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FACTORS that influence prepaid churn subscribers when choosing a mobile- service provider

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Abstract

High prepaid subscriber churn impacts on the service provider's profitability, financial evaluation and resource utilisation. Simultaneously it deprives subscribers of improved service because service providers are committing resources to subscriber acquisition and the management of subscriber retention instead of committing these resources to improving the value propositions offered to subscribers.

A prepaid churn rate of just less than 50% in South Africa (2009) highlights the need for research into the factors that influence churned prepaid subscribers' choice of mobile-service provider. This in turn will increase the knowledge of retention and acquisition of prepaid subscribers.

Using a telephonic survey on a sample of 861 prepaid subscribers, quantitative research was conducted to determine those factors that churned prepaid subscribers consider important when choosing a mobile-service provider.

By making use of Analysis of Variance 4 out of 11 factors that, prepaid subscribers considered very important were identified when choosing a mobile-service provider. These included, in order of importance, Customer service quality, Mobile tariffs, Prepaid airtime and Starter-pack availability and Promotions.

Discriminant Analysis highlighted 9 factors to be used to predict and classify groups of subscribers based on average monthly spend. The discriminate equation coefficients highlighted how these two groups of subscribers view the 9 factors when choosing a mobile- service provider.

Keywords

Churn: Churn is the discontinuation of the services of a mobile-service provider, and calculated by dividing the annualised number of disconnections during the period by the average monthly reported mobile subscriber base during the period. It is reported as an annualised percentage figure.

Subscribers: Subscribers are the ultimate users i.e. customers, that subscribe to a mobile-telecommunication service.

Prepaid: A product offering that requires the holder to purchase call credit/ service in advance before the service/ call credit is used.

Mobile-service provider: A company that provides mobile-telecommunication services typically using its own mobile network.

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for 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.

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1. Research formulation

1.1 Research problem

Unlike the water and electricity industries, which are mostly monopolistic in nature, the mobile-telecommunication industry, although regulated, allows subscribers the opportunity to choose and change a service provider at will.

While similar to the water and electricity industries, consumers usually have a choice of contractual, post-paid or prepaid payment options for the services provided.

The following table provides a summary of the differences and similarities between the water, electricity and mobile-telecommunication industries in the South African regulated environment:

Table 1.1: Differences and similarities between the water, electricity and mobile-telecommunication industries in the South African regulated environment

	Water Industry	Electricity	Mobile
Product payment options	Contractual, and prepaid offerings	Contractual, and prepaid offerings	Contractual, and prepaid offerings
Industry structure	Monopolistic and oligopolistic	Monopolistic and oligopolistic	Oligopolistic
Acquisition Costs	Minimal	Minimal	High
Product offerings	Limited	Limited	Limited by price, but high variations in mobile tariffs and mobile tariff plans

Source: (Eberhard, 2002), (Conradie, Goldin, Leiman, Standish, & Visser, 2001), (MTN Group Limited, 2011), (Vodacom Group Limited, 2010)

In the mobile-telecommunication industry, post-paid subscribers have contractual obligations, which impose financial penalties on subscribers if the

contracts are prematurely terminated (Lee, Murphy & Dickringer, 2006). These penalties for early terminations of contracts allow service providers the opportunity to recover the subscriber acquisition expenses incurred in acquiring the subscriber.

Prepaid subscribers on the other hand are not bound by a contract, and can therefore discontinue (churn) the services of the mobile-service provider almost at their convenience and without notification (Radosavljevik, Putten & Larsen, 2010).

Prepaid subscribers' ability to churn at their convenience is a major source of financial operational loss for service providers because service providers have no means of recovering the direct subscriber acquisition costs incurred to acquire a prepaid subscriber.

On the contrary, other regulated utilities, like electricity and water, have minimal customer-acquisition costs, and they do not have service configuration costs, as is the case in mobile-telecommunication industry.

Furthermore, as noted in Table 1.1, the electricity and water industries are mostly monopolistic, and as such have a very high probability of recovering any direct acquisition cost incurred from the increased lifetime of the prepaid subscriber.

It is generally much more expensive to attract new customers than it is to retain existing ones, and sell to them (Kotler & Keller, 2009). Jaworski, Stathakopoulos and Krishnan (1993) also note that, owing to increased purchases, referrals price premiums and reduced servicing costs, the

profitability of customers tend to increase over the lifetime of the retained customer.

Livne, Simpson, and Talmor (2011) further argue that successful investment in customer acquisition is capable of saving future operational expenses, and hence improve the net profitability of a service provider. Furthermore, Livne, Simpson and Talmor (2011) note that there is a positive statistical association with increasing customer retention levels that will result in increases in the future, net profits and market capitalisation of service providers.

Considering the above, it confirms the need for research to determine the factors that influence the churned prepaid subscriber's choice of service provider in a regulated mobile industry. Having established the factors that are important to churned subscribers, focus on these factors can increase subscriber retention.

Govender (2011), noted that on average the direct subscriber acquistion cost per prepaid subscriber is in the region of R45.00. This is made up of the following cost elements:

Table 1.2: Direct acquisition cost of a prepaid mobile subscriber, August 2011

Cost element	Cost (including VAT)
Cost of prepaid starter pack, including the cost of SIM card	R15
Dealer acquisition bonus paid to a dealer for signing up a prepaid subscriber	R20
Supply -chain cost	R5
Preload airtime	R5
Total	R45

Source: (Govender, 2011)

Given the direct acquisition cost of a prepaid subscriber as in Table 1.2, a mobile-service provider is at risk of losing R45.00 per prepaid acquisition. The provider has no means of recovering the above cost if the prepaid subscriber decides not to use the mobile service once the service is acquired.

For the period ending 31 March 2010, Vodacom Group Limited (2010) reported gross prepaid connections of 8.52 million, a churn rate of 43.7%, and an average of R70,00 revenue per subscriber (ARPU). The net subscriber growth for the period was minus 1.91 million which implies that Vodacom Group limited churn 10.44 million subscribers for the reported financial year.

If Vodacom Group managed to reduce their churn percentage by 4% to 40%. This means that they only churned 9.49 million subscribers instead of 10.44 million subscribers. They would have increased their gross revenue by 2.8%, while increasing their EBITDA margin by 0.3%. The increase in their EBITDA margin assumes that they did not need to add 0.947 million subscribers to their network to compensate for the churned subscribers at a direct acquistion cost of R45.00 per subscriber (see Table 10.1, Appendix, for calculations and assumptions).

Given that the mobile-telecommunication industry in South Africa is oligopolistic and regulated, with two dominating players, a weak third player and a new fourth entrant, subscriber churn rates should arguably be low. However, the Vodacom Group Limited (2010) reported a prepaid subscriber churn rate of 43.7% for the year ending 31 March 2010, while the MTN Group Limited (2010) reported a prepaid subscriber churn rate of 43.5% for the year ending 31 December 2009.

The high prepaid churn rates of Vodacom Group Limited (2010) and MTN Group Limited (2010) would indicate strong competition between the service providers. However, owing to the oligopolistic nature of the market, and no incentive to compete aggressively on mobile tariffs, it is argued that there are other factors apart from price that cause subscribers to churn from their respective service providers. These factors similarly drive subscribers to join the service providers that meet subscribers' expectations of the factors that they consider important.

Thus, with just under 50% churn rate for prepaid service in South Africa in 2009, arguably that there are other factors or a combination of factors, including mobile-telecommunication tariffs that influence the churned prepaid subscribers' choice of a service provider in the South Africa.

A high yearly churn rate thus warrants a need for research into factors that influence the churned prepaid subscriber's choice of a service provider in the South African regulated mobile-telecommunication industry to understand which factors are important, and perceived to be significantly different by churned prepaid subscribers when they change their mobile-telecommunication service provider.

With reference to the growth potential, the World Cellular Information Services (2011) estimated that there were 40 473 350 registered prepaid subscriber identification module (SIM) users in South Africa with a potential growth of 24% in the next five years.

However, there are only 29 148 000 unique prepaid subscribers. World Cellular Information Services (2011) define these subscribers as the number of individuals who own SIM cards. The difference of 39% between unique subscribers and registered SIM subscribers draws attention to the high churn rate and the multiple SIM usage behaviour in the market, among other things. In accordance with the above, a subscriber might have several SIMs registered with different networks, and alternate between different service providers. Multiple factors could be the reason for this. For example, to take advantage of differing call rates at different times of the day, as well as to exploit multiple electronic identities.

In summary, the research problem is about the high prepaid subscriber churn in an oligopolistic and regulated service industry that still has potential growth.

High prepaid subscriber churn impacts on the service provider's profitability, financial evaluation and resource utilisation. Simultaneously it deprives subscribers of improved service because service providers are committing resources to subscriber acquisition and the management of subscriber retention instead of committing these resources to improving the value propositions offered to subscribers.

1.2 Research objective

The main objective of this research is to determine the factors that churned prepaid mobile-telecommunication subscribers considered important when they choosing their service provider in the context of the South African regulated mobile-telecommunication industry.

In meeting the objective of the research, the benefits from the research are as follows:

- Adding to the knowledge on prepaid subscriber retention in the high mobile churn market of South Africa.
- Adding to the knowledge on prepaid subscriber acquisition in the high mobile churn market of South Africa.
- Adding to the knowledge on optimal resource allocation of limited business resources.

The above benefits are dependent on reaching the following research results:

- Determining the factors that are statistically significant when churned prepaid subscribers choose a mobile-service operator.
- Determining the factors that churned prepaid subscribers consider being equal when choosing a mobile-service provider, and similarly, the factors that they do not consider to be equal.
- Determining a discriminate model to predict and classify which groups churn prepaid subscribers will belong to by using the factors that they consider important when choosing a mobile-service provider.

2. Literature review

2.1 Network quality

Research by Paulrajan and Rajkumar (2011) indicated that communication and price are the key and influencing factors that motivate subscriber's preference of service provider in the Indian mobile-telecommunication market. Communication was defined as call quality, call drop rate and geographical coverage, which in essence, amount to network quality.

Seo, Ranganathan and Babad (2008) further note that geographical coverage and voice clarity (call quality) are the fundamental quality characteristics of a mobile-telecommunication service which affect the subscriber's choice of a mobile-service provider. In addition, research conducted by Birke and Swann (2006) also found that network geographical coverage influences the subscriber's choice of a mobile-service provider.

Research results by Turki (2010) further show that more than a third of the participants in the UK mobile market claimed that poor mobile signal, which usually results from poor network coverage, is the main cause of subscribers switching to another mobile-service provider.

Rahman, Haque and Ahmad (2010) also noted that network quality was one of the important factors of overall service quality of mobile-service providers in Malaysia.

Similarly, Min and Wan (2009) noted from research undertaken in the Korean mobile market that 13,7% of subscribers had churned their mobile-service provider owing to network coverage problems in the form of weak signals.

2.2 Mobile tariffs

Sensitivity of demand refers to the extent to how volume-sensitive a product, or a service, is to price changes. Thus, sensitivity represents a valuable strategic tool in pricing (Tucker, 1966). Although the principle is relatively old, it holds true for modern-day price and demand that a small change in price could result in higher subscriber churn.

