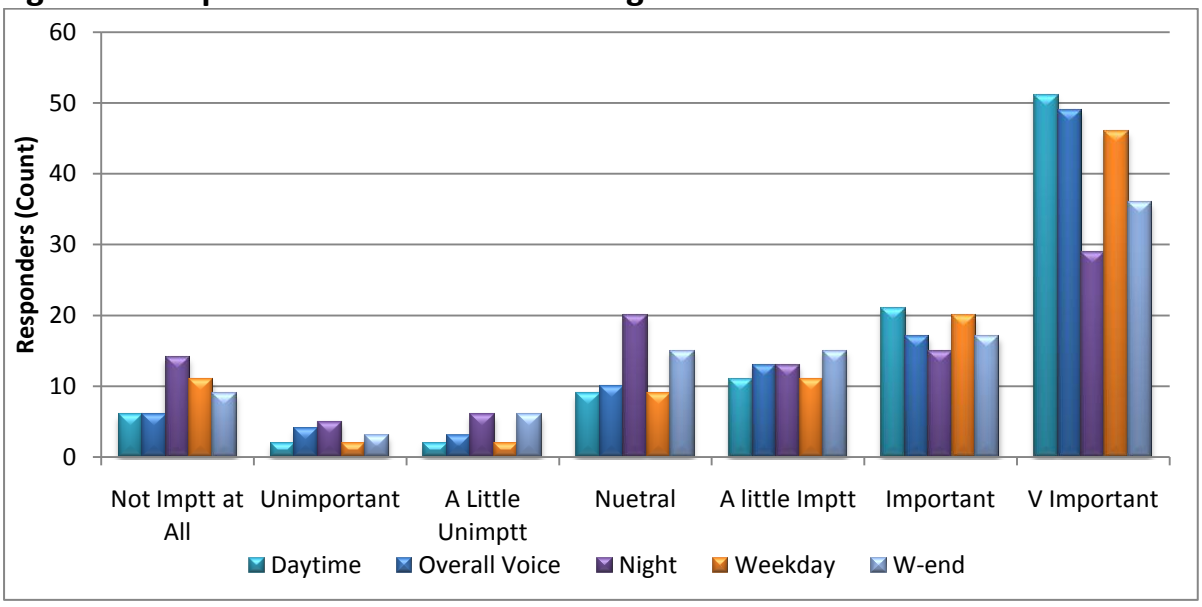



The neutral rating was also the modal response was neutral for both questions with 18.5% for hands free sets and 22.1% for car kits. This indicated that the two accessories were not considered to be important.

### 5.3.8 Service Charges

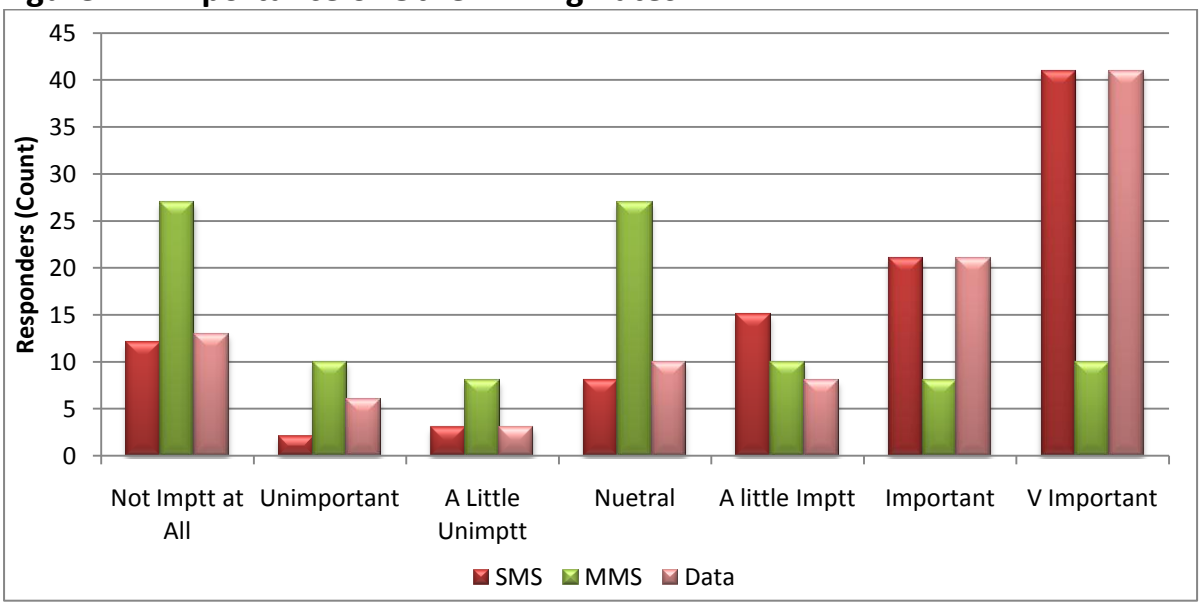
Voice service billing issues were subdivided into five component issues. These were namely daytime billing rates, overall voice billing rates, night billing rates, weekday billing rates, and weekend billing rates. As seen in (Figure 23), responses to all five ratings generated negatively skewed graphs. This indicated that most respondents (55.8% - 81.4%) rated all the component issues as being of more than 'neutral' importance.

**Figure 23: Importance of Voice Call Billing Rates**




The relative importance of issues was reflected by the proportion of responders that rated them higher than the 'neutral' ratings. Using this criteria daytime billing was most important (81.4%) followed by overall rates (77.5%), weekday rates (76.2%), weekend rates (67.3%) and lastly night time rates (55.8%).

**Figure 24: Importance of Other Billing Rates**



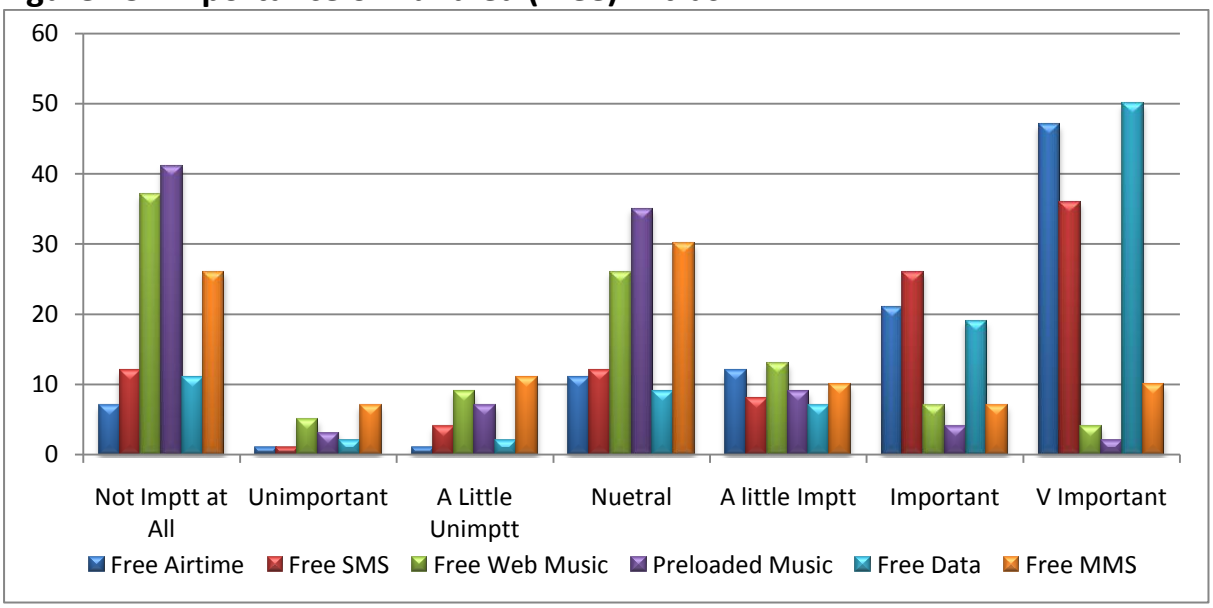

Non-voice service billing ratings produced a similar pattern to that of voice services in the case of text messaging (SMS) and data but not so for multimedia

messaging (MMS) (Figure 24). In the case of SMS a large majority of respondents (75.5%) indicated that they were more than neutral to the importance of its billing rates. The corresponding value for data billing was also high at 68.6%. On the other hand MMS billing was of relatively minor concern to the sampled group. Most responders (72.0%) rated their concern for this issue as being between neutral and not important at all.

### 5.3.9 Offer Bundling

Similar to the billing considerations Figure 25 indicates that the survey responders were most interested in the availability of bundled talk (air) time, data, and SMS. This was reflected in positive, more than neutral, ratings of 80.0%, 76.0% and 70.7% respectively for these questions.

**Figure 25: Importance of Bundled (Free) Extras**

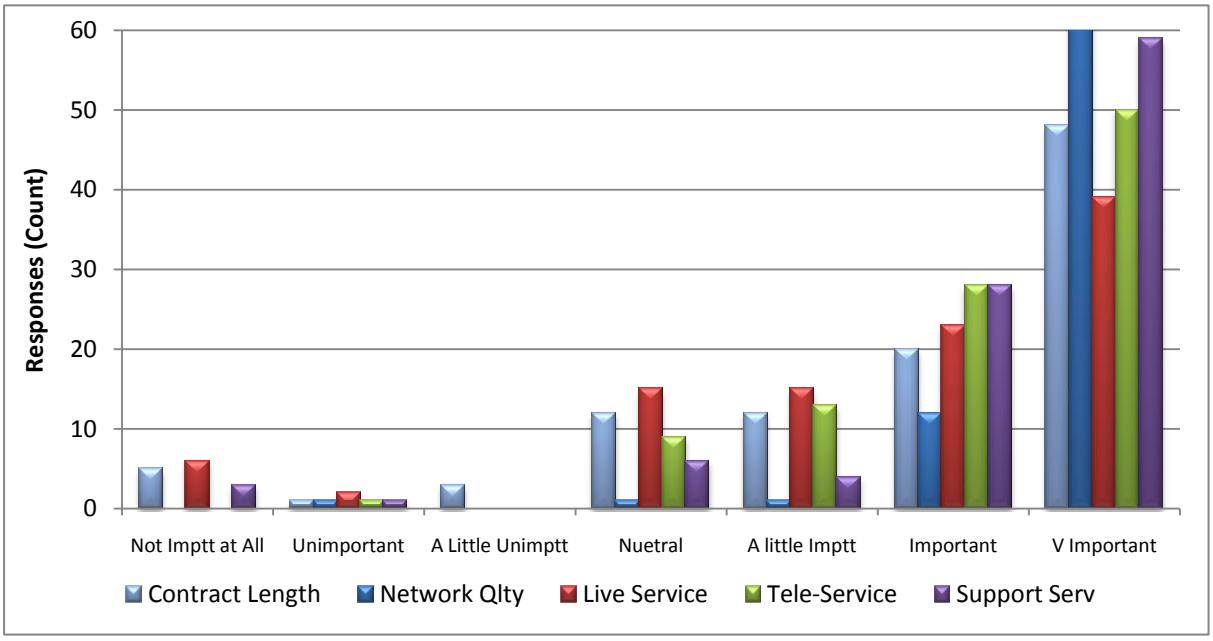



In the same diagram (Figure 25), the ratings labelled 'not important at all' and 'neutral' were modal for preloaded music with 40.6% and 36.7% respectively. The same was true free music downloads (36.6% and 25.7%); bundled MMS (25.7% and 29.7%). Thus responders did not perceive these three bundle components as being of importance when making repurchase decisions.

### 5.3.10 Service Quality

Service quality considerations generated similar results to the previous service charges section (Figure 26). Each of the graphs was negatively skewed indicating the importance of the five elements of services quality. These elements included contract length, network coverage quality, live service quality, telephonic service quality, as well as other back office support services.

**Figure 26: Importance of Service Quality Components**




Network signal quality and reception were ranked as the most important with 98.0% of responders indicating that this consideration had a more than zero level of importance. Similarly high ratings were observed with regards to telephonic (contact centre) service at 90.1%, back office support also at 90.1%, length of the service contract at 79.2% and quality of face to face service at 77.0%.

## 5.4. Test Scale Reliability for Groups

Cronbach alpha reliability tests (Devellis, 1991) were used to evaluate whether the scale variables in this study were internally consistent and thus reliable for use in the subsequent hypothesis testing procedures. To be deemed to be reliable, each group of variables needed to achieve a Cronbach alpha value of between 0.60 and 0.95 but ideally above 0.70 (Cortina, 1993).

As recommended by Santos (1999), where the critical alpha value was not achieved the variables were considered for transformations. However the transformations were only performed where this was theoretically justified. Alternatively, the variables were omitted from the subsequent hypothesis testing if the signs of unreliability persisted after the transformations or if there were no theoretical justifications for transforming the raw responses.

Reliability testing was only appropriate for questions that sought to triangulate responses for the same construct by asking the same questions in different ways (Cortina, 1993). In this study four groups of questions were appropriate for reliability testing. These included questions 12_1 to 12_8 concerning visibility and fashion; questions 16_1 and 16_2 on cellphone features; questions 18_1 to 18_6 on usability and lastly questions 26_1 to 26_5 on cellular provider service quality.

The following subsections analyse and summarise the outcomes of the four tests as well as the remedies applied where the responses were found to be unstable. The complete sets of reliability test results are also displayed in Appendix 4.

### 5.4.1 Testing Reliability in Conspicuousness & Fashion Sense

This first reliability test pertained to questions 12_1 to 12_8 which referred to the importance of visibility in consumption and fashion sense. The group

achieved a standardised Cronbach alpha of 0.86369 (raw alpha 0.864). This result was well above the critical value indicating that the group was reliable and consistent. At an individual level all eight of the group members achieved both raw and standardised alphas of over 0.800 indicating reliability across the board. Thus the group could be relied upon for use in hypothesis testing procedures.

### 5.4.2 Testing Reliability in Cellphone Features

The second reliability test was on the two member group including questions 16_1 and 16_2 which was concerned with responders ratings of the importance of cellular device features and capabilities as repurchase intention drivers. The test result gave the group a standardised alpha of 0.890 (raw 0.890) meaning that the group was stable and suitable for use in the subsequent hypothesis testing section.

### 5.4.3 Testing Reliability in Ease of Use

The next reliability tests were on the six questions 18_1 to 18_6 which concerned usability of the devices. Initial evaluation indicated that this was an unstable group of variables as they generated a standardised Cronbach alpha of 0.498 (raw 0.424). The detailed reliability test revealed that the unreliability stemmed from two questions namely questions 18_2 and 18_6. These two were ratings of the importance of user manuals (18_2) and the preference for challenging devices (18_6).