Thus, mobile tariffs are argued to be an influential factor for prepaid mobile subscribers when choosing a mobile-service provider (Haque, Rahman & Rahman, 2010). Haque, Rahman and Rahman (2010) also argue that mobile tariffs are one of the factors that subscribers consider when deciding to churn from a mobile-service provider.

However, Munnukka (2008) argues that the subscriber's price perception relates to perception of quality, value and other beliefs. Thus, arguably, if a service provider was rated as high in network quality, the subscriber might be less sensitive to changes in mobile tariffs. The opposite would be true if the network quality was poor. In other words, changes in mobile tariffs could result in subscriber churn if network quality was poor.

With reference to mobile tariffs, a company that offers lower charges would be able to attract more subscribers who would be willing to commit themselves to the mobile telephone networks, and hence, a significant number of "call

minutes" might be achieved (Rahman, Haque & Ahmad, 2010). Thus, arguably mobile tariffs do play a vital part in the choices that subscribers make in terms of a service provider.

In addition, research conducted by Paulrajan and Rajkumar (2011) found that mobile tariffs was one of the key and influencing factors that motivated subscribers to prefer a specific service provider. This was further supported by Rahman, Haque and Ahmad (2010) in their research findings that mobile tariff was an important factor for subscribers when selecting a mobile-service provider.

Min and Wan (2009) also identified mobile tariffs as one of the four main factors that affect the switching behaviour of subscribers in the Korean mobile market. The other factors included customer satisfaction, switching cost and customer loyalty. From their research results 27,4% of subscribers churned their mobile-service provider because of more competitive deals in the market, while 14,7% of subscribers churned their mobile-service provider owing to high-priced calls tariffs.

2.3 Mobile tariff plan types

Mobile tariffs and mobile tariff plan types are closely related. However, mobile tariff plans reflect subscribers' preferences that minimise their billing rates, given their expected usage (Raghuram, Jedidi, & Kohli, 2008). The empirical results of Lambrecht and Skiera (2007) indicate that prepaid tariffs are driven by the underestimation of the subscriber's usage, and indicate the subscriber's risk of overspending.

Considering that the prepaid subscribers at the lower end of the market are driven by cost, and tend to make short calls, changes in the billing unit can make a significant difference in overall mobile expenditure (Barrantesa & Galperin, 2008). In addition, Barrantesa and Galperin (2008) note that per-second tariffs will increase usage among lower-end prepaid subscribers, and will prevent them from churning.

Thus mobile tariff plans of mobile-service providers such as per-second tariffs, flat tariffs or two-part tariffs would drive certain usage behaviour (Kollmann, 2000), and, depending on the market, will be perceived differently by subscribers.

However, the risk of having many different prepaid mobile tariffs plans in an oligopolistic or competitive mobile-telecommunication market could encourage multiple mobile-service provider SIM usage behaviour (Kollmann, 2000). A subscriber could use any SIM of the different service providers at a specific point that provides the maximum benefit to the subscriber at the expense of another service provider.

2.4 Distribution and availability

For most service organisations, consumer-marketing and industrial-marketing firms, the distribution channel, or inter-organisational network of institutions, comprising agents, wholesalers, distributors and retailers play a significant role in the flow of goods from producers to consumers (Gorchels, Marien, & West, 2004).

In commoditised industry, such as the mobile-telecommunication industry, subscribers will expect product availability through both formal and informal channels, and it to be easily accessible (Heggde & Kumar, 2011). Thus, lack of product availability will in turn result in subscribers churning as their needs and wants of product are not met (Ireland, Hoskisson & Michael, 2011).

Lambart, Stock and Ellram (1998), argued that when consumers perceived all of the top brands as substitutes for each other, this would lead to a lower brand loyalty, which in turn would decrease the manufacturer's power. However, this actually increases the distributor's power because sales are then determined by what is in stock, and most often by what is recommended by the distributor, and not by what a particular brand is offering.

Considering the high prepaid churn in South Africa, it would appear that the subscribers are not significantly influenced by what the brand offers. By making use of the argument of Lambart, Stock and Ellram (1998), this highlights the power that distributors have in the South Africa prepaid market. This in turn highlights the importance of product availability for subscribers' purchase decision (Kotler & Keller, 2009).

2.5 Promotions

The objectives of any promotional strategy are to increase sales, maintain or improve market share, create or improve brand recognition, create a favourable climate for future sales, inform and educate the market, create a competitive advantage that is relative to competitor's products or market position; and improve promotional efficiency (Rowley, 1998). With these objectives, the

importance of promotions as a factor in the choice of a mobile-service provider is noted.

Alvarez and Casielles (2005) further noted that promotion was a set of stimuli that were offered sporadically, and these stimuli reinforced publicity actions to promote the purchasing of a certain product. Moreover promotional offers consist of several different objects for creating a better sales impact, for example, coupons, samples, premiums, discounts, contests, point-of-purchase displays and frequent-buyer programmes.

Every promotion technique was intended to have a direct impact on buying behaviour and perception about the company or service providers (Alvarez & Casielles, 2005). Alvarez and Casielles (2005) further argued that the objectives of promotion would be reached largely when it was done sporadically; in other words, when the consumer did not expect it. Furthermore, they note that promotional actions had to be well planned, systematically organised, and commonly integrated into the subject corporation's strategic marketing plan.

Rahman, Haque and Ahmad (2010), further noted that promotion had significant impact on subscriber perception in selecting a mobile-telecommunication service provider in Malaysia, since it was used to communicate with the subscribers in terms of product offerings. Thus, promotion, and the perceived value it creates for the subscriber are factors that could significantly influence the prepaid subscriber's choice of a service provider.

Similarly, in the Bangladesh mobile-telecommunication market, Haque, Rahman and Rahman (2010), found that statistically promotions had a positive impact on the subscribers' perceptions when choosing a mobile-service provider.

2.6 Loyalty programmes

A loyalty programme is a supplier's structural effort to increase the customer's attitudinal and behavioural commitment to the supplier's marketing offer (Noordhoff, Pauwels & Odekerken, 2006). Yi and Jeon (2003) noted that in times of serve competition, a loyalty programme is usually introduced to build customer loyalty through a planned reward scheme that is based on a customer's purchase history.

Furthermore, loyalty programmes enable firms to build stronger relationships, enhance customer retention, encourage customers' recommendations, and increase the number of products and services sold to their clients (Steers, 2007).

Leenheer, Bijmolt, Heerde and Smidts (2002), noted that loyalty has three types of designs, namely, a saving component, price discounts and a multivendor structure.

- A saving component is a saving programme, which gives saving points to customers, dependent on the monetary amount spent by the customer at the company. A programme member can redeem his or her points for a reward, such as a free product, after reaching the minimal redeeming threshold.

- Price discounts are loyalty programmes that give price discounts on promoted items.
- A multivendor structure is a loyalty programme that a company forms in cooperation with companies from other industries with non-overlapping product offerings.

Loyalty programmes are similar for mobile-telecommunication users with the objective of rewarding subscribers for their usage (Kim, Park, & Jeong, 2004).

According to Kotler and Keller (2009), frequency programmes are designed to provide rewards to customers who buy frequently. These programmes are also evident in the mobile-telecommunication industry. However, the relevance and the impact of influencing customer retention and acquisition have been highlighted as possible factors that will influence a prepaid subscriber's choice of a mobile-service operator.

2.7 Customer service quality

Customer service is a system of activities that comprises customer-support systems, complaint-processing, speed of complaint processing, ease of reporting a complaint and friendliness when reporting complaint (Kim, Park, & Jeong, 2004). According to Soderlund and Rosengren (2008) the friendly attitude and courteous behaviour of the service workers at service firms leave a positive impression on the customer, which leads to customer satisfaction, whilst the opposite behaviour will result in subscribers churning as of a result of poor customer service.

According to Leisen and Vance (2001), customer service quality helps to create the necessary competitive advantage by being an effective differentiating factor. However, competitive advantage by firms is a value-creating strategy, which is not simultaneously implemented by any existing or potential competitors (Barny, 1991). As a result, service quality can be used as a competitive advantage, which is related to the customer's satisfaction, and leads to consumer loyalty and future purchase (Johnson & Sirikit, 2002).

In particular, consumers prefer service quality when the price and other cost elements are held in a constant state (Boyer & Hult, 2005). It has become a distinct and important aspect of the product and service offering (Wal, Pampallis & Bond, 2002). Moreover, according to them, a competitive advantage is also sustained when other companies are unable to duplicate the benefits of this strategy.

Service quality is essential and important for a telecommunication provider to ensure the quality service for establishing and maintaining a loyal and profitable customer (Zeithaml, 2000; Leisen & Vance, 2001). Rahman, Haque and Ahmad (2010) noted that this might be a major problem for the telecommunication service providers, especially for the mobile-telecommunication service providers, to deliver quality service consistently as changes in market compositions and competing characteristics have been surfacing incessantly.

Omotayo and Joachim (2008), through research results indicated a strong relationship between customer service, satisfaction and retention in the mobile-telecommunication industry in Nigeria.

Research conducted by Rahman, Haque and Ahmad (2010) on Malaysian mobile-telecommunication subscribers also found that customer service quality directly affected the subscriber's perceptions in selecting mobile-telecommunication service providers. Furthermore, among all the significant variables from the study, they also found that Malaysian telecommunication subscribers perceived that price or call rate was the most important issue followed by customer service quality, service availability and promotion.

In the Korean mobile-telecommunication market, Min and Wan (2009), noted that 11,6% of subscribers churned their mobile-service provider because of poor customer services.

2.8 Product bundles

Consumer relation to product form is dependent on consumer's personal characteristics, surrounding products, utilities, experience, enjoyment of use and the contribution to the fulfilment of the object's purpose (Horvath & Sajtos, 2002). Therefore, suppliers should increase the quality and quantity of utilitarian reinforcements provided to both existing and potential new subscribers in order to satisfy their needs, and encourage their retention behaviour (Ferguson & Hlavinka, 2006).

Product bundles are a reflection of utilitarian reinforcements that could encourage consumer retention. Thus, the research proposition is that by offering different types of product benefits it would increase the utilitarian reinforcements, and would influence the subscriber's choice of a mobile-service provider.

Bundling is defined as the sale of two or more separate products or services in a package at a discount (Stremersch & Tellis, 2002). A premise of bundling is that consumers have asymmetric valuations of separate products. The larger the dispersion and the higher the uncertainty in such valuations, the bigger the gains are from the bundling of these products (Rautio, Anttila & Tuominen, 2007).

Among other things, benefits of bundling include the following:

- Bundling is likely to transfer surplus from consumers to firms, but it also encourages products to be offered that might not be available under an *a la carte* pricing system (Crawford & Cullen, 2007).
- They (Crawford & Cullen) further stated that bundling is an effective entry-deterrent strategy, especially in an oligopolistic market.
- Bundling also changes competitive structure, and reduces the threat of focused specialists (Nalebuff, 2004).
- Bundling reduces both average and fixed costs, as average costs are reduced by the demand increase and by shared fixed costs (Rautio, Anttila & Tuominen, 2007).