The former (18_2) displayed a negative mean of -0.167. However there were no observable reasons for this negative mean value. Thus the question was omitted from the group. The latter (18_6) had a larger negative mean (-0.769) as well as a negative correlation (-0.036) to the total. It was theoretically sound to reverse this question's ratings because it ranked the preference for

'difficulty in using cellphones' which was at adds with the ratings for its group counterparts. Thus reversing the rating for 18_6 was expected to improve the reliability of the group.

The net result of the omitted question (18_2) and reversing 18_6 was an improved standardised alpha of 0.603871 (raw 0.5334). This was a relatively low reliability rating but the value was high enough to permit its use in hypothesis testing.

### 5.4.4 Testing Reliability in Service Quality

The last group tested contained questions 26_1 to 26_5. These questions referred to cellular provider service quality. The group achieved a standardized alpha of 0.773 and raw alpha of 0.748. Therefore the group was firmly beyond the critical value, could be considered stable and could thus be used in hypothesis testing.

## 5.5. Hypothesis Testing

The previous section contained an evaluation of the survey data using descriptive statistics and the reliability testing of grouped variables using Cronbach's Alpha. Following those precursory evaluations the current section presents the results of the six hypothesis tests. These tests were performed using statistical (ANOVA) tools in the SAS program.

Two dependent variables were used in the hypotheses test. These were frequency of cell repurchase (question 8) and number of phones owned (question 9). For the purposes of the tests frequency of cellphone repurchase was categorised into three groups namely 0-12 months; 12-24 months and 25-72 months.

The second dependent variable 'number of phones owned' (question 9) was also classified into three groups. The first group being responders with

business phones only; the second being those with private phones only and the third being those that concurrently owned business and private cellphones.

The study's six hypotheses were then tested by calculating the correlations between the dependent and independent variables as set out in Table 6. The significance of each of the variables was determined through the correlation p-values. Variables with p-values of less than 0.05 were statistically significant at the 5% level and were denoted by 2 stars (**). Those with p-values of between 0.05 and 0.10 were significant at the 10% level. The latter were marked by a single star (*) but were not discussed at length due to their relatively low significance level. Independent variables with p-values above 0.10 were not significantly correlation to the dependent variables.

**Table 6: Test Variables**

| Hypothesis | Indicators | Dependent (Y) Variables | Independent (X) Variables |
|---|---|---|---|
| **$H_1$: Repurchase intention is higher for CE that are consumed visibly relative to those that are consumed inconspicuously** | Visibility indicators including: fashionability, being trendy, enviable, individuality, public exposure, use occasions & attracting amorous social appeal | Repurchase intention Q8,9 | Visibility in consumption Q12,13,14,15 |
| **$H_2$: Repurchase intention is higher where CEs are perceived to have new additional product features than for CEs that are not seen to have added features** | Ranking the relative importance and levels of use of both basic & advanced cellphone features | Repurchase intention Q8,9 | Features available Q16,17 |
| **$H_3$: Repurchase intention is higher when consumers perceive a high level of CE usability than when consumers find usability to be relatively low** | Rating importance of ease of use, user manual usage, & preference for complexity | Repurchase intention Q8,9 | Usability Q18 |
| **$H_4$: Repurchase intention is higher for CE with low** | Expected & actual time to product failure; number & | Repurchase intention | Reliability Q20,22,23 |

| | | | |
|---|---|---|---|
| **reliability than it is for CEs have relatively high reliability** | frequency of repairs to handset, batteries and accessories & preference about these variables | Q8,9 | |
| **$H_5$: Repurchase intention is higher where the CE offer bundles are expanded than where the CE offer bundles are comparatively narrow** | Preferences for bundled extras, service quality, & service charges and their influence on repurchase intent | Repurchase intention Q8,9 | Offer bundling Q24,25,26 |
| **$H_6$: Repurchase intention is higher for younger CE consumers than it is for older CE consumers** | Demographics & life stage indicators including: age, sex, income, marital status & number of children | Repurchase intention: Q8,9 | Age & Demographics : Q1, 2,3,4,5,6,7 |

In cases where variables were found to be significant at the 5% level a Duncan's Multiple Range Grouping test was then performed to determine the nature of the component groups. This would help to further explain the nature of the explanatory variable's effect on the dependent variable (Zikmund, 2003).

The following subsections present a systematic outline of the outcomes of the six hypothesis tests.

### 5.5.1 Hypothesis 1: Visibility in Consumption

As seen in Table 7 there was a mix of outcomes to the test of the impact of independent variables pertaining to fashion sense and conspicuousness on both dependent variables (repurchase period and the number of cellphones possessed).

The grouped question 12 on fashionability (12_1 to 12_8) showed a low but significant correlation (10% level) to repurchase period but no significant correlation to the number of devices owned. The frequency of home guest hosting (13_1) also showed some correlation to the repurchase period at the 10% level but no correlation with the number of devices owned.

The number of public and social events attended (13_2 and 13_3) did not correlate with either of the dependent variables. The number of business events attended (13_4) displayed a no correlation to the repurchase period but a high correlation (at the 5% level) to the number of business events attended. Furthermore, according to Duncan's Grouping test, responders in all three groups (business phones, private phone and both business and private phones) were not significantly different from each other. Thus the correlation was consistent across the groups.

The proportion of business cellphone users that used the business device for private communication (14_1) was significantly correlated to the number of devices owned. According to Duncan's Grouping, responders that only had private cellphones had a significantly lower mean cross-over of use of business cellphones for private purposes and the reverse. This result stands to reason because private cellphone users would be expected to have fewer devices than the other two groups. This same variable (14_1) was not correlated to repurchase period. With regards to private devices used for business purposes (14_2), the result was that there was no correlation with either of the dependent variables (repurchase period and number of devices).

**Table 7: Visibility in Consumption ANOVA**

| Hypothesis | Dependent (Y) Variables | Independent (X) Variables | P Value |
|---|---|---|---|
| $H_1$: Visibility in consumption | Repurchase period (Q8) | Q12 | 0.0545* |
| | | Q13_1 | 0.0659* |
| | | Q13_2 | 0.4429 |
| | | Q13_3 | 0.4574 |
| | | Q13_4 | 0.555 |
| | | Q14_1 | 0.7556 |
| | | Q14_2 | 0.4809 |
| | | Q 15_1 | 0.2027 |
| | | Q 15_2 | 0.7758 |
| | | Q 15_3 | 0.1436 |

| | | | |
|---|---|---|---|
| | | Q 15_4 | 0.0306** |
| | | Q 15_5 | 0.6589 |
| | | Q 15_6 | 0.5289 |
| | | Q 15_7 | 0.0085** |
| | | Q 15_8 | 0.9184 |
| | | Q 15_9 | 0.3328 |
| | | Q 15_10 | 0.3701 |
| | | Q 15_11 | 0.33 |
| | Number of devices (Q9) | Q12 | 0.4647 |
| | | Q13_1 | 0.9676 |
| | | Q13_2 | 0.6902 |
| | | Q13_3 | 0.6394 |
| | | Q13_4 | 0.0491** |
| | | Q14_1 | 0.0006** |
| | | Q14_2 | 0.1683 |
| | | Q 15_1 | 0.2596 |
| | | Q 15_2 | 0.0057** |
| | | Q 15_3 | 0.7772 |
| | | Q 15_4 | 0.6025 |
| | | Q 15_5 | 0.1112 |
| | | Q 15_6 | 0.9307 |
| | | Q 15_7 | 0.0838* |
| | | Q 15_8 | 0.1979 |
| | | Q 15_9 | 0.1473 |
| | | Q 15_10 | 0.0044** |
| | | Q 15_11 | 0.2724 |

**significant at the 5% level
*significant at the 10% level

Most of the situational variables to repurchase (question 15) were not significantly correlated to the repurchase period or the number of devices owned. The members of the group were significantly correlated were 15_2, 15_4 and 15_10. The first was cellular use at work (15_2) which was significantly correlated to the number of devices owned. According to Duncan's test, owners with only private devices had significantly fewer devices than the other two groups. This was also an intuitively sound result.

Outdoor cellphone use (15_4) was also significantly correlated to the repurchase period at the 5% level. According to Duncan's groupings, responders that repurchased cellphones within twelve months had a significantly higher outdoor cellphone use than the two groups that kept their devices for one to two years and the other that kept devices for up to three years. The latter two groups did not differ significantly from each other. This result supported the first hypothesis that visible outdoor users preferred to repurchase their devices early.

Night time cellphone use (15_7) was also significantly correlated to the time to repurchase. Users that repurchased within twelve months used their devices at night significantly more than the other two groups (Duncan's test). One could deduce that night time users were more outgoing and active in the night times. Thus this result also supported the first hypothesis that conspicuous users preferred to repurchase cellphones early.

Use of cellphones over holidays (15_10) was significantly correlated to the number of devices owned. Business cellphone users had significantly lower number of devices than the other two groups. Users in the remaining two groups - namely with private cellphones only and ones with both private and business phones - were not significantly different from each other with regards to cellphone use during holidays.

### 5.5.2 Hypothesis 2: Product Features

The impact of product features on repurchase period and the number of cellphones possessed appears to be low (Table 8). Only one variable out of the set of 28 tested showed a significant correlation to repurchase period at the 5% level another one showed a low correlation at the 10% level. In addition,

none of the independent variables were correlated to the number of devices owned.

The variable for sending and receiving call backs messages (17_5) was significantly correlated to the repurchase period. In addition Duncan's Multiple Range Test showed that responders that repurchased cellphone within twelve months had significantly higher use of call backs than both groups that repurchased after more than a year. Use of cellphone navigation systems (17_13) had a low (10%) correlation to the repurchase period.

**Table 8: Product Features ANOVA**

| Hypothesis | Dependent (Y) Variables | Independent (X) Variables | P Value |
|---|---|---|---|
| $H_2$: Products Features | Repurchase period (Q8) | Q16 | 0.3556 |
| | | Q17_1 | 0.8533 |
| | | Q17_2 | 0.8446 |
| | | Q17_3 | 0.3821 |
| | | Q17_4 | 0.1824 |
| | | Q17_5 | 0.0045** |
| | | Q17_6 | 0.5056 |
| | | Q17_7 | 0.6566 |
| | | Q17_8 | 0.3703 |
| | | Q17_9 | 0.1689 |
| | | Q17_10 | 0.7773 |
| | | Q17_11 | 0.5716 |
| | | Q17_12 | 0.3645 |
| | | Q17_13 | 0.0556* |
| | Number of devices (Q9) | Q16 | 0.3776 |
| | | Q17_1 | 0.144 |
| | | Q17_2 | 0.4566 |
| | | Q17_3 | 0.5014 |
| | | Q17_4 | 0.8316 |
| | | Q17_5 | 0.5255 |
| | | Q17_6 | 0.3936 |
| | | Q17_7 | 0.1902 |
| | | Q17_8 | 0.7417 |
| | | Q17_9 | 0.2695 |
| | | Q17_10 | 0.3312 |

| | | | |
|---|---|---|---|
| | | Q17_11 | 0.8526 |
| | | Q17_12 | 0.2985 |
| | | Q17_13 | 0.3409 |

In general product features were not correlated to repurchase period or the number of devices owned. Thus there is insufficient evidence to support the second hypothesis of a relationship between the product features and repurchase intention.

### 5.5.3 Hypothesis 3: Ease of Use

As mentioned previously the ease of use (usability) group of questions (18) was reformulated into a single stable variable for the current hypothesis testing. It was found that usability was significantly correlated to the repurchase period (Table 9). Furthermore, according to Duncan's Multiple Range Test, responders that replaced their cellphones within twelve months were significantly less concerned with usability than the other two groups. The two groups of responders that replace their devices after more than a year were not significantly different from each other. This result supports hypothesis three which states that there is a relationship between usability and repurchase intention.

**Table 9: Usability ANOVA**

| Hypothesis | Dependent (Y) Variables | Independent (X) Variables | P Value |
|---|---|---|---|
| $H_3$: Ease of Use | Repurchase period (Q8) | Q18 | 0.0019** |
| | Number of devices (Q9) | Q18 | 0.5049 |

The second test indicates that there is no correlation between usability and the number of devices owned. This detracts some of the support for hypothesis three.

### 5.5.4 Hypothesis 4: Product Reliability

As shown in Table 10, none of the variables related to reliability tested in this section showed a significant correlation with the dependent variables at the 5% level.

**Table 10: Reliability ANOVA**

| Hypothesis | Dependent (Y) Variables | Independent (X) Variables | P Value |
|---|---|---|---|
| $H_4$: Product Reliability | Repurchase period (Q8) | Q20_1 | 0.6483 |
| | | Q20_2 | 0.3894 |
| | | Q22_1 | 0.5302 |
| | | Q22_2 | 0.0919* |
| | | Q22_3 | 0.8755 |
| | | Q22_4 | 0.4298 |
| | | Q23_1 | 0.7132 |
| | | Q23_2 | 0.2445 |
| | | Q23_3 | 0.7462 |
| | | Q23_4 | 0.6599 |
| | Number of devices (Q9) | Q20_1 | 0.5245 |
| | | Q20_2 | 0.5699 |
| | | Q22_1 | 0.8640 |
| | | Q22_2 | 0.2691 |
| | | Q22_3 | 0.7591 |
| | | Q22_4 | 0.5319 |
| | | Q23_1 | 0.2004 |
| | | Q23_2 | 0.6711 |
| | | Q23_3 | 0.0875* |
| | | Q23_4 | 0.1054 |

Only two variables showed some correlation at the 10% level. The first dedicated that cellphone chargers (22_2) had a low correlation (at 10%) with repurchase period. The second was the hands free set which also showed a low correlation (at 10%) but this was with the number of devices purchased.

The overall outcome of the test was therefore that there was insufficient evidence to support hypothesis three of a negative relationship between reliability and repurchase intention.

### 5.5.5 Hypothesis 5: Offer Bundling

Among the 38 tests conducted to test the fifth hypothesis only two tests produced a significant correlation at the 5% level and one was correlated at the 10% level (Table 11). The low correlation (10% level) was attained between repurchase period and weekday call billing rates (24_6).

Both of the two significant correlation results with both repurchase period and the number of devices were detected with regards to remote (contact centre) customer service (26_4). Using Duncan's test it was shown that responders that retained their devices for between two and three years assigned significantly lower importance to the quality of contact centre support than their counterparts that kept their devices for shorted periods. The same Duncan's grouping test also showed a significant difference between owners of private phones, business cellphones and those that concurrently owned business and private cellphones with regards to their rating of contact centre importance.

**Table 11: Offer Bundling ANOVA**

| Hypothesis | Dependent (Y) Variables | Independent (X) Variables | P Value |
|---|---|---|---|
| $H_5$: Offer Bundling | Repurchase period (Q8) | Q24_1 | 0.648 |
| | | Q24_2 | 0.9592 |
| | | Q24_3 | 0.5209 |
| | | Q24_4 | 0.2541 |
| | | Q24_5 | 0.3079 |
| | | Q24_6 | 0.0885* |
| | | Q24_7 | 0.4172 |
| | | Q24_8 | 0.6606 |
| | | Q25_1 | 0.4387 |
| | | Q25_2 | 0.4555 |

| | | | |
|---|---|---|---|
| | | Q25_3 | 0.8733 |
| | | Q25_4 | 0.7626 |
| | | Q25_5 | 0.3703 |
| | | Q25_6 | 0.6324 |
| | | Q26_1 | 0.4781 |
| | | Q26_2 | 0.2474 |
| | | Q26_3 | 0.3842 |
| | | Q26_4 | 0.0313** |
| | | Q26_5 | 0.8843 |
| | Number of devices (Q9) | Q24_1 | 0.2591 |
| | | Q24_2 | 0.3601 |
| | | Q24_3 | 0.3968 |
| | | Q24_4 | 0.6539 |
| | | Q24_5 | 0.4809 |
| | | Q24_6 | 0.5437 |
| | | Q24_7 | 0.2257 |
| | | Q24_8 | 0.9281 |
| | | Q25_1 | 0.6523 |
| | | Q25_2 | 0.3268 |
| | | Q25_3 | 0.7256 |
| | | Q25_4 | 0.8527 |
| | | Q25_5 | 0.2844 |
| | | Q25_6 | 0.4068 |
| | | Q26_1 | 0.3096 |
| | | Q26_2 | 0.1677 |
| | | Q26_3 | 0.1395 |
| | | Q26_4 | 0.0009** |
| | | Q26_5 | 0.2914 |

Given that only one out of 19 variables in 38 tests showed significant correlation with the dependent variables. The quality of contact centre support was the only bundling component of significance to repurchase and number devices owned. It was therefore concluded that there was insufficient evidence to support the relationship between general offer bundling and repurchase intention as postulated in hypothesis five.

### 5.5.6 Hypothesis 6: Buyer's Age

Table 12 shows the test results for the fifth hypothesis. According to this result there was no correlation between the buyers' age and both the repurchase period, neither was there correlation with the number of devices owned.

**Table 12: Buyers Age ANOVA**

| Hypothesis | Dependent (Y) Variables | Independent (X) Variables | P Value |
|---|---|---|---|
| $H_6$: Buyer's Age | Repurchase period (Q8) | Q1 | 0.2943 |
| | Number of devices (Q9) | Q1 | 0.2842 |

Thus one could deduce that there was no statistically significant support for the sixth hypothesis concerning the relationship between buyers' age and repurchase intention.

## 5.6. Précis

The current section reviews the current Chapter of the research report. The chapter began with a description of the responders using descriptive statistics. That was followed by an analysis of mean findings to check if they were consistent with expectations and intuitive reason. The subsequent text contained reliability tests which were performed by applying Cronbach's Alpha tests to the grouped variables. The final section then evaluated the six hypotheses using correlations tests.

Based on survey responses it was found that two of the six hypotheses were supported by statistical testing (Table 13). The supported and thus accepted theories were namely Hypothesis 1 (visibility in consumption) and the second was Hypothesis 3 (product usability or ease of use). In these two instances the study accepted the null hypotheses.

**Table 13: Summary of Hypothesis Test Results**

| Hypothesis | Test Result |
|---|---|
| **$H_1$: Repurchase intention is higher for CE that are consumed visibly** | Supported |

| | |
|---|---|
| **relative to those that are consumed inconspicuously** | |
| **$H_2$: Repurchase intention is higher where CEs are perceived to have new additional product features than for CEs that are not seen to have added features** | Not Supported |
| **$H_3$: Repurchase intention is higher when consumers perceive a high level of CE usability than when consumers find usability to be relatively low** | Supported |
| **$H_4$: Repurchase intention is higher for CE with low reliability than it is for CEs have relatively high reliability** | Not Supported |
| **$H_5$: Repurchase intention is higher where the CE offer bundles are expanded than where the CE offer bundles are comparatively narrow** | Not Supported |
| **$H_6$: Repurchase intention is higher for younger CE consumers than it is for older CE consumers** | Not Supported |

The other four hypotheses were not supported by the data thus the alternative hypotheses that those variables had no bearing on the dependant variable (repurchase intention) were accepted.

# Chapter 6: Discussion of Findings

## 6.1. Introduction

The quantitative results in the previous Chapter 5: are discussed in the current Chapter using the literature review in Chapter 2: and according to the research hypotheses outlined in Chapter 3:. The aim of the chapter is to interpret the hypothesis test results as well as to glean recommendations relevant to the target audiences which are academic professionals, members of the consumer electronics (CE) industry's value chain as well as CE consumers.

## 6.2. Sample

A total of 144 individuals were sampled in this study. This was more than three times the recommended minimum sample size required to reach a statistically representative set of responders (Zikmund, 2003 and Heckathorn, 2007). The responders' network provider profile shown in Chapter 5: also bore close resemblance to the prevailing markets shares in South Africa as reported in BMT_Tech (2009). In addition all the variables used in hypothesis testing had a minimum of 44 responses ensuring their statistical validity. The combined impact of these sampling outcomes ensured the validity of the findings discussed in this chapter.

## 6.3. Hypothesis Test Discussion

As shown in Chapter 5: each of the hypotheses were tested using between two and 38 sub indicators. This was done to better understand the nature of the influence on repurchase intent drivers.

Where the hypotheses were supported by the statistical tests the subsequent text point out the responsible subsets of variables and separate them from the

insignificant ones. These were then interpreted further to determine the implications for business and marketing professionals, academics as well as for consumers in general.

## 6.4. Hypothesis 1: Visibility in Consumption

**Repurchase intention is higher for CE that are consumed visibly relative to those that are consumed inconspicuously.**

This hypothesis was empirically supported indicating that fashion and conspicuousness in consumption does impact repurchase intent through the repurchase period as well as the number of devices owned.

Fashionability ratings (12_1 to 12_8) show some weak support to the theorised Veblen effect (Rege, 2008) which predicted the positive impact of fashion on the speed to devise replacement. This did not apply to cellphone consumption at home. It did however have a strong influence on the number of devices purchased by attendees of business events. It would therefore appear cellphones were not an important status and symbol at home (Solnick & Hemenway, 1998) possibly due to the other indicators available in that setting. Conversely cellphones importance as status symbols was higher for business event attendees (13_4).

Situations of high visibility in cellphone consumption including outdoors (15_2) and at work (15_4) showed high influence on repurchase intent. Conversely, inconspicuous use occasions including use at home (15_1) and indoors (15_3) showed low impact on repurchase intent. This result provided further support to the existence of the spectator effect (Heffetz, 2004).

Industry professionals should therefore note that the visual appearance aesthetics and prestige are of critical importance in the repurchase process.

Therefore significant returns can be expected from time and effort investment into building positive, fashionable impressions about consumer electronics and the producers themselves. These could be performed through marketing activities such as brand positioning and promotional activities. The critical insight here is that these efforts should emphasise aesthetical attributes possessed by a CE device.

## 6.5. Hypothesis 2: Product Features

**Repurchase intention is higher where CEs are perceived to have new additional product features than for CEs that are not seen to have added features.**

Contrary to the postulations in Wood (2004), Fernandez (2001) and Bayus (1991) the influence of product features on repurchase intent was not supported by the data in this study. The results also failed to support the Rice & Katz (2003) concept of feature fatigue where buyers were averse to added features. In other words consumers were indifferent to enhanced styling and added features when repurchasing cellular devices.

This finding was also evident in the descriptive statistics section where the majority of responders consistently awarded neutral ratings to cellphone feature enhancements. In addition the descriptive statistics confirmed findings in ABI (2009) and World Wide Worx (2009) that consumers were not using the increasing number of advanced and premium features loaded onto their cellphones. Despite the available feature array, use remained confined to the basic features including telephony, text messaging, Email and to a lesser extent multimedia messaging.

This result implies that one could expect low return to further technological convergence where more features are added to cellphones. This is an important insight for product developers and business leaders as it should influence the relative investment into product features. For marketers this indicates that features need not be the focal point in promotional campaigns.

## 6.6. Hypothesis 3: Ease of Use (Functionality)

**Repurchase intention is higher when consumers perceive a high level of CE usability than when consumers find usability to be relatively low.**

The research data here supported hypothesis three and the findings in Wood (2004), Bayus (1991) as well as Thompson *et al.* (2005) of a positive relationship between ease of use and repurchase intention. However this support was limited to the period between repurchase events and not so with regards to the number of devices owned. Thus usability could be used to enticed earlier device replacement but not to increase the number of devices purchased.

The descriptive statistics concurred with this finding as more than 85% of responders indicated a preference effortless human to device interfaces. This was consistent across six questions (18_1 to 18_6) used to triangulate feedback on the device usability construct.

This result implied that product designers would do well to focus on creating intuitive and fluid user interfaces where manuals were no longer required to operate the devices. Intuitive usability and functionality should thus be used as key points in promotional messages.

## 6.7. Hypothesis 4: Product Reliability

**Repurchase intention is higher for CE with low reliability than it is for CEs have relatively high reliability.**

The findings in this study did not support those of Fernandez (2001) and Strausz (2009). Table 10 shows that none of the variables related to reliability showed a significant correlation to the dependent variables at the 5% level.

The data indicates that users counteracted device failure with repair rather than immediate replacement. This is seen in Figure 23 where device breakdown induced at least one repair attempt for 70% of responders before it triggered repurchase. Accessories were typically not replaced but discarded when they failed. This was especially true where the accessories in question did not affect the ability to use the cellphone. Conversely key component accessories such as batteries and chargers were replacement when they broke down. However in both cases their failure did not induce repurchase.

Although users indicated dissatisfaction with the durability of their devices this did not appear to induce a change in repurchase intentions. From an industry perspective this implies that there would be no returns to increased durability. However from an individual produced and brand perspective durability could be a potential source of competitive advantage. Unfortunately this study did not conclusively test this potential effect.

## 6.8. Hypothesis 5: Product Bundling

**Repurchase intention is higher where the CE offer bundles are expanded than where the CE offer bundles are comparatively narrow.**

Contrary to the findings in Gupta *et al.* (2002) and Bayus (1988) the configuration of product bundles in mobile phone market did not significantly alter buyers' repurchase intent.

Interestingly the individual indicator for contact centre support (26_4) was significantly correlated to both repurchase intent variables (repurchase period and the number of phones owned). This implies that contact centre support was a critical consideration when the cellphones repurchase decision is made. This consideration was particularly important to survey responders that replaced their devices in less than twelve months.

The lack of overall insignificance of this hypothesis implies that service providers would not achieve an increase in cellphone repurchase by adding services to their bundled offerings. Thus the optimal strategy for CE industry players is to only match the existing CE offering bundles and not to base their competitive strategy on this consideration.

## 6.9. Hypothesis 6: Buyer's Age

**Repurchase intention is higher for younger CE consumers than it is for older CE consumers.**

The study failed to support the notion of age influencing repurchase intention. This was in contradiction to findings in World Wide Worx (2009), Rice & Katz (2003) and Huh & Kim (2006). These past studies had found that with age came diminishing learning capability and resistance to change which altered repurchase behaviour. As shown earlier, the survey responders' ages ranged from 16 to 66 which spanned 49 years. This covered a wide range of the adult age groups and could therefore be relied upon as a representative reflection of the population of cellphone consumers.

This finding implied that altering mobile phone offerings to target different age groups was unlikely to significantly increase or alter the repurchase rates.

## 6.10.Conclusion

The current chapter was a discussion of the survey results with reference to earlier studies reviewed (Chapter 2:) and the hypotheses postulated in Chapter 3:. Table 13 in the previous chapter summarises the outcome of the six hypotheses tested in the preceding sections showing that only two were supported statistically. These were the first and third hypotheses. The two represented one Hedonic (sensory) driver referring to conspicuousness and the second was a Utilitarian (pragmatic) driver referring to usability. The chapter went on to discuss the implications of the findings to the study's key academic and practitioner audiences.

# Chapter 7: Conclusions & Recommendations

## 7.1. Introduction

This terminal part of the research document presents an overview of the entire document as well as some final remarks emerging from the study. The section was then closed off with a list of the potential areas of related future research that were either uncovered during research process or which were beyond the scope of the current study.

## 7.2. Research Overview

This study sought to investigate factors driving consumers' repurchase intention in the consumer electronics sector using mobile cellular phones as a case in point. The work's readership was expected to be threefold. Firstly were academics professionals that seek to increase their knowledge of the underlying motivators to the behaviour of the buying public. The second group are business fraternity particularly those plying their trade in consumer electronics. This could help to inform their strategic decisions especially in terms of comparing competing investment opportunities aimed at improving business performance.

The subsequent review of literature was conducted to establish an understanding of the current level of knowledge in this field of study. This secondary analysis indicated that earlier researchers found repurchase intent to be driven by two categories of motivators namely hedonic and utilitarian drivers. Hedonic drivers were handled first and these referred to factors that appealed to the senses, the subconscious and emotions rather than the pragmatic evaluation. In this study this referred to the extent to which the CE consumption was visible, displayable, conspicuous and knowable to others

(Heffetz, 2004). In the second category were utilitarian drivers including product features, ease of use (usability), bundled extra offers as well as the buyer's age.

The study then formulated these factors into a set of six hypotheses to be tested using a quantitative and descriptive method applied to primary survey data. This method was employed to confirm the postulated relationship to repurchase intention as well as to determine the direction of that interaction.

The primary data collection was conducted between August and September 2010 using a cross sectional internet based survey. The survey reached a representative sample of 144 unique individuals between the ages of 17 and 66 years. Each of the six hypotheses were tested using between two and 38 indicators by correlating them to two dependent variables namely the repurchase period and number of devices owned.

Two of the six hypotheses were found to be statistically significant as repurchase intention drivers. The first was the hedonic driver attesting to the positive relationship between conspicuousness in CE consumption. The second was the utilitarian driver concerned the positive relationship with product ease of use. The remaining four hypotheses could not be supported as significant drivers to repurchase intention.

## 7.3. Stakeholder Recommendations

The key finding from this research was the critical importance of visual appearance, fashionability; aesthetics appeal and prestige in inducing consumers' repurchase intention. This finding encourages members of the consumer electronics industry to place less emphasis on improving product features, durability, bundling or segmenting by buyers' age. Thus they should

focus on producing fashionable devices that are easy to use requiring minimal if any reference to user manuals.