Stremersch and Tellis (2002), identify the following two categories of bundling:

1. “Price bundling”, which is the sale of two or more separate products in a package at a discount without any integration of the products.
2. “Product bundling”, which is the integration and sale of two or more separate products in a discounted package with benefit to some consumers because of the benefit brought about by the integration.

Whereas price bundling is a pricing and promotional tool, product bundling is regarded as strategic and of long-term value, and involves new product development.

Chan-Olmsted and Guo (2011), note that in a competitive market, a mixed-product bundling strategy, one that offers both bundled and individual services, would dominate pure bundling strategy. In a sense, when necessary the mixed-product bundling system offers a firm more opportunity for differentiation.

Furthermore, Chan-Olmsted and Guo (2011), argue that in order to differentiate their products in a competitive marketplace, mobile-telecommunication service providers will adopt a “mixed-product” bundling strategy.

2.9 Content and location-based services

Messaging services, mobile commerce, music and sound download, photo download, mobile TV, mobile games and location-based services are becoming important product additions to mobile-service providers (Kuo & Yen, 2009).

Value-added services have an impact on subscribers' usage patterns, and become a significant differentiator across telecommunication service providers (Kargin, Basoglu, & Daim, 2009). Thus, the research proposition is that content and location-based services will be factors that influence the choice of a mobile-service provider.

2.10 Brand perception

The concept of brand loyalty has strategic importance in terms of a firm’s ability to obtain sustainable competitive advantage and growth (Ersoy & Calık, 2010).

Ersoy and Calık, (2010) further noted that brand-loyal consumers are more profitable, and that the costs of marketing to them are lower, than customers who are not brand-loyal. In fact, it is suggested that the cost of recruiting a new customer is five times greater than the cost of retaining an existing customer (Wood, 2004) because of the following:

- Loyalty reduces customer acquisition costs.
- Positive word of mouth from loyal customers saves on marketing costs to get new customers.
- Loyal customers' demand elasticity is lower, based on the degree or type of loyalty.
- Brand-loyal customers increase the chances that a brand extension will succeed and lower the risk of new product failure.
- Loyalty rates are connected to market share.

Arguably, consumers who develop a positive mental schema of a brand will tend towards higher satisfaction and loyalty (Brodie, Whittome & Brush, 2009; Hartmank & Spiro, 2005). Therefore, a positive corporate image appears to encourage customer loyalty to the service provider.

In addition, research findings by Kim and Lee (2010) indicate that corporate image and brand awareness are also strong antecedents for establishing customer loyalty in mobile-communications service markets. These findings support the results of the two previous studies (Andreassen & Lindestad B, 1988; Kwon & Lennon, 2009) that corporate image impacts on customer loyalty with a varying degree of service expertise. In addition, corporate image and

brand awareness are also strong antecedents for establishing customer loyalty in mobile-communications service markets (Kim, Park, & Jeong, 2004).

3. Research propositions

The following proposed factors influences churn prepaid mobile subscribers in choosing their service providers in the South African regulated mobile-telecommunication industry:

F1. Network quality significantly influences the choice of a mobile-service provider

$F1_1$ Call quality significantly influences the choice of a mobile-service provider.

$F1_2$ Call drop rate significantly influences the choice of a mobile-service provider.

$F1_3$ Geographical coverage significantly influences the choice of a mobile-service provider.

F2. Mobile tariffs significantly influences the choice of a mobile-service provider

$F2_1$ The price of voice calls significantly influences the choice of a mobile-service provider.

$F2_2$ The price of a megabit of data significantly influences the choice of a mobile-service provider.

$F2_3$ The price of an SMS significantly influences the choice of a mobile-service provider.

F3. Mobile tariffs plan types significantly influences the choice of a mobile service-provider.

$F3_1$ A per-second tariff plan significantly influences the choice of a mobile-service provider.

$F3_2$ A per-minute tariff plan significantly influences the choice of a mobile-service provider.

$F3_3$ A peak and off-peak tariff plan significantly influences the choice of a mobile-service provider.

$F3_4$ A flat tariff plan significantly influences the choice of a mobile-service provider.

F4. Prepaid airtime and starter-pack availability significantly influences the choice of a mobile-service provider.

$F4_1$ Access to prepaid airtime and starter- pack availability via food-retail channels significantly influences the choice of a mobile-service provider.

$F4_2$ Access to prepaid airtime and starter- pack via clothing-retail channels significantly influences the choice of a mobile-service provider.

$F4_3$ Access to prepaid airtime and starter- pack availability via informal retails significantly influences the choice of a mobile-service provider.

$F4_4$ Access to prepaid airtime and starter- pack availability via mobile-operator specific stores significantly influences the choice of a mobile-service provider.

F5. Different airtime recharge options significantly influences ~~s~~ the choice of a mobile-service provider.

F6. Promotions significantly influence the choice of a mobile-service provider.

F7. Loyalty programmes significantly influences the choice of a mobile-service provider.

F8. Customer service quality significantly influences the choice of a mobile-service provider.

F9. Different types of prepaid product bundles significantly influence the choice of a mobile-service provider.

$F9_1$ Prepaid service-offering SIM only, significantly influences the choice of a mobile-service provider.

$F9_2$ Prepaid service offering SIM and phone, significantly influences the choice of a mobile-service provider.

$F9_3$ Prepaid service offering SIM and free airtime significantly influences the choice of a mobile-service provider.

$F9_4$ Prepaid service offering an SMS bundles significantly influences the choice of a mobile-service provider.

$F9_5$ Prepaid service offering a data bundle significantly influences the choice of a mobile-service provider.

$F9_6$ Prepaid service offering music downloads significantly influences the choice of a mobile-service provider.

F10. Access to mobile content and location services significantly influences the choice of a mobile-service provider.

F11. Brand reputation significantly influences the choice of a mobile-service provider.

4. Methodology

4.1 Statement of method

4.1.1 Type of research study

Having considered the research problem, the research objectives and research propositions, namely identify the factors that are significant in influencing churned prepaid subscribers choosing a mobile-service provider, the researcher decided on following a quantitative approach. Blumberg, Cooper & Schindler (2008) describe quantitative studies as studies that rely on quantitative information, in other words numbers and figures.

The research will determine those factors that churned prepaid subscribers consider being important when choosing a mobile-service provider by making use of Analysis of Variance and Discriminant Analysis.

Once these factors have been defined as important through Descriptive statistics and Analysis of Variance analysis, Discriminant Analysis will be used to predict and classify churn subscribers into groups, based on the average monthly spend on prepaid service, by using the factors that they consider as been important.

A qualitative research approach will not be suitable for achieving the objectives of the research neither will it be in a position to test the research propositions. Qualitative research studies base their accounts on qualitative information that is words, non-quantified causalities, semantics, sentences and narratives (Blumberg, Cooper & Schindler, 2008). The research propositions called for

testing the significance of the factors that were achieved by statistical analysis. For this purpose, words, sentences and narratives will not suffice.

4.1.2 Degree of research question crystallisation

The study will be ~~a~~ formal in nature in that it begins with a descriptive account of the current situation, namely the high rate of subscriber churn, and an exploration of factors that are important in driving churned subscriber's choosing a mobile-service provider followed by research propositions. The former involves precise procedures and data-source specification.

The goal of the research will be to provide a valid representation of the current state, namely the research problem that is the high prepaid subscriber churn in an oligopolistic and regulated mobile service industry. In addition, the research will test the proposed factors that influence churned subscribers choosing a mobile-service provider which in turn will –

- improve subscriber acquisition;
- improve subscriber retention and thereby reduce subscriber acquisition costs;
- allow service providers to focus their resources adequately to ensure optimal utilisation of resources;
- Reduce subscriber churn, while increasing the lifetime of subscribers, and thereby increasing the revenue-generating potential of the mobile service.

4.1.3 Method of data collection

Blumberg, Cooper and Schindler (2008) highlight two methods of data collection, namely, monitoring and interrogation or communication. Monitoring includes studies in which the researcher inspects the activities of a subject or the nature of certain material without attempting to elicit responses from anyone. This type of method will not suffice for the purposes and objective of the researcher since actual information about respondents gathered from them are required.

The interrogation or communication method allows the researcher to question the subjects, and to collect their responses by personal or impersonal means. This method will achieve the objectives and purpose of the research, and is the method that is recommended for data collection.

4.1.4 Control of variables

The research will follow an *ex-post facto* design, in that there will be no control over the variables, and for that reason, no manipulation can take place.

The research will only report on what has happened, or what is happening, and in doing so factors will be held constant by judicious selection of subjects in accordance with strict sampling procedures and statistical manipulation of findings. In addition, the research will be limited to churned subscribers who have been actively using the mobile network within a six-month period, and who have been active in the last month of the six-month period.

4.1.5 The purpose of the study

Of the various types of studies that are available for the purpose, namely descriptive, causal and/or predictive, the descriptive study will be the most appropriate for the research objectives and propositions of this study.

According to Blumberg, Cooper and Schindler (2008) descriptive studies serve the following research objectives:

- Description of phenomena or characteristics that are associated with a subject population (such as the significant factors that influence the choice of a mobile-service provider).
- Estimates of the proportion of a population that have similar characteristics.
- Discovering associations among different independent variables and a dependent variable.

4.1.6 The time dimension

The proposed research will be a cross-sectional study, in the sense that the study will be carried out only once, and will represent a snapshot of a single point in time. This is unlike longitudinal studies, which are repeated over an extended period.

However, it is anticipated that this research will form the reference for longitudinal studies through which the relevance of factors can be evaluated to establish whether the factors that churned subscribers regard as determining their choice of a mobile-service provider change over time.

4.1.7 The topical scope

The proposed research will be a statistical study, which, according to Blumberg, Cooper and Schindler (2008), is designed for breadth.

In essence, the study will attempt to capture a population's characteristics (characteristics of churned prepaid subscribers in South Africa) by making inferences from a sample's characteristic.

Hypotheses, or research propositions, are to be tested quantitatively, and generalisation about the findings will be presented. This will be subject to constraining hypotheses that are based on the representativeness of the sample and the validity of the research design.

4.1.8 The research environment

Given the nature of the study, the research environment will be similar to that of field conditions, in that the research will be conducted under actual environmental conditions. Respondents will be interrogated in their usual or current environment, such as in their homes or workplaces.

4.2 Unit of analysis

In accordance with the research topic and research proposition, the unit of analysis will be churned prepaid mobile subscribers who have been active users of the mobile network within a six-month period, and who have been active in the last month of the six-month period. This unit of analysis will be the level at which the research is performed and the objects are researched, these being churned prepaid mobile subscribers.

4.3 Population

According to Blumberg, Cooper and Schindler (2008), the population is the total collection of elements from which some inferences are made. In the proposed research, the population will be prepaid registered subscribers who have been active on the 8ta mobile network during a six-month period ending 31 December 2010. On 31 December 2010 there were 296 059 of these subscribers on the 8ta mobile network.

It is argued that although there are four mobile network service providers in South Africa, with 8ta entering the market only in 2010, the prepaid subscribers who use 8ta are no different from those of the other three mobile operators because of the following:

- Vodacom Group Limited (2010) reported a prepaid subscriber churn rate of 45.4% between 1 April 2008 and 31 March 2009 while MTN Group Limited (2010) reported a prepaid subscriber churn rate of 43.5% between 1 January 2009 and 31 December 2009. These relatively similar churn rates would imply that the factors that cause prepaid subscribers to change and leave a mobile-service provider are not unique to an individual service provider.
- The review of the prepaid offering in June 2011, in the South African market, in Table 4.1, indicates that there is no significant difference between the products offered by the different mobile-service providers.
- Mobile tariffs of the four mobile-service providers (see Table 4.2) are of a similar nature.

Table 4.1: Characteristics of a mobile-service provider's prepaid offerings in South Africa, June 2011

	MTN	VODACOM	Cell C	8ta
Per-second and per-minute products	Yes	Yes	Yes	Yes
Peak and off-peak tariff rates	Yes	Yes	Yes	Yes
Flat-rate tariffs	Yes	Yes	Yes	Yes
SMS, MMS, content services, location services internet browsing	Yes	Yes	Yes	Yes
Loyalty campaigns	Yes	Yes	Yes	Yes
Bonus-recharge campaigns	Yes	Yes	Yes	Yes

Source: (Cell C, 2011), (MTN, 2011), (Vodacom, 2011), (8ta, 2011)

Table 4.2: Mobile-service providers per second mobile prepaid tariffs in South Africa, June 2011

	Cell C Easy-chat prepaid	Vodacom 4U prepaid	MTN Call per sec	MTN Call per sec peak	8ta Per second
*Tariff rates during peak hours (07:00 and 20:00)					
Own net	R 2.85	R 2.85	R 2.89	R 2.39	R 2.75
Other net	R 2.85	R 2.99	R 2.89	R 2.39	R 2.75
Fixed	R 2.85	R 2.85	R 2.89	R 2.39	R 0.65
MMS	R 0.90	R 0.80			R 0.50
SMS	R 0.80	R 0.80	R 0.75	R 0.75	R 0.50
*Tariffs rates during non-peak hours (20:00 and 07:00)					
Own net	R 1.30	R 1.12	R 1.19	R 1.59	R 1.12
Other net	R 1.30	R 1.30	R 1.19	R 1.59	R 1.12
Fixed	R 1.30	R 1.12	R 1.19	R 1.59	R 0.65
MMS	R 0.90	R 0.80			R 0.50
SMS	R 0.34	R 0.80	R 0.35	R 0.35	R 0.50

Source: (Cell C, 2011), (MTN, 2011), (Vodacom, 2011), (8ta, 2011)

4.4 Sampling

The strength of a sample design lies in how well it represents the characteristics of the population it purports to represent (Blumberg, Cooper & Schindler, 2008). In the proposed research, the sample is expected to be representative of the

296 059 prepaid registered subscribers that have been active within a six-month period ending 31 December 2010 on the 8ta mobile network and who have churned in the last 12 months from a mobile-service provider.

4.4.1 Relevant population

As noted above, the relevant population will be all prepaid registered subscribers on the 8ta mobile network who have been active within a six-month period ending 31 December 2010. On 31 December 2010 there were 296 059 prepaid registered subscribers to the above network.

4.4.2 Parameters of interest

Population parameters are summarised statistic descriptors, which in the proposed research are factors that are significant in subscribers choosing a mobile-service provider. Examples of these will be incidence proportions, means and variance.

Sample statistics that are gathered in essences will be descriptive statistics, Analysis of Variance statistics and statistics generated from Discriminant Analysis.

4.4.3 Sample frame

The sample frame is very similar to the population. However, it differs at the theoretical level because a complete and correct list of the population is rarely found (Blumberg, Cooper & Schindler, 2008). In other words, there will be a difference between the population and the sample frame for the proposed research.

For the purpose of the proposed research the sample frame will be the 296 059 prepaid registered subscribers on the 8ta mobile network who have been active within a six-month period ending 31 December 2010. The sample frame and population will be the same, as there is a complete and correct list of the population.

However, considering that not all registered subscribers remain active users over a prolonged period, the 296 059 prepaid registered subscribers referred to above have been further reduced to 106 122 who were active on the 8ta network for the month of December 2010. Thus the sample frame for the study is the above list of 106 122 subscribers. From these 106 122 subscribers a sample of 861 were chosen who completed the questionnaire that will be used for the research.

Furthermore, of the sample of 861 subscribers above, only subscribers who churned from their previous service provider in the last 12 months will be used in the analysis, as churned subscribers are the focus sample of the research.

4.4.4 Sample type

The research will follow a probability sample, in that probability-based confidence estimates of various parameters to the population will be made of prepaid subscribers. In this study, as noted in section 4.4.3, the population will be the 106 122 subscribers as explained above.

In addition, all 106 122 of the population elements make up the sample frame. The sample frame is a list of elements that will have an equal chance of being selected to be included in the sample (Blumberg, Cooper & Schindler, 2008).

Furthermore, considering that an actual sampling frame exists, sampling will be done with replacement. In selecting the sample elements for the research, the following predetermined rules will be used:

- A three-process callback will be followed, after which the subscriber will be regarded as not active, and will be removed from the sample frame.
- Once a subscriber has been removed from the sample frame, a new subscriber will be randomly selected as a replacement.
- A subscriber non-participation in the research is considered as no-response, and will be replaced with a new randomly selected subscriber.
- If most of his or her answers are irrelevant, or if a respondent refuses to answer, this respondent will be replaced.

4.4.5 Sample size

With an error margin of 5%, a 95% confidence level, a population size of 106 122 subscribers and a response distribution probability of 50%, the recommended sample size of the proposed research will be 385 units (http://www.raosoft.com, 2011). However, considering that the research focus is on subscribers' preference-based decisions, which generally do not follow normal distributions, the sample size will be increased to 861 completed and meaningful answers. Furthermore, it is anticipated that of the 861 selected subscribers at least half would have churned in the last 12 months.

4.4.5.1 Stratified sampling

Having considered, that there could be different subscriber usage behaviour in the sample frame of 106 122, the frame was broken down into segments.

Table 4.3 lists the two segments of subscribers in accordance with their average spend amount and sample size. However to ensure that those subscribers who spend less are well represented in the sample, the sample is disproportionate to subscribers who spend less as they are most likely to demonstrate the characteristic of subscribers that churn.

Table 4.3: Sample size per segment of subscriber usage behaviour

	Count	Sample size
Count of subscribers who spend less than R15.00 per month on their prepaid service	44 738	760
Count of subscribers who spend more than R15.00 per month on their prepaid service	61 384	101
Total	**106 122**	**861**

Source: (8ta, 2011)

4.4.6 Communication method

Considering that the research will be conducted by means of a survey, the options available for conducting the research are personal interviews, telephonic interviews, mail, computer or a combination of all four (Blumberg, Cooper & Schindler, 2008). Having considered the advantages and disadvantages, the telephonic interview process was chosen to be the proposed survey method.

Further preference for the choice of the telephonic survey is that it will allow the sampling method as described in sections 4.4.2, 4.4.3 and 4.4.4 to be utilised.

4.4.7 Data-collection method

The data will be collected by means of a predefined questionnaire. Since the survey will be conducted via the telephone, the results will be captured immediately on the computer terminal.

The data will be coded into electronic format for statistical analysis.

4.4.8 Measurement Instruments

Properties are characteristics of the objects (Blumberg, Cooper & Schindler, 2008). In the proposed research, the social properties of the individuals will be measured.

The research will focus strongly on the social properties of individuals and on subscribers' perception of factors that are significant when choosing a service provider. In addition, the research will explain a virtual preference for the service provider, and not necessarily be followed by an action. The proposed research will also measure the subscribers' decisions and decision confidence in choosing a mobile-service provider.

4.4.8.1 Data types

The research will utilise all four types of data, namely nominal, ordinal, interval and ratio.

4.4.8.2 Error sources

Blumberg, Cooper and Schindler (2008) identify the following four major error sources that may contaminate the research results:

- Participant

- Situational factors
- Measurer
- Data-collection instruments

4.4.8.3 Characteristics of sound measurement

There are three major criteria for evaluating a measurement tool, namely, validity, reliability and practically (Blumberg, Cooper & Schindler, 2008).

Regarding validity, Blumberg, Cooper and Schindler (2008) suggest defining what constitutes relevant evidence in terms of the nature of the research problem. The researcher's judgement is to organise the answer in accordance with measure-relevant types.

Reliability draws reference to consistency; a measure is reliable to the degree that it supplies consistent results.

Stability has three measurement coefficients, namely stability, equivalence and internal consistency

In evaluating the measurement tool for the research, validity, reliability, and practically will be measured by using the appropriate statistical as necessitated.

4.4.8.4 Rating scales

See questionnaire in appendix for rating scales used in the question.

4.4.9 Data analysis

In addition to descriptive statistics, Analysis of Variance and Discriminant Analysis will be used together with the associated analysis. These methods are referenced further under the research results section.

5. Results

All statistical tests and subsequent results were obtained by using the IBM SPSS Statistics 19 version with the researched data as the source data.

5.1. Reliability analysis

5.1.1 Case-processing summary

Table 5.1: Reliability analysis case-processing summary for 419 selected cases used in Analysis of Variance and Discriminant Analysis

		N	%
Cases	Valid	419	100.0
	Excluded	0	.0
	Total	419	100.0

5.1.2 Reliability statistics

Table 5.2: Reliability statistics for 419 selected cases for 419 selected cases used in Analysis of Variance and Discriminant Analysis

Cronbach's Alpha	Cronbach's Alpha based on standardised Items	No of Items
.711	.713	11

Table 5.3: Mean scores of factors considered by churned prepaid mobile subscribers when choosing a mobile-service provider, n 419

	Mean	Std deviation	N
Network quality	7.25	2.452	419
Mobile tariffs	9.54	.936	419

Mobile tariffs plans	7.89	1.889	419
Prepaid airtime and starter- pack availability	9.29	1.711	419
Different airtime recharge options	8.16	2.185	419
Promotions	8.79	1.822	419
Loyalty programmes	8.05	2.125	419
Customer service quality	9.62	.826	419
Different types of prepaid product bundles	7.54	2.613	419
Access to mobile content and location services	6.61	2.131	419
Brand reputation	6.96	1.993	419

Table 5.4: Means and variances item summary statistics of 11 factors that are considered important by churned prepaid subscribers when choosing a mobile-service provider, n 419

	Mean	Minimum	Maximum	Range	Maximum /Minimum	Variance	No of Items
Item means	8.155	6.609	9.616	3.007	1.455	1.083	11
Item variances	3.819	0.682	6.828	6.145	10.009	3.54	11

Table 5.5: Scale statistics of 11 factors that are considered important by churned prepaid subscribers when choosing a mobile-service provider, n 419

Mean	Variance	Std deviation	No of Items
89.71	101.562	10.078	11

5.1.3 Hotelling's T-squared test

Table 5.6: Hotelling's T-squared test of 11 factors that are considered important by churned prepaid subscribers when choosing a mobile-service provider, n 419