An anomaly among these considerations was that contact centre support emerged as an important repurchase intention consideration despite it being within a hypothesis five which was not supported as a repurchase intent driver.

## 7.4. Research Limitations

As with other studies, the current study was limited by time and resources. Consequently decisions were made to restrict the research scope to fit within these constraints. These limitations are discussed in the following text.

Firstly this study did not explore the magnitude of the impact of the repurchase intent drivers. Thus although it could verify a driver's significance it could not attest to the strength of this impact.

The research also omitted an investigation of the possible interaction between independent variables. Related to this omission was that the possible intercedence among repurchase driver variables was also excluded. Thus some of the variables found to be insignificant as direct repurchase drivers may have had important but indirect influences on the dependent repurchase intent outcome.

Multiple indicators were generated for each of the six hypotheses in an effort to triangulate responses and gain precision. Although this enabled better data analysis through descriptive statistics, it also caused a limitation in the hypothesis testing section (5.5). That is, as a result of the structure of the multiple indicators it was not possible to generate six aggregated variables to use in each of the six hypothesis tests. Thus the hypothesis tests were

performed using multiple indicators. The limitation of this approach was that it inflated the risk of committing type 1 (false positive) errors (Brunner & Austin, 2007). Thus increasing the risk of erroneously rejecting true drivers of repurchase intent. It was also noted however that the study's relatively large sample size served to mitigate this risk (Zikmund, 2003)

As underscored in the background (Chapter 1:), this study used repurchase-intent as a proxy for actual repurchase behaviour. This posed a limitation in that reported intentions may not necessarily culminate into repurchase actions. Thus the reported repurchase intent drivers may differ from the repurchase behaviour drivers.

The study also used cellphones to represent consumer electronics in general. The limitation here was that the study did not explore the possible alternate array of repurchase drivers across product categories, product brands, producers, and in different geographic locations.

As noted in the research method (Chapter 4: this study was performed using cross sectional data. By definition (Zikmund, 2003) this approach limited the findings to a single period and assumed that there were no divergences in the repurchase intent drivers over time.

## 7.5. Areas of Future Research

Following on the research limitations discussed above some areas of possible future research were uncovered. These leads were defined in the following text.

### 7.5.1 Predictive Power of Independent Variables

The first suggested area of future related study would be to test the predictive power of the independent variables. This could be performed by generating

regression models using repurchase intention as dependent variables against its drivers as the independent variables. These studies could start by using the variables identified in this study. This would serve to verify their validity as well as to specify the magnitude of their impact.

Although only two hypotheses were supported as drivers to repurchase they were each composed of at least eight individual questions each. These questions were correlated against two dependent variables each bringing the total to at least 36 relationships that could be built into regression models.

The regression studies could also evaluate the existence of interaction, multicollinearity and intercedence between the multiple indicators of each of the independent variables. This could reveal possible indirect influences on repurchase intent that could occur in different contexts.

### 7.5.2 Repurchase Behaviour

Further to reported repurchase intentions used in this study, future research could study actual repurchase behaviour. This could involve observing choices made at the actual purchase events or soon after the event had occurred. Approaches such as these would avoid reliance on respondents' intensions which may not materialise.

A milder form of these possible methods could be to simulate the repurchase event in controlled environments such as mock stores. Although this approach could benefit from greater precision it is likely to also involve greater expense as well.

### 7.5.3 Other Sectors & Products

There is an opportunity to test the findings of this study in other consumer electronics (CE) sectors and for other products. Examples of related products

that could be tested include computers and in particular tablet devices; television sets, gaming consoles and media playing devices.

### 7.5.4 Impact of Alternate Brands

Another area of potential study would be to compare the impact of the repurchase drivers across producers, brands and product classes. This could reveal widely differing outcomes in terms of using them as competitive tools. For instance comparative reliability could have a high impact on repurchase across countries.

### 7.5.5 Importance of Contact Centre Support

A final area of possible future study could be to verify the unusual finding that contact centre support was an important repurchase consideration. This was the finding in the current study despite this being an indicator within hypothesis five which was not an important repurchase driver overall.

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# Appendix 1: Project Plan

Being part of the MBA program, the ultimate scheduling milestone for this research project is completion before the submission deadline in November 2010. The following is a preliminary breakdown of the expected intermediate targets.

**Table 14: High Level Project Timeline**

| Period | Task |
|---|---|
| **Oct 2009 – Oct 2010** | Literature Review |
| **Nov 2009 – Dec 2009** | Topic selection & refinement |
| **Jan 2010 – Mar 2010** | Complete Research Proposal |
| **Apr 2010 – Jun 2010** | Research Method & Procedure |
| **Jul 2010** | Sample selection |
| **Jul 2010 – Aug 2010** | Deploy electronic survey |
| **Sept 2010** | Data cleaning & analysis |
| **Sept 2010** | Findings Discussion |
| **Sept 2010 – Oct 2010** | Conclusions and implications |
| **Oct 2010** | Report Writing and Editing |

*Note that the conclusion of each section will feature a period of research supervisor review followed by the incorporation of her recommendations.

# Appendix 2: Introductory Letter

## South African Cellphone Use & Perceptions

### Cover Letter & Consent Form

**Dear Participant,**

**This research project seeks to understand the issues that help you decide on when to buy a new or replacement cellphone. This is an academic study but will also help the industry to better serve your needs.**

**Your contribution is voluntary and you have the right to change your mind at any stage with no penalty.**

**If you have any questions please contact me or my supervisor using the following:**

**Researcher: Hilton Madevu**
**Email: hiltonm@tuks.co.za**
**Phone: 082 759 9692**
**Supervisor: Nicola Kleyn**
**Email: kleynn@gibs.co.za**
**Phone: 011 771 4000**

**Regards**
**Hilton**

**General Guide:**
**For all questions please select the closest block/group/category where provided.**
**A warning will be displayed if you omit questions. You may ignore it if you need to.**
**Unless otherwise stated all questions refer to:**

- **Your personal (private) cellular (mobile) phone**
- **Please refer to your main phone if you have more than 1 private and/or 1 business phone**
- **Excludes additional cellphones provided by your employer (*unless specified otherwise*)**
- **Excludes other cellphones that you sponsor but do not use personally &**
- **Refers to the past calendar year from July 2009 to July 2010 (*unless specified otherwise*).**

# Appendix 3: Research Questionnaire

## Getting to Know You

1.) How old will you be (age) on 31 December 2010?

_____number_____

2.) Please select you sex.

| | Male | Female |
|---|---|---|
| Sex | 1 | 2 |

3.) Please indicate your marital status.

| | Married | Single | In a Relationship |
|---|---|---|---|
| Marital Status | 1 | 2 | 3 |

4.) In which industry are you employed?

1. Not Employed
2. Academic & Research
3. Agriculture, Fishery & Forestry
4. Arts, Design, Entertainment, Sports, and Media
5. Business & Financial Operations
6. Cleaning & Sanitation
7. Community & Social Services
8. Computer & Mathematical
9. Construction, Architecture & Engineering
10. Corporate & General Management
11. Education, Research & Library
12. Food Preparation & Serving
13. Government & Legislation
14. Healthcare Practitioners, Technicians & Support
15. Human Resources & Training
16. Law Enforcement, Security & Protective Services
17. Legal & Judiciary
18. Life, Physical & Social Science
19. Military
20. Mining & Extraction
21. Office, Secretarial & Administrative Support
22. Plant & Machinery Operators, Assemblers & Maintenance
23. Production (Fabrication, Textile, Metal/Plastic works, Printing etc)
24. Shop & Market Sales
25. Transportation, Logistics & Material Moving
26. Other (not otherwise specified)

5.) At which level are you employed?

1. Executive

2. Senior Management
3. Management
4. Technical & Professional
5. Front Line & Client Service
6. Administrative/Support personnel
7. Trainee/Apprentice
8. N/A - Unemployed/Homemaker/Retired/Student

6.) In which South African province do you live?

1. Gauteng
2. KwaZulu-Natal
3. Free State
4. Western Cape
5. Eastern Cape
6. Northern Cape
7. North West
8. Mpumalanga
9. Northern Province

7.) About how much do you earn per month?

1. N/A & R0
2. R1 - R10,000
3. R10,001 - R20,000
4. R20,001 - R30,000
5. R30,001 - R40,000
6. R40,001 - R50,000
7. R50,001 - R60,000
8. R50,001 - R60,000
9. R60,001 - R70,000
10. R70,001 - R80,000
11. R90,001 - R100,000
12. R100,001 & more

## Your Cellphone Use

8.) How often, in months, do you replace your cellphone(s)?

_____number_____

9.) How many functioning private/business cellphones do you use?

| | | Number |
|---|---|---|
| Q9_1 | Number of private cellphones? | number--- |
| Q9_2 | Number of business cellphones? | number--- |

10.) Please select one appropriate service type for your (main) private & business phone(s).

| | | Contract | Pre-Paid | Not Sure |
|---|---|---|---|---|
| Q10_1 | What kind of service is your private cellphone | 1 | 2 | 3 |

| | | | | |
|---|---|---|---|---|
| | on? | | | |
| Q10_2 | What kind of service is your business cellphone on? | 1 | 2 | 3 |

11.) Please select your network provider(s)

| | Vodacom | MTN | Cell C | Virgin Mobile | Do Not Know |
|---|---|---|---|---|---|
| | **11_1** | **11_2** | **11_3** | **11_4** | **Zero responses** |
| Please select your private cellphone(s) network(s) | 1 | 2 | 3 | 4 | 5 |
| | **11_5** | **11_6** | **11_7** | **11_8** | **11_9** |
| Please select your business cellphone(s) network(s) | 1 | 2 | 3 | 4 | 5 |

## Your Cellphone Use

12.) Please select the closest match:

| | | -3 (not important at all) | -2 | -1 | 0 (neutral) | 1 | 2 | 3 (very important) |
|---|---|---|---|---|---|---|---|---|
| 12_1 | How important is being fashionable? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 12_2 | How fashionable would you consider yourself to be? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 12_3 | Please rate the importance of having a fashionable cellphone? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 12_4 | How important is it for people to like you (hold you in high regard)? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 12_5 | How important is it to be different (unique) from others? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 12_6 | Please rate the importance of your cellphone to be different (unique) from what others have? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 12_7 | How likely is it that other people will notice the type of cellphone you use? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 12_8 | What level of importance do you rate the appearance of your cellphone (i.e. scratches and signs of age)? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

13.) How often does the following happen?

| | | Count of individual events |
|---|---|---|
| 13_1 | How often do you host guests in your home per month? | number___ |
| 13_2 | How often do you attend public events per month? | number___ |
| 13_3 | How often do you attend social events per month? | number___ |
| 13_4 | How often do you attend busineness events per month? | number___ |

## Your Cellphone Use

14.) To what proportion does the following happen?

Please use whole number i.e. 50 = 50%

| | | Percentage (%) of time |
|---|---|---|
| 14_1 | What percent of your BUSINESS cellphone use is PRIVATE? | % |
| 14_2 | What percent of your PRIVATE cellphone use is BUSINESS? | % |

15.) How often do you use your cellphone in these situations?

| | | -3 (never) | -2 | -1 | 0 (moderately) | 1 | 2 | 3 (very often) |
|---|---|---|---|---|---|---|---|---|
| 15_1 | At Home | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_2 | At Work | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_3 | Indoors | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_4 | Outdoors | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_5 | Mornings | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_6 | Afternoons | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_7 | Nights | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_8 | Weekdays | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_9 | Weekends | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_10 | Holidays | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 15_11 | Non-Holidays | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

## Cellphone Features

16.) How important are the following items?

| | | -3 (not important at all) | -2 | -1 | 0 (neutral) | 1 | 2 | 3 (very important) |
|---|---|---|---|---|---|---|---|---|
| 16_1 | To have the latest cellphone available? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 16_2 | To have the latest capabilities on your | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | cellphone? | | | | | | | |

17.) Please estimate how often you used the following cellphone feature on your primary private cellphone this past year (July 2009- July 2010).
Please note the code difference

| | | Not Available | Never | Once a year | Once a month | Once in 2 weeks | Once a week | Once in 2 days | Once a day | Many every day | Not Sure |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17_1 | Send or receive voice calls | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_2 | Send or receive SMS (text) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_3 | Take photographs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_4 | Make video recordings | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_5 | Send or receive call-backs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_6 | Send or receive airtime transfers | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_7 | Send or receive MMS text | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_8 | Send or receive MMS pictures | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_9 | Send or receive MMS videos | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_10 | Send or receive video calls | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_11 | Access the internet | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_12 | Send or receive emails | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 17_13 | Use the GPS Navigation system | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

## Ease of Use

18.) Please rate the importance of the following:

| | | -3 (very minor) | -2 | -1 | 0 (neutral) | 1 | 2 | 3 (very important) |
|---|---|---|---|---|---|---|---|---|
| 18_1 | How important is it for a cellphone to be easy to use? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 18_2 | How important are cellphone user manuals? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 18_3 | How easy is it to use a cellphone without a manual? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 18_4 | How important is it to be able to easily use a cellphone without a manual? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 18_5 | How important is it for a cellphone to be simple to operate? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 18_6 | How important is it for a cellphone to be a (stimulating) challenge to use? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

## Reliability

19.) Breakdown time (in whole months):

| | | Months |
|---|---|---|
| 19_1 | How long after buying did your last (previous) cellphone to ACTUALLY breakdown? | number___ |
| 19_2 | After how long did you EXPECT your last (previous) cellphone to breakdown? | number___ |
| 19_3 | How soon SHOULD a cellphone breakdown? | number___ |
| 19_4 | After how long, after buying, do you think your current cellphone WILL breakdown? | number___ |

20.) Repair Attempts

| | | Number |
|---|---|---|
| 20_1 | How many repairs would you try before replace your PRIVATE cellphone? | number___ |
| 20_2 | How many repairs would you try before replace your BUSINESS cellphone? | number___ |

21.) How often would you repair your cellphone before you replace it?