Hotelling's T-Squared	F	df1	df2	Sig
1395.050	136.501	10	409	.000

5.1.4 Intraclass correlation coefficient

Table 5.7: Intraclass correlation coefficient two-way mixed model for consistency, n 419

	Intraclass correlation	95% confidence interval		F-test with true value 0		F-test with true value 0	
		Lower bound	Upper bound	Value	df1	df2	Sig
Single measures	.142[b]	0.117	0.171	2.817	418	4180	0
Average measures	.711[c]	0.612	0.723	2.817	418	4180	0

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. Type C intraclass correlation coefficients using a consistency definition –the between-measure variance is excluded from the denominator variance.
b. The estimator is the same, whether the interaction effect is present or not.
c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

5.2. Analysis of Variance between factors that are considered important by prepaid mobile subscribers when choosing a mobile-service provider

5.2.1 Test of homogeneity of variances

Table 5.8: Test of homogeneity of variances between 11 factors that are considered important by churned subscribers when choosing a mobile-service provider, n 419

Levene statistic	df1	df2	Sig.
69.142	10	4598	.000

5.2.2 Analysis of Variances

Table 5.9: Analysis of Variance of 11 factors that are considered by churned subscribers when choosing a mobile-service provider, n 419

	Sum of squares	df	Mean square	F	Sig.
Between groups	4537.461	10	453.746	118.807	.000
Within groups	17560.621	4598	3.819		
Total	22098.081	4608			

5.2.3 Robust tests of equality of means

Table 5.10: Robust tests of equality of means of 11 factors that are considered by churned subscribers when choosing a mobile-service provider when equal variance is not assumed, n 419

	Statistic[a]	df1	df2	Sig.
Welch	194.280	10	1821.902	.000
Brown-Forsythe	118.807	10	3766.851	.000

a. Asymptotically F distributed

5.2.4 Post-hoc test of means

Table 5.11: Tamhane'sT2 multiple comparison post-hoc test of mean difference of 11 factors that are considered by churned subscribers when choosing a mobile-service provider, n 419

(I) Category	(J) Category	Mean difference (I-J)	Std. Error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Network quality	Mobile tariffs	-2.296*	.128	.000	-2.72	-1.87
	Mobile tariffs plans	-.642*	.151	.001	-1.14	-.14
	Prepaid airtime and starter- pack availability	-2.038*	.146	.000	-2.52	-1.55

	Different airtime recharge options	-.916*	.160	.000	-1.45	-.38
	Promotions	-1.539*	.149	.000	-2.04	-1.04
	Loyalty programmes	-.804*	.158	.000	-1.33	-.28
	Customer service quality	-2.368*	.126	.000	-2.79	-1.95
	Different types of prepaid product bundles	-.296	.175	.995	-.88	.29
	Access to mobile content and location services	.640*	.159	.003	.11	1.17
	Brand reputation	.284	.154	.977	-.23	.80
Mobile tariffs	Network quality	2.296*	.128	.000	1.87	2.72
	Mobile tariffs plans	1.654*	.103	.000	1.31	2.00
	Prepaid airtime and starter- pack availability	.258	.095	.320	-.06	.57
	Different airtime recharge options	1.379*	.116	.000	.99	1.77
	Promotions	.757*	.100	.000	.42	1.09
	Loyalty programmes	1.492*	.113	.000	1.11	1.87
	Customer service quality	-.072	.061	1.000	-.27	.13
	Different types of prepaid product bundles	2.000*	.136	.000	1.55	2.45
	Access to mobile content and location services	2.936*	.114	.000	2.56	3.31
	Brand reputation	2.580*	.108	.000	2.22	2.94
Mobile tariffs plans	Network quality	.642*	.151	.001	.14	1.14
	Mobile tariffs	-1.654*	.103	.000	-2.00	-1.31
	Prepaid airtime and starter- pack availability	-1.396*	.124	.000	-1.81	-.98
	Different airtime recharge options	-.274	.141	.947	-.74	.19
	Promotions	-.897*	.128	.000	-1.32	-.47
	Loyalty programmes	-.162	.139	1.000	-.62	.30
	Customer service quality	-1.726*	.101	.000	-2.06	-1.39
	Different types of prepaid product bundles	.346	.158	.794	-.18	.87

	Access to mobile content and location services	1.282*	.139	.000	.82	1.74
	Brand reputation	.926*	.134	.000	.48	1.37
Prepaid airtime and starter- pack availability	Network quality	2.038*	.146	.000	1.55	2.52
	Mobile tariffs	-.258	.095	.320	-.57	.06
	Mobile tariffs plans	1.396*	.124	.000	.98	1.81
	Different airtime recharge options	1.122*	.136	.000	.67	1.57
	Promotions	.499*	.122	.003	.09	.90
	Loyalty programmes	1.234*	.133	.000	.79	1.68
	Customer service quality	-.329*	.093	.023	-.64	-.02
	Different types of prepaid product bundles	1.742*	.153	.000	1.24	2.25
	Access to mobile content and location services	2.678*	.134	.000	2.23	3.12
	Brand reputation	2.322*	.128	.000	1.90	2.75
Different airtime recharge options	Network quality	.916*	.160	.000	.38	1.45
	Mobile tariffs	-1.379*	.116	.000	-1.77	-.99
	Mobile tariffs plans	.274	.141	.947	-.19	.74
	Prepaid airtime and starter- pack availability	-1.122*	.136	.000	-1.57	-.67
	Promotions	-.623*	.139	.000	-1.08	-.16
	Loyalty programmes	.112	.149	1.000	-.38	.61
	Customer service quality	-1.451*	.114	.000	-1.83	-1.07
	Different types of prepaid product bundles	.621*	.166	.011	.07	1.17
	Access to mobile content and location services	1.556*	.149	.000	1.06	2.05
	Brand reputation	1.200*	.144	.000	.72	1.68
Promotions	Network quality	1.539*	.149	.000	1.04	2.04
	Mobile tariffs	-.757*	.100	.000	-1.09	-.42
	Mobile tariffs plans	.897*	.128	.000	.47	1.32
	Prepaid airtime and starter- pack availability	-.499*	.122	.003	-.90	-.09
	Different airtime recharge options	.623*	.139	.000	.16	1.08

	Loyalty programmes	.735*	.137	.000	.28	1.19
	Customer service quality	-.828*	.098	.000	-1.15	-.50
	Different types of prepaid product bundles	1.243*	.156	.000	.73	1.76
	Access to mobile content and location services	2.179*	.137	.000	1.72	2.63
	Brand reputation	1.823*	.132	.000	1.39	2.26
Loyalty programmes	Network quality	.804*	.158	.000	.28	1.33
	Mobile tariffs	-1.492*	.113	.000	-1.87	-1.11
	Mobile tariffs plans	.162	.139	1.000	-.30	.62
	Prepaid airtime and starter- pack availability	-1.234*	.133	.000	-1.68	-.79
	Different airtime recharge options	-.112	.149	1.000	-.61	.38
	Promotions	-.735*	.137	.000	-1.19	-.28
	Customer service quality	-1.563*	.111	.000	-1.93	-1.19
	Different types of prepaid product bundles	.508	.165	.108	-.04	1.06
	Access to mobile content and location services	1.444*	.147	.000	.96	1.93
	Brand reputation	1.088*	.142	.000	.62	1.56
Customer service quality	Network quality	2.368*	.126	.000	1.95	2.79
	Mobile tariffs	.072	.061	1.000	-.13	.27
	Mobile tariffs plans	1.726*	.101	.000	1.39	2.06
	Prepaid airtime and starter- pack availability	.329*	.093	.023	.02	.64
	Different airtime recharge options	1.451*	.114	.000	1.07	1.83
	Promotions	.828*	.098	.000	.50	1.15
	Loyalty programmes	1.563*	.111	.000	1.19	1.93
	Different types of prepaid product bundles	2.072*	.134	.000	1.63	2.52
	Access to mobile content and location services	3.007*	.112	.000	2.64	3.38
	Brand reputation	2.652*	.105	.000	2.30	3.00
Different types of prepaid	Network quality	.296	.175	.995	-.29	.88

product bundles	Mobile tariffs	-2.000*	.136	.000	-2.45	-1.55
	Mobile tariffs plans	-.346	.158	.794	-.87	.18
	Prepaid airtime and starter- pack availability	-1.742*	.153	.000	-2.25	-1.24
	Different airtime recharge options	-.621*	.166	.011	-1.17	-.07
	Promotions	-1.243*	.156	.000	-1.76	-.73
	Loyalty programmes	-.508	.165	.108	-1.06	.04
	Customer service quality	-2.072*	.134	.000	-2.52	-1.63
	Access to mobile content and location services	.936*	.165	.000	.39	1.48
	Brand reputation	.580*	.161	.018	.05	1.11
Access to mobile content and location services	Network quality	-.640*	.159	.003	-1.17	-.11
	Mobile tariffs	-2.936*	.114	.000	-3.31	-2.56
	Mobile tariffs plans	-1.282*	.139	.000	-1.74	-.82
	Prepaid airtime and starter- pack availability	-2.678*	.134	.000	-3.12	-2.23
	Different airtime recharge options	-1.556*	.149	.000	-2.05	-1.06
	Promotions	-2.179*	.137	.000	-2.63	-1.72
	Loyalty programmes	-1.444*	.147	.000	-1.93	-.96
	Customer service quality	-3.007*	.112	.000	-3.38	-2.64
	Different types of prepaid product bundles	-.936*	.165	.000	-1.48	-.39
	Brand reputation	-.356	.143	.507	-.83	.12
Brand reputation	Network quality	-.284	.154	.977	-.80	.23
	Mobile tariffs	-2.580*	.108	.000	-2.94	-2.22
	Mobile tariffs plans	-.926*	.134	.000	-1.37	-.48
	Prepaid airtime and starter- pack availability	-2.322*	.128	.000	-2.75	-1.90
	Different airtime recharge options	-1.200*	.144	.000	-1.68	-.72
	Promotions	-1.823*	.132	.000	-2.26	-1.39
	Loyalty programmes	-1.088*	.142	.000	-1.56	-.62
	Customer service quality	-2.652*	.105	.000	-3.00	-2.30

	Different types of prepaid product bundles	-.580*	.161	.018	-1.11	-.05
	Access to mobile content and location services	.356	.143	.507	-.12	.83

*. The mean difference is significant at the 0.05 level.