1. Zero
2. Once yearly
3. Once monthly
4. Once weekly
5. Once every 2 days
6. Once per day
7. Unlimited times

## Reliability

22.) How likely are you to replace the cellphone if the following accessories were to breakdown or fail:

| | | -3 (very unlikely) | -2 | -1 | 0 (neutral) | 1 | 2 | 3 (very likely) |
|---|---|---|---|---|---|---|---|---|
| 22_1 | Battery | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 22_2 | Charger | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 22_3 | Hands-free | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 22_4 | Car kit | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

23.) How likely are you to replace/repair the following accessories if they were to breakdown or fail:

| | | -3 (very unlikely) | -2 | -1 | 0 (neutral) | 1 | 2 | 3 (very likely) |
|---|---|---|---|---|---|---|---|---|
| 23_1 | Battery | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 23_2 | Charger | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 23_3 | Hands-free | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 23_4 | Car kit | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

## Service Charges

24.) Indicate how important the following items when replacing a cellphone or buying a new one?

| | | -3 (very minor) | -2 | -1 | 0 (neutral) | 1 | 2 | 3 (very important) |
|---|---|---|---|---|---|---|---|---|
| 24_1 | Day time call billing rates? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 24_2 | Overall voice-call billing rates? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 24_3 | SMS billing rates? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 24_4 | MMS billing rates? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 24_5 | Night time call billing | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | rates? | | | | | | | |
| 24_6 | Weekday call billing rates? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 24_7 | Weekend call charges?? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 24_8 | Data (internet) billing rates? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

## Free (bundled) Extras

25.) Please indicate how important the following items are when replacing a cellphone or buying a new one?

| | | **-3 (very minor)** | **-2** | **-1** | **0 (neutral)** | **1** | **2** | **3 (very important)** |
|---|---|---|---|---|---|---|---|---|
| 25_1 | Amount of free (bundled) airtime? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 25_2 | Number of free SMSs? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 25_3 | Access to free music websites? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 25_4 | Amount of free preloaded music? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 25_5 | Amount of free data (internet) access? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 25_6 | Number of free MMSs? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

## Service Quality

26.) Please indicate how important the following items are when replacing a cellphone or buying a new one?

| | | **-3 (very minor)** | **-2** | **-1** | **0 (neutral)** | **1** | **2** | **3 (very important)** |
|---|---|---|---|---|---|---|---|---|
| 26_1 | Length (months) of the service contract? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 26_2 | Quality of network reception/coverage? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 26_3 | Quality of face to face customer service? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 26_4 | Quality of remote customer service (contact centre)? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 26_5 | Quality of support service (billing, repairs & other)? | -3 | -2 | -1 | 0 | 1 | 2 | 3 |

## Thank You!

**All done!**
**Thank you for completing this questionnaire.**
**Kindly email me if you would like a copy of the published report on**
**hiltonm@tuks.co.za**
**...and lastly please copy and send a link to this survey to other cellphone users you know in South Africa.**

---

# Appendix 4: Cronbach Alpha Test Output

The MEANS Procedure

| Variable | Label | N | Mean | Std Dev | Minimum | Maximum |
|---|---|---|---|---|---|---|
| **q1** | **q1** | 133 | 33.7518797 | 8.2429088 | 17.0000000 | 66.0000000 |
| **q8** | **q8** | 117 | 23.6324786 | 7.2618492 | 12.0000000 | 72.0000000 |
| **q9_1** | **q9_1** | 122 | 0.9672131 | 0.4441433 | 0 | 3.0000000 |
| **q9_2** | **q9_2** | 111 | 0.4324324 | 0.5497375 | 0 | 3.0000000 |
| **q13_1** | **q13_1** | 122 | 2.7786885 | 2.3408422 | 0 | 12.0000000 |
| **q13_2** | **q13_2** | 122 | 2.0163934 | 2.1435415 | 0 | 15.0000000 |
| **q13_3** | **q13_3** | 122 | 3.6229508 | 2.8986399 | 0 | 20.0000000 |
| **q13_4** | **q13_4** | 122 | 2.0573770 | 2.0135868 | 0 | 10.0000000 |
| **q14_1** | **q14_1** | 80 | 17.7625000 | 22.6756121 | 0 | 90.0000000 |
| **q14_2** | **q14_2** | 101 | 25.8316832 | 23.8499766 | 0 | 100.0000000 |
| **q19_1** | **q19_1** | 89 | 23.4269663 | 17.2856270 | 1.0000000 | 99.0000000 |
| **q19_2** | **q19_2** | 95 | 28.7368421 | 17.8969928 | 1.0000000 | 123.0000000 |
| **q19_3** | **q19_3** | 99 | 38.0606061 | 19.5723765 | 2.0000000 | 100.0000000 |
| **q19_4** | **q19_4** | 99 | 27.3636364 | 17.4282521 | 1.0000000 | 100.0000000 |
| **q20_1** | **q20_1** | 97 | 1.7216495 | 1.5528352 | 0 | 12.0000000 |
| **q20_2** | **q20_2** | 75 | 0.9466667 | 1.2180327 | 0 | 5.0000000 |

## Conspicuousness & Fashion Sense

The CORR Procedure

**8 Variables:** q12_1 q12_2 q12_3 q12_4 q12_5 q12_6 q12_7 q12_8

**Simple Statistics**

| Variable | N | Mean | Std Dev | Sum | Minimum | Maximum | Label |
|---|---|---|---|---|---|---|---|
| **q12_1** | 121 | 0.23140 | 1.82007 | 28.00000 | -3.00000 | 3.00000 | q12_1 |
| **q12_2** | 122 | 0.81967 | 1.49940 | 100.00000 | -3.00000 | 3.00000 | q12_2 |
| **q12_3** | 122 | -0.03279 | 1.83147 | -4.00000 | -3.00000 | 3.00000 | q12_3 |
| **q12_4** | 121 | 0.94215 | 1.61914 | 114.00000 | -3.00000 | 3.00000 | q12_4 |
| **q12_5** | 122 | 0.41803 | 1.97019 | 51.00000 | -3.00000 | 3.00000 | q12_5 |
| **q12_6** | 121 | -0.35537 | 1.95303 | -43.00000 | -3.00000 | 3.00000 | q12_6 |
| **q12_7** | 122 | 0.71311 | 1.72238 | 87.00000 | -3.00000 | 3.00000 | q12_7 |
| **q12_8** | 121 | 0.48760 | 1.83083 | 59.00000 | -3.00000 | 3.00000 | q12_8 |

**Cronbach Coefficient Alpha**

| Variables | Alpha |
|---|---|
| Raw | 0.864386 |
| Standardized | 0.863691 |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |
| **q12_1** | 0.734161 | 0.833847 | 0.737044 | 0.832790 | q12_1 |
| **q12_2** | 0.585192 | 0.851682 | 0.582029 | 0.850546 | q12_2 |
| **q12_3** | 0.757092 | 0.831006 | 0.756826 | 0.830458 | q12_3 |
| **q12_4** | 0.455643 | 0.863952 | 0.458517 | 0.864048 | q12_4 |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |
| **q12_5** | 0.551018 | 0.856062 | 0.545697 | 0.854576 | q12_5 |
| **q12_6** | 0.724721 | 0.834381 | 0.721872 | 0.834568 | q12_6 |
| **q12_7** | 0.544840 | 0.855329 | 0.546575 | 0.854479 | q12_7 |
| **q12_8** | 0.568284 | 0.853116 | 0.562379 | 0.852731 | q12_8 |

## Cellphone Features

The CORR Procedure

**2 Variables:** q16_1 q16_2

**Simple Statistics**

| Variable | N | Mean | Std Dev | Sum | Minimum | Maximum | Label |
|---|---|---|---|---|---|---|---|
| **q16_1** | 110 | -0.00909 | 1.91802 | -1.00000 | -3.00000 | 3.00000 | q16_1 |
| **q16_2** | 110 | 0.80909 | 1.91323 | 89.00000 | -3.00000 | 3.00000 | q16_2 |

**Cronbach Coefficient Alpha**

| Variables | Alpha |
|---|---|
| Raw | 0.890147 |
| Standardized | 0.890149 |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |
| **q16_1** | 0.802043 | . | 0.802043 | . | q16_1 |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |
| **q16_2** | 0.802043 | . | 0.802043 | . | q16_2 |

## Ease of Use - Original

The CORR Procedure

**6 Variables:** q18_1 q18_2 q18_3 q18_4 q18_5 q18_6

**Simple Statistics**

| Variable | N | Mean | Std Dev | Sum | Minimum | Maximum | Label |
|---|---|---|---|---|---|---|---|
| **q18_1** | 107 | 2.42056 | 1.21343 | 259.00000 | -3.00000 | 3.00000 | q18_1 |
| **q18_2** | 108 | -0.16667 | 1.94071 | -18.00000 | -3.00000 | 3.00000 | q18_2 |
| **q18_3** | 108 | 1.17593 | 1.59338 | 127.00000 | -3.00000 | 3.00000 | q18_3 |
| **q18_4** | 108 | 2.08333 | 1.46054 | 225.00000 | -3.00000 | 3.00000 | q18_4 |
| **q18_5** | 108 | 2.38889 | 1.09231 | 258.00000 | -2.00000 | 3.00000 | q18_5 |
| **q18_6** | 108 | -0.76852 | 1.96515 | -83.00000 | -3.00000 | 3.00000 | q18_6 |

**Cronbach Coefficient Alpha**

| Variables | Alpha |
|---|---|
| Raw | 0.424302 |
| Standardized | 0.498479 |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |
| **q18_1** | 0.341323 | 0.320732 | 0.432116 | 0.354600 | q18_1 |
| **q18_2** | 0.271633 | 0.332986 | 0.276172 | 0.441247 | q18_2 |
| **q18_3** | 0.144124 | 0.416232 | 0.168346 | 0.496423 | q18_3 |
| **q18_4** | 0.361185 | 0.289845 | 0.414507 | 0.364804 | q18_4 |
| **q18_5** | 0.322723 | 0.338833 | 0.395573 | 0.375654 | q18_5 |
| **q18_6** | -.036223 | 0.553412 | -.092374 | 0.615033 | q18_6 |

## Ease of Use – Transformed

The CORR Procedure

**5 Variables:** q18_1 q18_3 q18_4 q18_5 qq18_6

**Simple Statistics**

| Variable | N | Mean | Std Dev | Sum | Minimum | Maximum | Label |
|---|---|---|---|---|---|---|---|
| **q18_1** | 107 | 2.42056 | 1.21343 | 259.00000 | -3.00000 | 3.00000 | q18_1 |
| **q18_3** | 108 | 1.17593 | 1.59338 | 127.00000 | -3.00000 | 3.00000 | q18_3 |
| **q18_4** | 108 | 2.08333 | 1.46054 | 225.00000 | -3.00000 | 3.00000 | q18_4 |
| **q18_5** | 108 | 2.38889 | 1.09231 | 258.00000 | -2.00000 | 3.00000 | q18_5 |
| **qq18_6** | 108 | 0.76852 | 1.96515 | 83.00000 | -3.00000 | 3.00000 | |

**Cronbach Coefficient Alpha**

| Variables | Alpha |
|---|---|
| Raw | 0.533340 |
| Standardized | 0.603871 |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |
| **q18_1** | 0.546550 | 0.353481 | 0.583827 | 0.421503 | q18_1 |
| **q18_3** | 0.097033 | 0.600970 | 0.129939 | 0.661686 | q18_3 |
| **q18_4** | 0.411500 | 0.407547 | 0.434023 | 0.508473 | q18_4 |
| **q18_5** | 0.502647 | 0.393948 | 0.529975 | 0.453688 | q18_5 |
| **qq18_6** | 0.147563 | 0.610681 | 0.175232 | 0.640735 | |

## Service Quality

The CORR Procedure

**5 Variables:** q26_1 q26_2 q26_3 q26_4 q26_5

**Simple Statistics**

| Variable | N | Mean | Std Dev | Sum | Minimum | Maximum | Label |
|---|---|---|---|---|---|---|---|
| **q26_1** | 101 | 1.74257 | 1.64106 | 176.00000 | -3.00000 | 3.00000 | q26_1 |
| **q26_2** | 101 | 2.78218 | 0.67237 | 281.00000 | -2.00000 | 3.00000 | q26_2 |
| **q26_3** | 100 | 1.56000 | 1.67163 | 156.00000 | -3.00000 | 3.00000 | q26_3 |
| **q26_4** | 101 | 2.14851 | 1.06194 | 217.00000 | -2.00000 | 3.00000 | q26_4 |
| **q26_5** | 101 | 2.23762 | 1.31262 | 226.00000 | -3.00000 | 3.00000 | q26_5 |

**Cronbach Coefficient Alpha**

| Variables | Alpha |
|---|---|
| Raw | 0.747827 |
| Standardized | 0.773326 |

**Cronbach Coefficient Alpha with Deleted Variable**

| Deleted Variable | Raw Variables | | Standardized Variables | | Label |
|---|---|---|---|---|---|
| | Correlation with Total | Alpha | Correlation with Total | Alpha | |
| **q26_1** | 0.441717 | 0.744299 | 0.429454 | 0.770075 | q26_1 |
| **q26_2** | 0.401292 | 0.750401 | 0.432014 | 0.769252 | q26_2 |
| **q26_3** | 0.554836 | 0.694900 | 0.535440 | 0.735048 | q26_3 |
| **q26_4** | 0.620795 | 0.676437 | 0.658512 | 0.691856 | q26_4 |
| **q26_5** | 0.692338 | 0.634477 | 0.686705 | 0.681570 | q26_5 |

# Appendix 5: Hypothesis Testing (ANOVA)

The SAS GLM Procedure

| Class Level Information | | |
|---|---|---|
| **Class** | **Levels** | **Values** |
| **qq8** | 3 | 12 13-24 25-72 |
| **qq9** | 3 | Both Busi Pri |

| Data for Analysis of qq12 q13_1 q13_2 q13_3 | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 97 |

| Data for Analysis of q14_2 | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 84 |

| Data for Analysis of q15_1 q15_5 q15_6 q15_8 q15_11 | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 94 |

| Data for Analysis of q15_3 | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 93 |

| Data for Analysis of q15_9 | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 93 |

| Data for Analysis of qq16 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 90 |

| Data for Analysis of q17_1 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 85 |

| Data for Analysis of q17_2 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 86 |

| Data for Analysis of q17_3 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 84 |

| Data for Analysis of q17_4 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 81 |

| Data for Analysis of q17_6 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 76 |

| Data for Analysis of q17_7 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 84 |

| Data for Analysis of q17_8 |
|---|

| Data for Analysis of q17_8 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 83 |

| Data for Analysis of q17_9 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 81 |

| Data for Analysis of q17_10 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 61 |

| Data for Analysis of q17_11 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 83 |

| Data for Analysis of q17_12 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 78 |

| Data for Analysis of q17_13 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 64 |

Note: Variables in each group are consistent with respect to the presence or absence of missing values.

The SAS System

The GLM Procedure

Dependent Variable: qq12

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 11.6725505 | 2.9181376 | 2.04 | 0.0953 |
| **Error** | 92 | 131.6339007 | 1.4308033 | | |
| **Corrected Total** | 96 | 143.3064512 | | | |

| R-Square | Coeff Var | Root MSE | qq12 Mean |
|---|---|---|---|
| 0.081452 | 236.9639 | 1.196162 | 0.504786 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 8.59433057 | 4.29716529 | 3.00 | 0.0545 |
| **qq9** | 2 | 2.21110320 | 1.10555160 | 0.77 | 0.4647 |

The SAS System

The GLM Procedure

Dependent Variable: q13_1 q13_1

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 34.0664153 | 8.5166038 | 1.51 | 0.2055 |
| **Error** | 92 | 518.5933785 | 5.6368845 | | |
| **Corrected Total** | 96 | 552.6597938 | | | |

| R-Square | Coeff Var | Root MSE | q13_1 Mean |
|---|---|---|---|
| 0.061641 | 84.35846 | 2.374212 | 2.814433 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 31.58045893 | 15.79022946 | 2.80 | 0.0659 |
| **qq9** | 2 | 0.37146995 | 0.18573497 | 0.03 | 0.9676 |

The SAS System

The GLM Procedure

Dependent Variable: q13_2 q13_2

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 10.5842505 | 2.6460626 | 0.50 | 0.7348 |
| **Error** | 92 | 485.5806979 | 5.2780511 | | |
| **Corrected Total** | 96 | 496.1649485 | | | |

| R-Square | Coeff Var | Root MSE | q13_2 Mean |
|---|---|---|---|
| 0.021332 | 109.7773 | 2.297401 | 2.092784 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 8.67451720 | 4.33725860 | 0.82 | 0.4429 |
| **qq9** | 2 | 3.92960510 | 1.96480255 | 0.37 | 0.6902 |

The SAS System

The GLM Procedure

Dependent Variable: q13_3 q13_3

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 24.1398426 | 6.0349607 | 0.61 | 0.6570 |
| **Error** | 92 | 911.3446935 | 9.9059206 | | |
| **Corrected Total** | 96 | 935.4845361 | | | |

| R-Square | Coeff Var | Root MSE | q13_3 Mean |
|---|---|---|---|
| 0.025805 | 84.56915 | 3.147367 | 3.721649 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 15.63096930 | 7.81548465 | 0.79 | 0.4574 |
| qq9 | 2 | 8.90257927 | 4.45128964 | 0.45 | 0.6394 |

The SAS System

The GLM Procedure

| Level of qq8 | N | qq12 | | q13_1 | | q13_2 | | q13_3 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| 12 | 11 | 1.31818182 | 0.97044390 | 4.18181818 | 3.15652283 | 1.45454545 | 1.43969694 | 3.36363636 | 2.15743956 |
| 13-24 | 75 | 0.35452381 | 1.24128475 | 2.77333333 | 2.36285062 | 2.22666667 | 2.47459160 | 3.92000000 | 3.39220091 |
| 25-72 | 11 | 0.71590909 | 1.02024952 | 1.72727273 | 0.78624539 | 1.81818182 | 1.25045446 | 2.72727273 | 1.48935618 |

| Level of qq9 | N | qq12 | | q13_1 | | q13_2 | | q13_3 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| Both | 26 | 0.75137363 | 0.95583497 | 3.07692308 | 1.67148023 | 2.23076923 | 2.68786447 | 3.46153846 | 2.13973399 |
| Busi | 12 | 0.66666667 | 1.54968227 | 2.66666667 | 1.30267789 | 1.75000000 | 1.21543109 | 3.16666667 | 2.12488859 |
| Pri | 59 | 0.36319613 | 1.25238429 | 2.72881356 | 2.82128919 | 2.10169492 | 2.26437869 | 3.94915254 | 3.62664340 |

The SAS System

The GLM Procedure

Dependent Variable: q14_2 q14_2

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 2902.96485 | 725.74121 | 1.37 | 0.2506 |
| **Error** | 79 | 41731.73753 | 528.24984 | | |
| **Corrected Total** | 83 | 44634.70238 | | | |

| R-Square | Coeff Var | Root MSE | q14_2 Mean |
|---|---|---|---|
| 0.065038 | 90.93875 | 22.98369 | 25.27381 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 780.576559 | 390.288280 | 0.74 | 0.4809 |
| **qq9** | 2 | 1925.762467 | 962.881233 | 1.82 | 0.1683 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q14_2 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **10** | 25.0000000 | 27.0801280 |
| **13-24** | **64** | 23.8750000 | 22.6375864 |
| **25-72** | **10** | 34.5000000 | 23.0277610 |

| Level of qq9 | N | q14_2 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **Both** | **23** | 28.2608696 | 24.9366787 |
| **Busi** | **3** | 0.0000000 | 0.0000000 |
| **Pri** | **58** | 25.3965517 | 22.4904967 |

The SAS System

The GLM Procedure

Dependent Variable: q15_1 q15_1

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 13.7792431 | 3.4448108 | 1.55 | 0.1944 |
| **Error** | 89 | 197.6782037 | 2.2211034 | | |
| **Corrected Total** | 93 | 211.4574468 | | | |

| R-Square | Coeff Var | Root MSE | q15_1 Mean |
|---|---|---|---|
| 0.065163 | 100.7854 | 1.490337 | 1.478723 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 7.21834802 | 3.60917401 | 1.62 | 0.2027 |
| **qq9** | 2 | 6.08306654 | 3.04153327 | 1.37 | 0.2596 |

The SAS System

The GLM Procedure

Dependent Variable: q15_5 q15_5

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 15.4180877 | 3.8545219 | 1.40 | 0.2419 |
| **Error** | 89 | 245.7840399 | 2.7616184 | | |
| **Corrected Total** | 93 | 261.2021277 | | | |

| R-Square | Coeff Var | Root MSE | q15_5 Mean |
|---|---|---|---|
| 0.059027 | 192.8522 | 1.661812 | 0.861702 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 2.31509799 | 1.15754900 | 0.42 | 0.6589 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq9 | 2 | 12.43364375 | 6.21682187 | 2.25 | 0.1112 |

The SAS System

The GLM Procedure

Dependent Variable: q15_6 q15_6

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 2.7818668 | 0.6954667 | 0.37 | 0.8284 |
| Error | 89 | 166.6223885 | 1.8721617 | | |
| Corrected Total | 93 | 169.4042553 | | | |

| R-Square | Coeff Var | Root MSE | q15_6 Mean |
|---|---|---|---|
| 0.016421 | 89.31760 | 1.368270 | 1.531915 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 2.40203681 | 1.20101840 | 0.64 | 0.5289 |
| qq9 | 2 | 0.26926781 | 0.13463391 | 0.07 | 0.9307 |

The SAS System

The GLM Procedure

Dependent Variable: q15_8 q15_8

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 5.8226761 | 1.4556690 | 0.86 | 0.4913 |
| Error | 89 | 150.6454090 | 1.6926450 | | |
| Corrected Total | 93 | 156.4680851 | | | |

| R-Square | Coeff Var | Root MSE | q15_8 Mean |
|---|---|---|---|
| 0.037213 | 69.48613 | 1.301017 | 1.872340 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 0.28849909 | 0.14424954 | 0.09 | 0.9184 |
| qq9 | 2 | 5.58472803 | 2.79236401 | 1.65 | 0.1979 |

The SAS System

The GLM Procedure

Dependent Variable: q15_11 q15_11

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 7.4972482 | 1.8743121 | 1.14 | 0.3424 |
| Error | 89 | 146.1623262 | 1.6422733 | | |
| Corrected Total | 93 | 153.6595745 | | | |

| R-Square | Coeff Var | Root MSE | q15_11 Mean |
|---|---|---|---|
| 0.048791 | 75.28884 | 1.281512 | 1.702128 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 3.68681169 | 1.84340585 | 1.12 | 0.3300 |
| qq9 | 2 | 4.33431137 | 2.16715569 | 1.32 | 0.2724 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q15_1 | | q15_5 | | q15_6 | | q15_8 | | q15_11 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| 12 | 10 | 2.300 00000 | 1.251 66556 | 1.200 00000 | 1.988 85785 | 2.000 00000 | 1.247 21913 | 1.800 00000 | 1.475 72957 | 2.200 00000 | 1.316 56118 |
| 13 | 7 | 1.397 | 1.478 | 0.876 | 1.666 | 1.465 | 1.385 | 1.863 | 1.326 | 1.616 | 1.308 |

| Level of qq8 | N | q15_1 | | q15_5 | | q15_6 | | q15_8 | | q15_11 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| 3-24 | 3 | 26027 | 92346 | 71233 | 20998 | 75342 | 26163 | 01370 | 17944 | 43836 | 41440 |
| 25-72 | 11 | 1.272 72727 | 1.793 92916 | 0.454 54545 | 1.507 55672 | 1.545 45455 | 1.213 55975 | 2.000 00000 | 1.000 00000 | 1.818 18182 | 1.078 71978 |

| Level of qq9 | N | q15_1 | | q15_5 | | q15_6 | | q15_8 | | q15_11 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev | Mean | Std Dev |
| Both | 24 | 1.416 66667 | 1.612 90089 | 1.375 00000 | 1.764 68990 | 1.625 00000 | 1.526 93213 | 2.000 00000 | 1.383 12815 | 1.791 66667 | 1.318 07391 |
| Busi | 12 | 0.833 33333 | 1.337 11585 | 1.250 00000 | 1.764 54990 | 1.583 33333 | 1.164 50015 | 2.416 66667 | 0.792 96146 | 2.166 66667 | 0.717 74056 |
| Pri | 58 | 1.637 93103 | 1.483 21930 | 0.568 96552 | 1.579 60765 | 1.482 75862 | 1.327 72565 | 1.706 89655 | 1.324 64654 | 1.568 96552 | 1.352 21805 |



The GLM Procedure

Dependent Variable: q15_3 q15_3

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 6.2711220 | 1.5677805 | 1.16 | 0.3358 |
| Error | 88 | 119.3417812 | 1.3561566 | | |
| Corrected Total | 92 | 125.6129032 | | | |

| R-Square | Coeff Var | Root MSE | q15_3 Mean |
|---|---|---|---|

| R-Square | Coeff Var | Root MSE | q15_3 Mean |
|---|---|---|---|
| 0.049924 | 60.16797 | 1.164541 | 1.935484 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 5.38085748 | 2.69042874 | 1.98 | 0.1436 |
| **qq9** | 2 | 0.68561606 | 0.34280803 | 0.25 | 0.7772 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q15_3 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **9** | 2.66666667 | 1.00000000 |
| **13-24** | **73** | 1.83561644 | 1.14277560 |
| **25-72** | **11** | 2.00000000 | 1.34164079 |

| Level of qq9 | N | q15_3 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **Both** | **23** | 2.08695652 | 1.23997960 |
| **Busi** | **12** | 2.00000000 | 1.04446594 |
| **Pri** | **58** | 1.86206897 | 1.17649906 |

The SAS System

The GLM Procedure

Dependent Variable: q15_9 q15_9

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 11.9969505 | 2.9992376 | 1.59 | 0.1830 |
| **Error** | 88 | 165.5729420 | 1.8815107 | | |

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Corrected Total | 92 | 177.5698925 | | | |

| R-Square | Coeff Var | Root MSE | q15_9 Mean |
|---|---|---|---|
| 0.067562 | 80.73823 | 1.371682 | 1.698925 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 4.19240892 | 2.09620446 | 1.11 | 0.3328 |
| qq9 | 2 | 7.36541420 | 3.68270710 | 1.96 | 0.1473 |

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The SAS System

The GLM Procedure

| Level of qq8 | N | q15_9 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 10 | 2.30000000 | 1.05934991 |
| 13-24 | 73 | 1.65753425 | 1.44548318 |
| 25-72 | 10 | 1.40000000 | 1.17378779 |

| Level of qq9 | N | q15_9 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 24 | 1.62500000 | 1.58285653 |
| Busi | 12 | 1.00000000 | 1.34839972 |
| Pri | 57 | 1.87719298 | 1.28271720 |

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The SAS System

The GLM Procedure

Dependent Variable: qq16

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 13.6115756 | 3.4028939 | 1.01 | 0.4057 |
| Error | 85 | 285.7106466 | 3.3613017 | | |
| Corrected Total | 89 | 299.3222222 | | | |

| R-Square | Coeff Var | Root MSE | qq16 Mean |
|---|---|---|---|
| 0.045475 | 532.2732 | 1.833385 | 0.344444 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 7.03678307 | 3.51839154 | 1.05 | 0.3556 |
| qq9 | 2 | 6.62274010 | 3.31137005 | 0.99 | 0.3776 |

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The GLM Procedure

| Level of qq8 | N | qq16 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 8 | 1.12500000 | 1.48203528 |
| 13-24 | 71 | 0.32394366 | 1.78104823 |
| 25-72 | 11 | -0.09090909 | 2.34326889 |

| Level of qq9 | N | qq16 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 22 | 0.68181818 | 1.54723605 |
| Busi | 12 | 0.70833333 | 1.93600260 |
| Pri | 56 | 0.13392857 | 1.91285382 |

The SAS System

The GLM Procedure

Dependent Variable: q17_1 q17_1

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 25.4698615 | 6.3674654 | 1.18 | 0.3261 |
| **Error** | 80 | 431.8242561 | 5.3978032 | | |
| **Corrected Total** | 84 | 457.2941176 | | | |

| R-Square | Coeff Var | Root MSE | q17_1 Mean |
|---|---|---|---|
| 0.055697 | 29.92151 | 2.323317 | 7.764706 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 1.71572593 | 0.85786296 | 0.16 | 0.8533 |
| **qq9** | 2 | 21.43331965 | 10.71665983 | 1.99 | 0.1440 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_1 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **8** | 7.25000000 | 2.96407056 |
| **13-24** | **66** | 7.87878788 | 2.27031107 |
| **25-72** | **11** | 7.45454545 | 2.38174878 |

| Level of qq9 | N | q17_1 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **Both** | **21** | 7.19047619 | 2.96005148 |
| **Busi** | **11** | 9.00000000 | 0.00000000 |
| **Pri** | **53** | 7.73584906 | 2.22875391 |

The SAS System

The GLM Procedure

Dependent Variable: q17_2 q17_2

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 1.67238499 | 0.41809625 | 0.51 | 0.7289 |
| Error | 81 | 66.46714989 | 0.82058210 | | |
| Corrected Total | 85 | 68.13953488 | | | |

| R-Square | Coeff Var | Root MSE | q17_2 Mean |
|---|---|---|---|
| 0.024544 | 10.41497 | 0.905860 | 8.697674 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 0.27767935 | 0.13883968 | 0.17 | 0.8446 |
| qq9 | 2 | 1.29930194 | 0.64965097 | 0.79 | 0.4566 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_2 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 8 | 8.62500000 | 1.06066017 |
| 13-24 | 67 | 8.73134328 | 0.91423241 |
| 25-72 | 11 | 8.54545455 | 0.68755165 |

| Level of qq9 | N | q17_2 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 21 | 8.47619048 | 1.43593341 |
| Busi | 11 | 8.81818182 | 0.60302269 |
| Pri | 54 | 8.75925926 | 0.64237722 |