5.3. Descriptive statistics of sub factors relating to the 11 factors that are considered by churned subscribers when choosing a mobile-service provider

5.3.1 Descriptive statistics of 3 factors that influence network quality

5.3.1.1. Descriptive statistics of the importance of call quality

Table 5.12: Descriptive statistics of the importance of call quality, n 419

N	Valid	394
	No response	25
Mean		1.38
Mode		1
Std deviation		.656

5.3.1.2. Descriptive statistics of the importance of drop calls

Table 5.13: Descriptive statistics of the importance of drop calls, n 419

N	Valid	389
	No response	30
Mean		2.49
Mode		3
Std deviation		.664

5.3.1.3. Descriptive statistics of the importance of geographical coverage

Table 5.14: Descriptive statistics of the importance of geographical coverage, n 419

N	Valid	389
	No response	30
Mean		2.11
Mode		2
Std deviation		.735

5.3.2 Descriptive statistics of 3 factors that influence mobile tariffs

5.3.2.1 Descriptive statistics of the importance of price of calls

Table 5.15: Descriptive statistics of the importance of price of voice calls, n 419

N	Valid	419
	No response	0
Mean		1.54
Mode		1
Std deviation		.739

5.3.2.2 Descriptive statistics of the importance of the price of data

Table 5.16: Descriptive statistics of the importance of the price of data, n 419

N	Valid	416
	No response	3
Mean		2.37
Mode		3
Std deviation		.735

5.3.2.3 Descriptive statistics of the importance of price of an SMS

Table 5.17: Descriptive statistics of the importance of price of an SMS, n 419

N	Valid	419
	No response	0
Mean		2.10
Mode		2
Std deviation		.750

5.3.3 Descriptive statistics of 4 factors that influence mobile-tariff plan types

5.3.3.1 Descriptive statistics of the importance of per-second tariffs

Table 5.18: Descriptive statistics of the importance of per-second tariffs, n 419

N	Valid	327
	No response	92
Mean		1.76
Mode		1
Std deviation		.814

5.3.3.2 Descriptive statistics of the importance of a per-minute tariff plan

Table 5.19: Descriptive statistics of the importance of a per-minute tariff plan, n 419

N	Valid	307
	No response	112
Mean		2.02
Mode		3
Std deviation		.826

5.3.3.3 Descriptive statistics of the importance of a peak and off peak tariff plan

Table 5.20: Descriptive statistics of the importance of a peak and off peak tariff plan, n 419

N	Valid	334
	No response	85
Mean		2.06
Mode		2
Std deviation		.775

5.3.3.4 Descriptive statistics of the importance of a flat tariff plan

Table 5.21: Descriptive statistics of the importance of a flat-tariff plan, n 419

N	Valid	197
	No response	222
Mean		2.27
Mode		3
Std deviation		.773

5.3.4 Descriptive statistics of 6 factors of different prepaid product bundles

5.3.4.1 Descriptive statistics of the importance of prepaid service with SIM only offering

Table 5.22: Descriptive statistics of the importance of prepaid service with SIM only offering, n 419

N	Valid	92
	No response	327
Mean		2.12
Mode		3

Std deviation	.823

5.3.4.2 Descriptive statistics of the importance of prepaid service with SIM and phone offering

Table 5.23: Descriptive statistics of the importance of prepaid service with SIM and phone offering, n 419

N	Valid	215
	No response	204
Mean		2.00
Mode		2
Std deviation		.800

5.3.4.3 Descriptive statistics of the importance of prepaid service with SIM and free air-time offering

Table 5.24: Descriptive statistics of the importance of prepaid service with SIM and free air-time offering, n 419

N	Valid	336
	No response	83
Mean		1.68
Mode		1
Std deviation		.771

5.3.4.4 Descriptive statistics of the importance of prepaid service with SIM bundle offering

Table 5.25: Descriptive statistics of the importance of prepaid service with SIM bundle offering, n 419

N	Valid	118
	No response	301
Mean		2.31
Mode		3
Std deviation		.790

5.3.4.5 Descriptive statistics of the importance of prepaid service with data bundle offering

Table 5.26: Descriptive statistics of the importance of prepaid service with data bundle offering, n 419

N	Valid	211
	No response	208
Mean		2.10
Mode		3
Std deviation		.821

5.3.4.6 Descriptive statistics of the importance of prepaid service with music download

Table 5.27: Descriptive statistics of the importance of prepaid service with music download, n 419

N	Valid	187
	No response	232
Mean		2.19
Mode		2

Std deviation	.744

5.3.5 Descriptive statistics of 5 factors that influence access to mobile content and location services

5.3.5.1 Descriptive statistics of the importance of prepaid service with access to mobile video

Table 5.28: Descriptive statistics of the importance of prepaid service with access to mobile video, n 419

N	Valid	207
	No response	212
Mean		2.43
Mode		3
Std deviation		.685

5.3.5.2 Descriptive statistics of the importance of prepaid service with access to mobile banking

Table 5.29: Descriptive statistics of the importance of prepaid service with access to mobile banking, n 419

N	Valid	307
	No response	112
Mean		1.63
Mode		1
Std deviation		.771

5.3.5.3 Descriptive statistics of the importance of prepaid service with access to

music download

Table 5.30: Descriptive statistics of the importance of prepaid service with access to music download, n 419

N	Valid	266
	No response	153
Mean		2.06
Mode		2
Std deviation		.758

5.3.5.4 Descriptive statistics of the importance of prepaid service with access to ring tones

Table 5.31: Descriptive statistics of the importance of prepaid service with access to ring tones, n 419

N	Valid	120
	No response	299
Mean		2.39
Mode		3
Std deviation		.714

5.3.5.5 Descriptive statistics of the importance of prepaid service with access to instant messaging

Table 5.32: Descriptive statistics of the importance of prepaid service with access to instant messaging, n 419

N	Valid	259
	No response	160

Mean	1.85
Mode	1
Std deviation	.822

5.3.6 Descriptive statistics of 4 factors for prepaid airtime and starter- pack availability

5.3.6.1 Descriptive statistics of the importance of prepaid airtime and starter-pack availability through food retail stores

Table 5.33: Descriptive statistics of the importance of prepaid airtime and starter- pack availability through food retail stores, n 419

N	Valid	325
	No response	94
Mean		2.19
Mode		2
Std deviation		.728

5.3.6.2 Descriptive statistics of the importance of prepaid airtime and starter-pack availability through clothing retail stores

Table 5.34: Descriptive statistics of the importance of prepaid airtime and starter- pack availability through clothing retail store, n 419

N	Valid	294
	No response	125
Mean		2.28
Mode		2
Std deviation		.698

5.3.6.3 Descriptive statistics of the importance of prepaid airtime and starter-pack availability through local neighbourhood stores

Table 5.35: Descriptive statistics of the importance of prepaid airtime and starter- pack availability through local neighbour stores, n 419

N	Valid	323
	No response	96
Mean		1.61
Mode		1
Std deviation		.794

5.3.6.4 Descriptive statistics of the importance of prepaid airtime and starter-pack availability through mobile-service provider stores

Table 5.36: Descriptive statistics of the importance of prepaid airtime and starter- pack availability through mobile-service provider stores, n 419

N	Valid	236
	No response	183
Mean		1.91
Mode		1
Std deviation		.878

5.4. Discriminant Analysis

5.4.1 Discriminant Analysis descriptive statistics

Discriminant Analysis was done with the following selection inputs:

- *Grouping variable:* Two grouping categories were used, namely subscribers that spend less than R15,00 a month on prepaid service, and subscribers that spend more than R15,00 a month on prepaid service.
- *Selection variable:* Subscribers who churned during the last 12 months from date of interview. Subscribers who did not churn during the last 12 months from date of interview were not selected.
- *Independent variables:* Nine independent variables of 11 variables selected.
- *Analysis was conducted with all variables entered together as opposed to the stepwise method.*

5.4.1.1. Discriminant Analysis descriptive case processing summary

Table 5.37: Discriminant Analysis case processing summary, n 419

Unweighted cases		N	Percent
Valid		419	48.7
	Missing or out-of-range group codes	0	.0
	At least one missing discriminating variable	0	.0
Excluded	Both missing or out-of-range group codes and at least one	0	.0
	Unselected a	442	51.3
	Total	442	51.3
Total		861	100.0

a: Unselected are subscribers that did not churn in the last 12 months

5.4.1.2. Discriminant Analysis group statistics

Table 5.38: Discriminant Analysis group statistics for factors that are considered by churned subscribers when choosing a mobile-service provider, n 419

				Valid N (listwise)	
Groups		Mean	Std deviation	Unweighted	Weighted
Usage less than R15,00 a month	Network quality	6.9	2.544	335	335
	Mobile tariffs	9.65	0.743	335	335
	Mobile tariffs plans	7.76	1.989	335	335
	Prepaid airtime and starter- pack availability	9.51	1.597	335	335
	Promotions	9.02	1.712	335	335
	Loyalty programmes	7.87	2.298	335	335
	Customer service quality	9.66	0.811	335	335
	Access to mobile content and location services	6.32	2.195	335	335
	Brand reputation	6.7	2.055	335	335
Usage more than R15,00 a month	Network quality	8.65	1.313	84	84
	Mobile tariffs	9.13	1.404	84	84
	Mobile tariffs plans	8.43	1.292	84	84
	Prepaid airtime and starter- pack availability	8.38	1.856	84	84
	Promotions	7.86	1.958	84	84
	Loyalty programmes	8.77	0.91	84	84
	Customer service quality	9.45	0.87	84	84
	Access to mobile content and location services	7.75	1.352	84	84
	Brand reputation	8.01	1.275	84	84
All groups combined	Network quality	7.25	2.452	419	419
	Mobile tariffs	9.54	0.936	419	419
	Mobile tariffs plans	7.89	1.889	419	419
	Prepaid airtime and starter- pack availability	9.29	1.711	419	419
	Promotions	8.79	1.822	419	419
	Loyalty programmes	8.05	2.125	419	419
	Customer service quality	9.62	0.826	419	419
	Access to mobile content and	6.61	2.131	419	419

location services				
Brand reputation	6.96	1.993	419	419

5.4.1.3. Test of equality of group means

Table 5.39: Tests of equality of group means for factors that are considered by churned subscribers when choosing a mobile-service provider, n 419

	Wilks' Lambda	F	df1	df2	Sig.
Network quality	.917	37.614	1	417	.000
Mobile tariffs	.951	21.495	1	417	.000
Mobile tariffs plans	.980	8.694	1	417	.003
Prepaid airtime and starter- pack availability	.930	31.576	1	417	.000
Promotions	.934	29.240	1	417	.000
Loyalty programmes	.971	12.441	1	417	.000
Customer service quality	.990	4.142	1	417	.042
Access to mobile content and location services	.928	32.413	1	417	.000
Brand reputation	.931	31.124	1	417	.000

5.4.1.4. Pooled within group matrices

Table 5.40: Pooled within group matrices for factors that are considered by churned subscribers when choosing a mobile-service provider, n 419

		Network quality	Mobile tariffs	Mobile tariffs plans	Prepaid airtime and starter-pack availability	Promotions	Loyalty programmes	Customer service quality	Access to mobile content and location services	Brand reputation
Correlation	Network quality	1	0.082	0.018	-0.013	0.022	0.143	0.06	0.243	0.219

Mobile tariffs	0.082	1	0.165	0.212	0.079	0.144	0.11	0.08	0.107
Mobile tariffs plans	0.018	0.165	1	0.24	0.145	0.235	0.096	0.064	0.166
Prepaid airtime and starter- pack availability	-0.013	0.212	0.24	1	0.129	0.153	0.125	0.039	0.056
Promotions	0.022	0.079	0.145	0.129	1	0.18	0.181	0.019	0.109
Loyalty programmes	0.143	0.144	0.235	0.153	0.18	1	0.192	0.283	0.266
Customer service quality	0.06	0.11	0.096	0.125	0.181	0.192	1	0.172	0.173
Access to mobile content and location services	0.243	0.08	0.064	0.039	0.019	0.283	0.172	1	0.291
Brand reputation	0.219	0.107	0.166	0.056	0.109	0.266	0.173	0.291	1

5.4.2 Discriminant Analysis

5.4.2.1 Box's test of equality of covariance matrices

Table 5.41: Box's test of equality of covariance matrices for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

Groups	Factors	Log determinant
Usage less than R15,00 a month	9	8.247
Usage more than R15,00 a month	9	3.280
Pooled within-groups	9	8.085

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Table 5.42: Box's test of equality of covariance matrices for nine factors and two groups that churned subscribers consider when choosing a mobile-service provider, n 419

Box's M		344.788
sF	Approx.	7.354
	df1	45
	df2	77491.191
	Sig.	.000

Tests null hypothesis of equal population covariance matrices.