The SAS System

The GLM Procedure

Dependent Variable: q17_3 q17_3

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 8.4700778 | 2.1175194 | 0.79 | 0.5363 |
| **Error** | 79 | 212.2323032 | 2.6864849 | | |
| **Corrected Total** | 83 | 220.7023810 | | | |

| R-Square | Coeff Var | Root MSE | q17_3 Mean |
|---|---|---|---|
| 0.038378 | 29.48184 | 1.639050 | 5.559524 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 5.23273178 | 2.61636589 | 0.97 | 0.3821 |
| **qq9** | 2 | 3.74172279 | 1.87086140 | 0.70 | 0.5014 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_3 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **7** | 6.28571429 | 1.79947082 |
| **13-24** | **66** | 5.45454545 | 1.58047528 |
| **25-72** | **11** | 5.72727273 | 1.84883256 |

| Level of qq9 | N | q17_3 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **Both** | **22** | 5.68181818 | 1.88695683 |
| **Busi** | **10** | 6.00000000 | 1.63299316 |

| Level of qq9 | N | q17_3 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Pri | 52 | 5.42307692 | 1.52554913 |

The SAS System

The GLM Procedure

Dependent Variable: q17_4 q17_4

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 8.0084621 | 2.0021155 | 0.96 | 0.4338 |
| Error | 76 | 158.3125256 | 2.0830595 | | |
| Corrected Total | 80 | 166.3209877 | | | |

| R-Square | Coeff Var | Root MSE | q17_4 Mean |
|---|---|---|---|
| 0.048151 | 39.49518 | 1.443281 | 3.654321 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 7.24929258 | 3.62464629 | 1.74 | 0.1824 |
| qq9 | 2 | 0.76999188 | 0.38499594 | 0.18 | 0.8316 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_4 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 5 | 4.40000000 | 2.50998008 |
| 13-24 | 65 | 3.50769231 | 1.16086009 |
| 25-72 | 11 | 4.18181818 | 2.18257563 |

| Level of | N | q17_4 |
|---|---|---|

| qq9 | | Mean | Std Dev |
|---|---|---|---|
| Both | 20 | 3.80000000 | 1.73508683 |
| Busi | 11 | 3.72727273 | 1.10371274 |
| Pri | 50 | 3.58000000 | 1.40102004 |

The SAS System

The GLM Procedure

Dependent Variable: q17_6 q17_6

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 4.9951210 | 1.2487802 | 0.89 | 0.4732 |
| Error | 71 | 99.3601422 | 1.3994386 | | |
| Corrected Total | 75 | 104.3552632 | | | |

| R-Square | Coeff Var | Root MSE | q17_6 Mean |
|---|---|---|---|
| 0.047866 | 45.63776 | 1.182979 | 2.592105 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 1.92715939 | 0.96357969 | 0.69 | 0.5056 |
| qq9 | 2 | 2.64454164 | 1.32227082 | 0.94 | 0.3936 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_6 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 7 | 3.14285714 | 2.26778684 |
| 13-24 | 61 | 2.54098361 | 1.05788737 |
| 25-72 | 8 | 2.50000000 | 0.75592895 |

| Level of qq9 | N | q17_6 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 21 | 2.57142857 | 1.07570575 |
| Busi | 10 | 2.10000000 | 0.31622777 |
| Pri | 45 | 2.71111111 | 1.32497379 |

The SAS System

The GLM Procedure

Dependent Variable: q17_7 q17_7

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 11.7639029 | 2.9409757 | 0.96 | 0.4338 |
| Error | 79 | 241.7956209 | 3.0607041 | | |
| Corrected Total | 83 | 253.5595238 | | | |

| R-Square | Coeff Var | Root MSE | q17_7 Mean |
|---|---|---|---|
| 0.046395 | 40.70828 | 1.749487 | 4.297619 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 2.58851461 | 1.29425731 | 0.42 | 0.6566 |
| qq9 | 2 | 10.37710641 | 5.18855321 | 1.70 | 0.1902 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_7 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 8 | 4.00000000 | 2.26778684 |
| 13-24 | 66 | 4.36363636 | 1.66997341 |

| Level of qq8 | N | q17_7 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 25-72 | 10 | 4.10000000 | 1.96920740 |

| Level of qq9 | N | q17_7 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 22 | 4.50000000 | 1.68325082 |
| Busi | 11 | 3.45454545 | 1.21355975 |
| Pri | 51 | 4.39215686 | 1.84475940 |

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The SAS System

The GLM Procedure

Dependent Variable: q17_8 q17_8

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 8.2839303 | 2.0709826 | 0.70 | 0.5937 |
| Error | 78 | 230.4630576 | 2.9546546 | | |
| Corrected Total | 82 | 238.7469880 | | | |

| R-Square | Coeff Var | Root MSE | q17_8 Mean |
|---|---|---|---|
| 0.034698 | 38.24922 | 1.718911 | 4.493976 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 5.94603330 | 2.97301665 | 1.01 | 0.3703 |
| qq9 | 2 | 1.77244023 | 0.88622011 | 0.30 | 0.7417 |

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The SAS System

The GLM Procedure

| Level of | N | q17_8 |
|---|---|---|

| qq8 | | Mean | Std Dev |
|---|---|---|---|
| 12 | 7 | 3.57142857 | 1.39727626 |
| 13-24 | 66 | 4.57575758 | 1.69215935 |
| 25-72 | 10 | 4.60000000 | 1.95505044 |

| Level of qq9 | N | q17_8 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 22 | 4.50000000 | 1.68325082 |
| Busi | 11 | 4.90909091 | 2.07145096 |
| Pri | 50 | 4.40000000 | 1.65369099 |

The SAS System

The GLM Procedure

Dependent Variable: q17_9 q17_9

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 10.5770276 | 2.6442569 | 1.63 | 0.1752 |
| Error | 76 | 123.2254415 | 1.6213874 | | |
| Corrected Total | 80 | 133.8024691 | | | |

| R-Square | Coeff Var | Root MSE | q17_9 Mean |
|---|---|---|---|
| 0.079050 | 43.15494 | 1.273337 | 2.950617 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 5.90455845 | 2.95227923 | 1.82 | 0.1689 |
| qq9 | 2 | 4.32634417 | 2.16317208 | 1.33 | 0.2695 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_9 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 7 | 2.42857143 | 0.78679579 |
| 13-24 | 64 | 2.90625000 | 1.07966412 |
| 25-72 | 10 | 3.60000000 | 2.36643191 |

| Level of qq9 | N | q17_9 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 20 | 3.35000000 | 1.69441808 |
| Busi | 11 | 3.00000000 | 1.34164079 |
| Pri | 50 | 2.78000000 | 1.07456683 |

The SAS System

The GLM Procedure

Dependent Variable: q17_10 q17_10

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 1.14099241 | 0.28524810 | 0.62 | 0.6476 |
| Error | 56 | 25.61310595 | 0.45737689 | | |
| Corrected Total | 60 | 26.75409836 | | | |

| R-Square | Coeff Var | Root MSE | q17_10 Mean |
|---|---|---|---|
| 0.042647 | 28.06400 | 0.676296 | 2.409836 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 0.23152523 | 0.11576262 | 0.25 | 0.7773 |
| qq9 | 2 | 1.03117976 | 0.51558988 | 1.13 | 0.3312 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_10 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 4 | 2.25000000 | 0.50000000 |
| 13-24 | 50 | 2.42000000 | 0.70247376 |
| 25-72 | 7 | 2.42857143 | 0.53452248 |

| Level of qq9 | N | q17_10 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 17 | 2.58823529 | 0.87026027 |
| Busi | 9 | 2.22222222 | 0.44095855 |
| Pri | 35 | 2.37142857 | 0.59831697 |

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The SAS System

The GLM Procedure

Dependent Variable: q17_11 q17_11

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 7.2831127 | 1.8207782 | 0.35 | 0.8408 |
| Error | 78 | 401.6807427 | 5.1497531 | | |
| Corrected Total | 82 | 408.9638554 | | | |

| R-Square | Coeff Var | Root MSE | q17_11 Mean |
|---|---|---|---|
| 0.017809 | 31.70917 | 2.269307 | 7.156627 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 5.80289365 | 2.90144683 | 0.56 | 0.5716 |
| qq9 | 2 | 1.64548330 | 0.82274165 | 0.16 | 0.8526 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_11 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 7 | 6.57142857 | 3.30943816 |
| 13-24 | 67 | 7.28358209 | 2.08752405 |
| 25-72 | 9 | 6.66666667 | 2.50000000 |

| Level of qq9 | N | q17_11 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 22 | 7.04545455 | 2.10390278 |
| Busi | 11 | 6.90909091 | 2.25630430 |
| Pri | 50 | 7.26000000 | 2.31948270 |

The SAS System

The GLM Procedure

Dependent Variable: q17_12 q17_12

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 43.6640615 | 10.9160154 | 1.13 | 0.3469 |
| Error | 73 | 702.1308103 | 9.6182303 | | |
| Corrected Total | 77 | 745.7948718 | | | |

| R-Square | Coeff Var | Root MSE | q17_12 Mean |
|---|---|---|---|
| 0.058547 | 49.36807 | 3.101327 | 6.282051 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 19.68737155 | 9.84368578 | 1.02 | 0.3645 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq9 | 2 | 23.64696751 | 11.82348376 | 1.23 | 0.2985 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_12 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 6 | 6.66666667 | 3.61478446 |
| 13-24 | 63 | 6.44444444 | 3.05211602 |
| 25-72 | 9 | 4.88888889 | 3.21886799 |

| Level of qq9 | N | q17_12 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 22 | 6.18181818 | 3.04937720 |
| Busi | 11 | 7.63636364 | 2.80259620 |
| Pri | 45 | 6.00000000 | 3.19089614 |

The SAS System

The GLM Procedure

Dependent Variable: q17_13 q17_13

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 24.8683256 | 6.2170814 | 1.99 | 0.1082 |
| Error | 59 | 184.5691744 | 3.1282911 | | |
| Corrected Total | 63 | 209.4375000 | | | |

| R-Square | Coeff Var | Root MSE | q17_13 Mean |
|---|---|---|---|
| 0.118739 | 45.27866 | 1.768698 | 3.906250 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 18.98882320 | 9.49441160 | 3.04 | 0.0556 |
| **qq9** | 2 | 6.85719927 | 3.42859964 | 1.10 | 0.3409 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_13 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **5** | 4.80000000 | 3.11448230 |
| **13-24** | **52** | 3.65384615 | 1.53245434 |
| **25-72** | **7** | 5.14285714 | 2.34012617 |

| Level of qq9 | N | q17_13 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **Both** | **18** | 3.77777778 | 2.04523997 |
| **Busi** | **7** | 3.14285714 | 1.06904497 |
| **Pri** | **39** | 4.10256410 | 1.81796404 |

The SAS System

The GLM Procedure

| Class Level Information | | |
|---|---|---|
| **Class** | **Levels** | **Values** |
| **qq8** | 3 | 12 13-24 25-72 |
| **qq9** | 3 | Both Busi Pri |

| Data for Analysis of q13_4 | |
|---|---|
| **Number of Observations Read** | 133 |

| Data for Analysis of q13_4 | |
|---|---|
| Number of Observations Used | 97 |

| Data for Analysis of q14_1 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 66 |

| Data for Analysis of q15_2 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 92 |

| Data for Analysis of q15_10 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 94 |

Note: Variables in each group are consistent with respect to the presence or absence of missing values.

The SAS System

The GLM Procedure

Dependent Variable: q13_4 q13_4

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 27.7636825 | 6.9409206 | 1.70 | 0.1573 |
| Error | 92 | 376.2156989 | 4.0893011 | | |
| Corrected Total | 96 | 403.9793814 | | | |

| R-Square | Coeff Var | Root MSE | q13_4 Mean |
|---|---|---|---|
| 0.068725 | 94.30461 | 2.022202 | 2.144330 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 4.84688256 | 2.42344128 | 0.59 | 0.5550 |
| qq9 | 2 | 25.47642228 | 12.73821114 | 3.12 | 0.0491 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q13_4 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 11 | 1.81818182 | 0.87386290 |
| 13-24 | 75 | 2.22666667 | 2.23953020 |
| 25-72 | 11 | 1.90909091 | 1.51357494 |

| Level of qq9 | N | q13_4 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 26 | 2.84615385 | 2.66371632 |
| Busi | 12 | 2.50000000 | 1.93061460 |
| Pri | 59 | 1.76271186 | 1.67475148 |

The SAS System

The GLM Procedure

| Class Level Information | | |
|---|---|---|
| Class | Levels | Values |
| qq8 | 3 | 12 13-24 25-72 |
| qq9 | 3 | Both Busi Pri |

| Data for Analysis of q20_1 | |
|---|---|
| Number of Observations Read | 133 |
| Number of Observations Used | 78 |

| Data for Analysis of q20_2 | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 63 |

Note: Variables in each group are consistent with respect to the presence or absence of missing values.

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The SAS System

The GLM Procedure

Dependent Variable: q20_1 q20_1

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 6.8599257 | 1.7149814 | 0.59 | 0.6674 |
| **Error** | 73 | 210.4349461 | 2.8826705 | | |
| **Corrected Total** | 77 | 217.2948718 | | | |

| R-Square | Coeff Var | Root MSE | q20_1 Mean |
|---|---|---|---|
| 0.031570 | 95.27464 | 1.697843 | 1.782051 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 2.51320207 | 1.25660104 | 0.44 | 0.6483 |
| **qq9** | 2 | 3.75357852 | 1.87678926 | 0.65 | 0.5245 |

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The SAS System

The GLM Procedure

| Level of qq8 | N | q20_1 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **8** | 1.75000000 | 1.48804762 |
| **13-24** | **61** | 1.70491803 | 1.22942076 |

| Level of qq8 | N | q20_1 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 25-72 | 9 | 2.33333333 | 3.67423461 |

| Level of qq9 | N | q20_1 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 20 | 2.15000000 | 2.66112362 |
| Busi | 4 | 1.25000000 | 1.25830574 |
| Pri | 54 | 1.68518519 | 1.17880775 |

The SAS System

The GLM Procedure

Dependent Variable: q20_2 q20_2

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 4.70733736 | 1.17683434 | 0.72 | 0.5791 |
| Error | 58 | 94.27678962 | 1.62546189 | | |
| Corrected Total | 62 | 98.98412698 | | | |

| R-Square | Coeff Var | Root MSE | q20_2 Mean |
|---|---|---|---|
| 0.047556 | 129.5500 | 1.274936 | 0.984127 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 3.11675877 | 1.55837938 | 0.96 | 0.3894 |
| qq9 | 2 | 1.84565936 | 0.92282968 | 0.57 | 0.5699 |

The SAS System

The GLM Procedure

| Level of | N | q20_2 |
|---|---|---|

| qq8 | | Mean | Std Dev |
|---|---|---|---|
| 12 | 7 | 1.28571429 | 1.11269728 |
| 13-24 | 49 | 1.02040816 | 1.33056686 |
| 25-72 | 7 | 0.42857143 | 0.78679579 |

| Level of qq9 | N | q20_2 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 20 | 1.20000000 | 1.23969436 |
| Busi | 12 | 1.00000000 | 1.04446594 |
| Pri | 31 | 0.83870968 | 1.36861911 |

The SAS System

The GLM Procedure

Duncan's Multiple Range Test for q13_4

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| Alpha | 0.05 |
| Error Degrees of Freedom | 92 |
| Error Mean Square | 4.089301 |
| Harmonic Mean of Cell Sizes | 21.62255 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | 1.221 | 1.285 |

| Means with the same letter are not significantly different. | | | |
|---|---|---|---|
| Duncan Grouping | Mean | N | qq9 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | Mean | N | qq9 |
|---|---|---|---|
| A | 2.8462 | 26 | Both |
| A | | | |
| A | 2.5000 | 12 | Busi |
| A | | | |
| A | 1.7627 | 59 | Pri |

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The SAS System

The GLM Procedure

Dependent Variable: q14_1 q14_1

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 6759.75303 | 1689.93826 | 4.35 | 0.0037 |
| **Error** | 61 | 23702.36818 | 388.56341 | | |
| **Corrected Total** | 65 | 30462.12121 | | | |

| R-Square | Coeff Var | Root MSE | q14_1 Mean |
|---|---|---|---|
| 0.221907 | 113.1298 | 19.71201 | 17.42424 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 218.821628 | 109.410814 | 0.28 | 0.7556 |
| **qq9** | 2 | 6512.010905 | 3256.005452 | 8.38 | 0.0006 |

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The SAS System

The GLM Procedure

| Level of qq8 | N | q14_1 | |
|---|---|---|---|
| | | Mean | Std Dev |

| Level of qq8 | N | q14_1 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 9 | 12.7777778 | 17.5198300 |
| 13-24 | 51 | 17.9411765 | 22.2525610 |
| 25-72 | 6 | 20.0000000 | 24.4948974 |

| Level of qq9 | N | q14_1 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 23 | 25.4347826 | 20.5001687 |
| Busi | 12 | 29.1666667 | 20.3194190 |
| Pri | 31 | 6.9354839 | 18.3792192 |

The SAS System

The GLM Procedure

Duncan's Multiple Range Test for q14_1

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| **Alpha** | 0.05 |
| **Error Degrees of Freedom** | 61 |
| **Error Mean Square** | 388.5634 |
| **Harmonic Mean of Cell Sizes** | 18.85966 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | 12.84 | 13.50 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | Mean | N | qq9 |
|---|---|---|---|
| A | 29.167 | 12 | Busi |
| A | | | |
| A | 25.435 | 23 | Both |
| | | | |
| B | 6.935 | 31 | Pri |

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The SAS System

The GLM Procedure

Dependent Variable: q15_2 q15_2

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 25.6781433 | 6.4195358 | 2.83 | 0.0294 |
| **Error** | 87 | 197.3979437 | 2.2689419 | | |
| **Corrected Total** | 91 | 223.0760870 | | | |

| R-Square | Coeff Var | Root MSE | q15_2 Mean |
|---|---|---|---|
| 0.115109 | 116.4535 | 1.506301 | 1.293478 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 1.15562775 | 0.57781387 | 0.25 | 0.7758 |
| **qq9** | 2 | 24.86594877 | 12.43297438 | 5.48 | 0.0057 |

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The SAS System

The GLM Procedure

| Level of qq8 | N | q15_2 | |
|---|---|---|---|
| | | Mean | Std Dev |

| Level of qq8 | N | q15_2 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 10 | 1.30000000 | 2.16281709 |
| 13-24 | 71 | 1.25352113 | 1.55580305 |
| 25-72 | 11 | 1.54545455 | 1.03572548 |

| Level of qq9 | N | q15_2 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 24 | 1.66666667 | 1.65940447 |
| Busi | 12 | 2.33333333 | 0.98473193 |
| Pri | 56 | 0.91071429 | 1.50486225 |

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The SAS System

The GLM Procedure

Duncan's Multiple Range Test for q15_2

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| **Alpha** | 0.05 |
| **Error Degrees of Freedom** | 87 |
| **Error Mean Square** | 2.268942 |
| **Harmonic Mean of Cell Sizes** | 21 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | .9239 | .9723 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | | Mean | N | qq9 |
|---|---|---|---|---|
| | A | 2.3333 | 12 | Busi |
| | A | | | |
| B | A | 1.6667 | 24 | Both |
| B | | | | |
| B | | 0.9107 | 56 | Pri |

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The SAS System

The GLM Procedure

Dependent Variable: q15_10 q15_10

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 26.5371754 | 6.6342939 | 3.42 | 0.0120 |
| **Error** | 89 | 172.8670799 | 1.9423267 | | |
| **Corrected Total** | 93 | 199.4042553 | | | |

| R-Square | Coeff Var | Root MSE | q15_10 Mean |
|---|---|---|---|
| 0.133082 | 90.97593 | 1.393674 | 1.531915 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 3.90447184 | 1.95223592 | 1.01 | 0.3701 |
| **qq9** | 2 | 22.46131364 | 11.23065682 | 5.78 | 0.0044 |

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The SAS System

The GLM Procedure

| Level of qq8 | N | q15_10 | |
|---|---|---|---|
| | | Mean | Std Dev |

| Level of qq8 | N | q15_10 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 12 | 10 | 2.10000000 | 1.59513148 |
| 13-24 | 73 | 1.49315068 | 1.41542384 |
| 25-72 | 11 | 1.27272727 | 1.67874412 |

| Level of qq9 | N | q15_10 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 24 | 1.29166667 | 1.73152777 |
| Busi | 12 | 0.41666667 | 1.50504203 |
| Pri | 58 | 1.86206897 | 1.20595417 |

The SAS System

The GLM Procedure

Duncan's Multiple Range Test for q15_10

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| **Alpha** | 0.05 |
| **Error Degrees of Freedom** | 89 |
| **Error Mean Square** | 1.942327 |
| **Harmonic Mean of Cell Sizes** | 21.09091 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | .8528 | .8974 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | Mean | N | qq9 |
|---|---|---|---|
| A | 1.8621 | 58 | Pri |
| A | | | |
| A | 1.2917 | 24 | Both |
| | | | |
| B | 0.4167 | 12 | Busi |

The SAS System

The GLM Procedure

**Class Level Information**

| Class | Levels | Values |
|---|---|---|
| **qq8** | 3 | 12 13-24 25-72 |
| **qq9** | 3 | Both Busi Pri |

**Data for Analysis of q15_4 q15_7**

| | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 94 |

**Data for Analysis of q17_5**

| | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 80 |

**Data for Analysis of qq18**

| | |
|---|---|
| **Number of Observations Read** | 133 |
| **Number of Observations Used** | 88 |

Note: Variables in each group are consistent with respect to the presence or absence of missing values.

The SAS System

The GLM Procedure

Dependent Variable: q15_4 q15_4

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 14.8491216 | 3.7122804 | 2.15 | 0.0813 |
| Error | 89 | 153.7572614 | 1.7276097 | | |
| Corrected Total | 93 | 168.6063830 | | | |

| R-Square | Coeff Var | Root MSE | q15_4 Mean |
|---|---|---|---|
| 0.088070 | 113.3507 | 1.314386 | 1.159574 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 12.53727885 | 6.26863943 | 3.63 | 0.0306 |
| qq9 | 2 | 1.76042231 | 0.88021115 | 0.51 | 0.6025 |

The SAS System

The GLM Procedure

Dependent Variable: q15_7 q15_7

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| Model | 4 | 38.6204556 | 9.6551139 | 4.17 | 0.0038 |
| Error | 89 | 206.1135869 | 2.3158830 | | |
| Corrected Total | 93 | 244.7340426 | | | |

| R-Square | Coeff Var | Root MSE | q15_7 Mean |
|---|---|---|---|
| 0.157806 | 144.4944 | 1.521803 | 1.053191 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| qq8 | 2 | 23.30020618 | 11.65010309 | 5.03 | 0.0085 |
| qq9 | 2 | 11.80857995 | 5.90428998 | 2.55 | 0.0838 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q15_4 | | q15_7 | |
|---|---|---|---|---|---|
| | | Mean | Std Dev | Mean | Std Dev |
| 12 | 10 | 2.10000000 | 1.72884033 | 2.50000000 | 0.70710678 |
| 13-24 | 73 | 1.12328767 | 1.25770078 | 0.95890411 | 1.61965665 |
| 25-72 | 11 | 0.54545455 | 1.21355975 | 0.36363636 | 1.56669890 |

| Level of qq9 | N | q15_4 | | q15_7 | |
|---|---|---|---|---|---|
| | | Mean | Std Dev | Mean | Std Dev |
| Both | 24 | 1.20833333 | 1.38247310 | 1.25000000 | 1.64845118 |
| Busi | 12 | 0.75000000 | 1.28805703 | 0.00000000 | 1.70560573 |
| Pri | 58 | 1.22413793 | 1.35132298 | 1.18965517 | 1.53847608 |

The SAS System

The GLM Procedure

Duncan's Multiple Range Test for q15_4

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| Alpha | 0.05 |
| Error Degrees of Freedom | 89 |
| Error Mean Square | 1.72761 |
| Harmonic Mean of Cell Sizes | 14.6622 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | 0.965 | 1.015 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | Mean | N | qq8 |
|---|---|---|---|
| A | 2.1000 | 10 | 12 |
| B | 1.1233 | 73 | 13-24 |
| B | | | |
| B | 0.5455 | 11 | 25-72 |

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The SAS System

The GLM Procedure

Duncan's Multiple Range Test for q15_7

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| **Alpha** | 0.05 |
| **Error Degrees of Freedom** | 89 |
| **Error Mean Square** | 2.315883 |
| **Harmonic Mean of Cell Sizes** | 14.6622 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | 1.117 | 1.175 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | Mean | N | qq8 |
|---|---|---|---|
| A | 2.5000 | 10 | 12 |
| B | 0.9589 | 73 | 13-24 |
| B | | | |
| B | 0.3636 | 11 | 25-72 |

The SAS System

The GLM Procedure

Dependent Variable: q17_5 q17_5

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 81.3566908 | 20.3391727 | 3.27 | 0.0159 |
| **Error** | 75 | 467.1308092 | 6.2284108 | | |
| **Corrected Total** | 79 | 548.4875000 | | | |

| R-Square | Coeff Var | Root MSE | q17_5 Mean |
|---|---|---|---|
| 0.148329 | 58.89507 | 2.495678 | 4.237500 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 72.42213195 | 36.21106597 | 5.81 | 0.0045 |
| **qq9** | 2 | 8.08347648 | 4.04173824 | 0.65 | 0.5255 |

The SAS System

The GLM Procedure

| Level of qq8 | N | q17_5 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **8** | 6.75000000 | 2.25198325 |

| Level of qq8 | N | q17_5 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 13-24 | 63 | 4.14285714 | 2.62037391 |
| 25-72 | 9 | 2.66666667 | 1.32287566 |

| Level of qq9 | N | q17_5 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 20 | 4.20000000 | 2.54641130 |
| Busi | 9 | 3.33333333 | 2.23606798 |
| Pri | 51 | 4.41176471 | 2.74354858 |

The SAS System

The GLM Procedure
Duncan's Multiple Range Test for q17_5

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| Alpha | 0.05 |
| Error Degrees of Freedom | 75 |
| Error Mean Square | 6.228411 |
| Harmonic Mean of Cell Sizes | 11.90551 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | 2.038 | 2.144 |

Means with the same letter are not significantly different.

| Duncan Grouping | Mean | N | qq8 |
|---|---|---|---|
| A | 6.750 | 8 | 12 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | Mean | N | qq8 |
|---|---|---|---|
| B | 4.143 | 63 | 13-24 |
| B | | | |
| B | 2.667 | 9 | 25-72 |

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The SAS System

The GLM Procedure

Dependent Variable: qq18

| Source | DF | Sum of Squares | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **Model** | 4 | 11.96201517 | 2.99050379 | 4.14 | 0.0042 |
| **Error** | 83 | 60.02298483 | 0.72316849 | | |
| **Corrected Total** | 87 | 71.98500000 | | | |

| R-Square | Coeff Var | Root MSE | qq18 Mean |
|---|---|---|---|
| 0.166174 | 47.90947 | 0.850393 | 1.775000 |

| Source | DF | Type III SS | Mean Square | F Value | Pr > F |
|---|---|---|---|---|---|
| **qq8** | 2 | 9.75382469 | 4.87691234 | 6.74 | 0.0019 |
| **qq9** | 2 | 0.99673190 | 0.49836595 | 0.69 | 0.5049 |

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The SAS System

The GLM Procedure

| Level of qq8 | N | qq18 | |
|---|---|---|---|
| | | Mean | Std Dev |
| **12** | **8** | 0.67500000 | 1.75966718 |
| **13-24** | **69** | 1.91014493 | 0.66645350 |

| Level of qq8 | N | qq18 | |
|---|---|---|---|
| | | Mean | Std Dev |
| 25-72 | 11 | 1.72727273 | 0.95612856 |

| Level of qq9 | N | qq18 | |
|---|---|---|---|
| | | Mean | Std Dev |
| Both | 20 | 1.51000000 | 1.34003142 |
| Busi | 12 | 2.01666667 | 0.62352857 |
| Pri | 56 | 1.81785714 | 0.75537038 |

The SAS System

The GLM Procedure
Duncan's Multiple Range Test for qq18

Note: This test controls the Type I comparison wise error rate, not the experiment wise error rate.

| | |
|---|---|
| Alpha | 0.05 |
| Error Degrees of Freedom | 83 |
| Error Mean Square | 0.723168 |
| Harmonic Mean of Cell Sizes | 13.02073 |

Note: Cell sizes are not equal.

| Number of Means | 2 | 3 |
|---|---|---|
| Critical Range | .6629 | .6975 |

**Means with the same letter are not significantly different.**

| Duncan Grouping | Mean | N | qq8 |
|---|---|---|---|
| A | 1.9101 | 69 | 13-24 |
| A | | | |

| | | | |
|---|---|---|---|
| A | 1.7273 | 11 | 25-72 |
| B | 0.6750 | 8 | 12 |