Table 5.43: Descriptive statistics for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

	N	Mean	Std deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Network quality	419	7.25	2.452	-.887	.119	-.278	.238
Mobile tariffs	419	9.54	.936	-2.427	.119	6.272	.238
Mobile tariffs plans	419	7.89	1.889	-1.211	.119	1.899	.238
Prepaid airtime and starter-pack availability	419	9.29	1.711	-2.531	.119	5.658	.238
Promotions	419	8.79	1.822	-2.013	.119	4.682	.238
Loyalty programmes	419	8.05	2.125	-1.644	.119	3.091	.238
Customer service quality	419	9.62	.826	-2.357	.119	5.386	.238
Access to mobile content and location services	419	6.61	2.131	-.213	.119	-.317	.238
Brand reputation	419	6.96	1.993	-.841	.119	1.082	.238
Valid N (listwise)	419						

5.4.2.2 Summary of canonical discriminant functions

Table 5.44: Discriminant function Eigen values for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

Function	Eigen value	% of variance	Cumulative %	Canonical correlation
1	.435[a]	100.0	100.0	.550

a. First 1 canonical discriminant functions were used in the analysis.

Table 5.45: Wilks' Lambda test for nine factors and two groups that are by considered by churned subscribers when choosing a mobile-service provider, n 419

Test of function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1	.697	148.903	9	.000

Table 5.46: Standardised canonical discriminant function coefficients for nine factors and two groups that considered by churned subscribers when choosing a mobile-service provider, n 419

	Function
	1
Network quality	.338
Mobile tariffs	-.373
Mobile tariffs plans	.333
Prepaid airtime and starter- pack availability	-.397
Promotions	-.420
Loyalty programmes	.208
Customer service quality	-.172
Access to mobile content and location services	.259
Brand reputation	.292

Table 5.47: Structure matrix for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

	Function
	1
Network quality	.456
Access to mobile content and location services	.423
Prepaid airtime and starter- pack availability	-.417
Brand reputation	.414
Promotions	-.402
Mobile tariffs	-.344
Loyalty programmes	.262
Mobile tariffs plans	.219
Customer service quality	-.151

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

Table 5.48: Canonical discriminant function coefficient for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

	Function
	1
Network quality	.144
Mobile tariffs	-.408
Mobile tariffs plans	.178
Prepaid airtime and starter- pack availability	-.240
Promotions	-.238
Loyalty programmes	.099
Customer service quality	-.209
Access to mobile content and location services	.126
Brand reputation	.152
(Constant)	5.089

5.4.3 Discriminant Analysis classification statistics

5.4.3.1 Classification processing summary

Table 5.49: Classification processing summary for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

Processed		861
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	0
Used in output		861

5.4.3.2 Prior probabilities for groups

Table 5.50: Prior probabilities for groups for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

Quota	Prior	Cases used in analysis	
		Unweighted	Weighted
Usage less than R15,00 a month	.500	335	335.000
Usage more than R15,00 a month per month	.500	84	84.000
Total	1.000	419	419.000

5.4.3.3 Classification function coefficients

Table 5.51: Classification function coefficient for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

	Quota	
	Usage less than R15,00 a month	Usage more than R15,00 a month
Network quality	.690	.926
Mobile tariffs	9.388	8.717

Mobile tariffs plans	.540	.832
Prepaid airtime and starter-pack availability	1.381	.986
Promotions	1.285	.894
Loyalty programmes	-.340	-.177
Customer service quality	12.135	11.792
Access to mobile content and location services	.128	.335
Brand reputation	.026	.275
(Constant)	-120.564	-113.011

Fisher's linear discriminant functions

5.4.3.4 Classification results

Table 5.52: Classification group results for nine factors and two groups that are considered by churned subscribers when choosing a mobile-service provider, n 419

				Predicted group membership		
			Group	Usage less than R15,00 a month	Usage more than R15,00 a month	Total
Cases selected	Original	Count	Usage less than R15,00 a month	271	64	335
			Usage more than R15,00 a month	15	69	84
		%	Usage less than R15,00 a month	80.9	19.1	100.0
			Usage more than R15,00 a month	17.9	82.1	100.0
	Cross-validated[a]	Count	Usage less than R15,00 a month	269	66	335
			Usage more than R15,00 a month	17	67	84
		%	Usage less than R15,00 a month	80.3	19.7	100.0

			Usage more than R15,00 a month	20.2	79.8	100.0
Cases not Selected	Original	Count	Usage less than R15,00 a month	377	48	425
			Usage more than R15,00 a month	1	16	17
		%	Us ageless than R15,00 a month	88.7	11.3	100.0
			Usage more than R15,00 a month	5.9	94.1	100.0

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b. 81.1% of selected original grouped cases correctly classified.
c. 88.9% of unselected original grouped cases correctly classified.
d. 80.2% of selected cross-validated grouped cases correctly classified.

6. Data quality

6.1 Reliability of scale

Before proceeding with the analysis, it is prudent to review, among other things, the reliability of the scale that is used in the research.

Reliability refers to the property of a measurement instrument that causes it to give similar results for similar inputs. In addition, reliability explains the degree of consistency of a measure (SPSS Inc, 2010).

Using the reliability analysis function in IBM SPSS Statistics 19, a reliability test was conducted on the key data items that were used in the research.

The model used for the reliability test was Cronbach's Alpha. This model is a model of internal consistency, based on the average inter-item correlation (SPSS Inc, 2010).

In addition, Hotelling's T-squared test and intraclass correlation coefficient tests were conducted.

6.1.1 Cronbach's Alpha reliability analysis

Cronbach's Alpha is a measure of reliability (Cronbach, 1951). More specifically, Alpha is a lower bound for the true reliability of the survey. Mathematically, reliability is defined as the proportion of the variability in the responses to the survey by respondents (SPSS Inc, 2010).

For the research to be deemed a reliable survey, answers to questions regarding the importance of factors that are considered by churned subscribers

when choosing a mobile-service provider should have differed. Respondents should have different opinions, not because the survey was confusing or had multiple interpretations.

Table 5.2 provides the Cronbach's Alpha and Cronbach's Alpha that is based on standardised items. The 11 factors tested in the research had coefficients of 0.711 and 0.713 respectively for Cronbach's Alpha and Cronbach's Alpha that is based on standardised items.

Values of 0.70 or greater are indicative of good scale reliability (O'Leary-Kelly & Vokurka, 1988). Considering that, the coefficients from the analysis are greater than 0.70 would indicate the scale in the research has good reliability.

6.1.2 All factors that are considered important by churned subscribers on the scale do not have the same mean.

Another measure to test whether the scale was reliable is to conduct Hotelling's T-square test for the null hypothesis that all the factors have the same means.

Table 5.6 confirms that the null hypothesis that all the factors have the same mean is not accepted, as the test statistic has a value that is lower than the 0.05 significant value. Thus, the null hypothesis is rejected, and the alternative hypothesis that factors do not have the same means is accepted, further indicating that the scale used in the research is reliable.

6.1.3 Churned subscribers were consistent in their rating of factors that they considered when choosing a mobile-service provider

The average measure of intraclass correlation of 0.711, from table 5.7, indicates that the subscribers were consistent in their ratings of the factors that they considered when choosing a mobile-service provider.

In addition, at a 95% confidence level there is not much variation between the lower-bound and upper-bound intraclass correlations. Similar to the Cronbach's Alpha of 0.711, an intraclass correlation of greater than 0.70 is considered a good indication of scale reliability (McGraw & Wong, 1996).

Results from Cronbach's Alpha reliability analysis, Hotellings T-squared test and intraclass correlation coefficient test indicate that the scale used in the survey is reliable.

7. Results analysis

7.1 Factors that were considered by churned prepaid subscribers when choosing a mobile-service provider

Customer service quality was the most important factor that churned subscribers considered when choosing a mobile-service provider. Customer service quality had and overall rating of 9.62 out of a scale of 10, with 10 been extremely important and 0 been totally unimportant, for a sample of 419 subscribers that churned.

Table 5.3 provides the mean scores of factors that were considered by churned prepaid subscribers when choosing a mobile-service provider. Evident from the table is that customer service quality, mobile tariffs, prepaid airtime, starter-pack availability and promotions all had mean scores over 8.5, indicating that these factors were extremely important to churned subscribers when choosing a mobile-service provider.

In addition to rating these factors with scores over 8.5, the standard deviation of these factors were also the lowest out of 11 factors that were considered by churned subscribers when choosing a mobile-service provider. This would indicate that subscribers perceived these as important factors, and that the sample of 419 subscribers consistently rated these factors highly.

Research conducted by Rahman, Haque and Ahmad (2010) on exploring influencing factors for the selection of mobile-phone service providers in Malaysia also concluded that service quality, price, availability and promotions were significant factors in influencing subscribers' choice of a mobile-service

provider. Similar research conducted by Haque, Rahman and Rahman (2010) also concluded that service quality, price, availability and Promotions were significant factors in influencing subscribers' choice of a mobile-service provider in the Bangladesh mobile market.

Access to mobile content and location services, brand reputation and network quality scored the lowest out of 11 factors that were considered important by churned subscribers when choosing a mobile-service provider.

Brand reputation had the second lowest mean rating out of the 11 factors, indicating that although important, churned subscribers did not consider the brand reputation of a mobile-service provider first when choosing a mobile-service provider.

In 2009, Vodacom Group Limited and MTN Group Limited reported an annual prepaid subscriber churn rate of 45.5% and 43.5% respectively for the South African prepaid mobile market. These figures support the answer to the question why subscribers rated brand reputation as their second lowest factor when choosing a mobile-service provider.

Arguably, the two different subscriber groups would have rated factors differently. As noted previously the two groups were subscribers that spent on average of less than R15,00 a month on their prepaid mobile service, and the subscriber group that spent more than R15,00 a month on their prepaid mobile service. This difference in rating of factors between the two subscriber groups are explored in the section about Discriminant Analysis.

7.1.1 Relationships between factors that were considered important by

churned subscribers when choosing a mobile-service provider

In order to establish whether churned subscribers rate factors differently, an Analysis of Variance test was conducted to test the null hypothesis that churned subscribers rated factors equally.

The alternative hypothesis was that churned subscribers do not rated factors equally when choosing a mobile-service provider.

In addition to establishing whether there was a difference in mean rating between factors that were considered by churned subscribers when choosing a mobile-service provider, a post-hoc multiple comparison test was conducted to establish which factors were significantly different from one another.

7.1.2 Test assumptions for Analysis of Variance

SPSS Inc (2010) lists the following assumptions that are required to conduct an Analysis of Variance test:

- Each group is an independent and random sample from a normal population. Considering the methodology that was used to conduct the research, the research met this assumption, as the subscribers were selected using simple random sampling.

  In meeting the assumptions of normality, an Analysis of Variance test was robust to departures from normality, although the data should be symmetric (SPSS Inc, 2010).

The kurtosis statistic for the data used in the analysis was 1.327, which indicated that subscribers rated factors very highly and as such does depart from a normally distributed sample. The high peak of the data could be explained because of using a scale of 0 to 10 in determining the importance of factors that were considered by churn subscribers when choosing a mobile-service provider.

The skewness statistic was -1.297 indicating that data was skewed to the left, and that subscribers rated factors positively and closer towards the rating of 10. The mean score of all factors in rating the importance of factors that were important to churned subscribers when considering a mobile-service provider was 8.155 (see Table 5.4) which explained why there was a negative skewness to the data.

Considering that the kurtosis and skewness did indicate that the data did not necessarily represent a normal distribution, the Analysis of Variance test was robust to departures from normality, and thus the analysis was still conducted.

- The groups should come from populations with equal variances. In order to test this assumption Levene's homogeneity-of-variance test was conducted. From Table 5.8 the null hypothesis that the data came from a population with equal variances was rejected. The test statistic was less than the significant value of 0.05, indicating that the assumption that the data came from a population of equal variance was rejected.

The analysis-of-variance test did provide unequal variance tests for data in which equal variance was rejected, these included Brown-Forsythe and Welch tests to test the null hypothesis that the mean ratings of factors that churned subscribers considered important when choosing a mobile-service provider were equal.

7.1.3 Mean rating of factors were not equal for churned subscribers when choosing a mobile-service provider

As noted in 7.1.2 the assumption of equal variance was rejected. The following were the tests that were used to test the null hypothesis that mean scores of factors that were considered by churned subscribers were equal:

- Brown-Forsythe: This statistic was preferable to the *F* statistic when the assumption of equal variances did not hold (SPSS Inc, 2010). From Table 5.10 the test statistic was less than the 0.05 significant level. This implied that the null hypothesis that mean for the different factors were equal was rejected. Thus, the alternative hypothesis was accepted that the mean of the different factors were not equal.
- Welch: This statistic was preferable to the *F* statistic when the assumption of equal variances did not hold (SPSS Inc, 2010). From Table 5.10 the test statistic was less than 0.05, which implied that the null hypothesis for the different factors was equal, was rejected. Thus, the alternative hypothesis was accepted that the means of the different factors were not equal.

Considering that both Welch and Brown-Forsythe tests rejected the null hypothesis and accepted the alternative hypothesis the conclusion was that churned subscribers rated the importance of different factors differently when choosing a mobile-service provider.

Thus, customer service quality, mobile tariffs, prepaid airtime and starter- pack availability and promotions were significant in influencing churned prepaid subscribers when choosing a service provider. These factors had the highest mean ratings (see Table 5.3).

The relationships between these factors, as well as the other seven factors are explored further under the Discriminant Analysis section.

7.1.4 Factors that were significantly different from each other when churned subscribers changed a mobile-service provider

In order to establish which factors were significantly different from each other when subscribers changed a mobile-service provider, a post-hoc multiple comparison test was conducted.

When taking into consideration that equal variance was not assumed for the Analysis of Variance test, Tamhane's T2 post-hoc test for unequal variance was used.

Tamhane's T2 post-hoc test is a conservative pairwise comparisons test that is based on a T test. This test is appropriate when the variances are unequal (SPSS Inc, 2010). The results from the test were the following:

7.1.4.1 Importance of customer service quality and when choosing a mobile-

service provider

Customer service quality had a mean rating of 9.62 out of 11 factors, and, based on mean rating, was listed as the most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of customer service quality was significantly different from means of the other nine factors. Churned subscribers rated customer service quality and mobile tariffs equally when choosing a mobile-service provider.

7.1.4.2 Importance of mobile tariffs when choosing a mobile-service provider

Mobile tariffs had a mean rating of 9.54 out of 11 factors, and, based on mean rating, was listed as the second most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of mobile tariffs was significantly different from the means of the other eight factors. Churned subscribers rated mobile tariffs, customer service quality, prepaid airtime and starter- pack availability equally when choosing a mobile-service provider.

7.1.4.3 The importance of prepaid airtime and starter- pack availability when choosing a mobile-service provider

Prepaid airtime and starter- pack availability had a mean rating of 9.29 out of 11 factors, and, based on mean rating, was the third most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of prepaid airtime and starter- pack availability was significantly different from the means of the other nine factors. Churned subscribers rated prepaid airtime, starter-pack availability and mobile tariffs equally when choosing a mobile-service provider.

7.1.4.4 The importance of promotion when choosing a mobile-service provider

Promotion had a mean rating of 8.79 out of 11 factors, and, based on mean rating, was the fourth most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of promotion was significantly different from the means of the other 10 factors.

7.1.4.5 The importance of different airtime recharge options when choosing a mobile-service provider

Different airtime recharge options had a mean rating of 8.16 out of 11 factors, and, based on mean, were the fifth most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of different airtime recharge options was significantly different from the means of the other eight factors. Churned subscribers rated different airtime recharge options, mobile tariff plans and loyalty programmes equally when choosing a mobile-service provider.

7.1.4.6 The importance of loyalty programmes when choosing a mobile-service provider

Loyalty programmes had a mean rating of 8.05 out of 11 factors, and, based on mean rating, was listed as the sixth most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of loyalty programmes was significantly different from means of the other seven factors. Churned subscribers rated loyalty programmes, mobile tariff plans, different airtime recharge options and different types of prepaid product bundles equally when choosing a mobile-service provider.

7.1.4.7 Importance of mobile tariff plans when choosing a mobile-service provider

Mobile tariff plans had a mean rating of 7.89 out of 11 factors, and, based on mean, was listed as the seventh most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of mobile tariff plans was significantly different from the means of the other seven factors. Churned subscribers rated mobile tariff plans, loyalty programmes, different airtime recharge options and different types of prepaid product bundles equally when choosing a mobile-service provider.

7.1.4.8 Importance of different types of prepaid product bundles when choosing a mobile-service provider

Different types of prepaid product bundles had a mean rating of 7.54 out of 11 factors, and were listed as the eight most important factors that were considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean for different types of prepaid product bundles was significantly different from the means of the other seven factors. Churned subscribers rated different types of prepaid product bundles, network quality, mobile tariff plans and loyalty programmes equally when choosing a mobile-service provider.

7.1.4.9 Network quality's importance when choosing a mobile-service provider

Network quality had a mean rating of 7.25 out of 11 factors, and, based on mean, was listed as the ninth most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of network quality was significantly different from the means of the other eight factors. Churned subscribers rated network quality, different types of prepaid product bundles and brand reputation equally when choosing a mobile-service provider.

7.1.4.10 Importance of brand reputation and when choosing a mobile-service provider

Brand reputation had a mean rating of 6.96 out of 11 factors, and, based on mean rating, was the tenth most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of brand reputation was significantly different from the means of the other eight factors. Churned subscribers rated brand reputation, network quality and access to mobile content and location services equally when choosing a mobile-service provider.

7.1.4.11 Importance of access to mobile content and location services when choosing a mobile-service provider

Access to mobile content and location services had a mean rating of 6.61, and, out of 11 factors, was the eleventh most important factor that was considered by churned subscribers when choosing a mobile-service provider.

In addition, the mean of access to mobile content and location services was significantly different from means of the other nine factors. Churned subscribers rated access to mobile content, location services and brand reputation equally when choosing a mobile-service provider.

7.2 Discriminant Analysis

7.2.1 Discriminant model assumptions

SPSS Inc (2010) lists the following assumptions that are to be met or that are required to run a discriminant model:

- The predictors must not be highly correlated with each other
- The mean and variance of a given predictor are not correlated
- The group variance-co-variance matrices are equivalent
- Group membership is assumed to be mutually exclusive and collectively exhaustive
- The values of each predictor have a normal distribution

7.2.1.1 Predictors are not highly correlated

Table 5.40 provides the correlations between the different factors. Evident from Table 5.40 is that the factors are not highly correlated, and the highest correlation is 0.291.

Hays (1981) noted that a perfect correlation had an absolute value of 1, thus 0.20 can be considered as an uncorrelated data set. Thus, the assumption needed to run a discriminant model that the predictors were not highly correlated with each other, has not been violated.

7.2.1.2 The mean and variance of a given factor are not correlated

To test the assumption that mean and variance of a given predictor are not correlated, SPSS did a test of equality of group means using Univariate Analysis of Variance.

Univariate Analysis of Variance performed a one-way analysis-of-variance test for equality of group means for each independent variable (SPSS Inc, 2010).

The factors that are used in the discriminant model are listed in Table 5.39. As is evident in the table, all the factors that are used in the model have means and variances that are not correlated. All factors have a significance level, which is less than the 0.05 for the null hypothesis that the factors have equal means.

The following factors were removed from the discriminant model:

- Different airtime recharge options
- Different types of prepaid product bundles

The above factors were removed from the discriminant model because they had means and variances that were correlated.

With the removal of the above factors, the assumption for mean and variance of a given factor not being correlated with another factor has not been violated.

7.2.1.3 The group variance-co-variance matrices are equivalent

Discriminant Analysis is dependent on the assumption that the variance-co-variance matrices are equivalent across groups.

SPSS uses the Box's M tests to validate this assumption by using the null hypothesis that the covariance matrices do not differ between groups formed by the dependent.

In addition, for this assumption to hold, the log determinants should be equal (Burns & Burns, 2008). Log determinants are a measure of the variability of the groups, and large differences in log determinants indicate groups that have different covariance matrices (SPSS Inc, 2010).

The log determinants in Table 5.41 differ from each other, and appear not to be equal. This indicates that the groups have different covariance matrices. In addition, the Box M test (see Table 5.42) has a test statistic, which is less than the significance value of 0.05, which indicates that the test is significant in rejecting the null hypothesis.

The null hypothesis states that the covariance matrices do not differ between groups formed by the dependent, and as such, the alternative hypothesis is accepted that the co-variances matrices differ between groups.

Since the co-variances differ between groups, the assumption to conduct a discriminant model is violated. However, with large samples, a significant result is not regarded as too important (Burns & Burns, 2008). It should be noted that the research has a sample size of 861, of which 419 subscribers churned in the last 12 months, and in the light of this, a significant result is not regarded as important. SPSS Inc (2010) notes that for sufficiently large samples, a non-significant p value indicates that there is insufficient evidence that the matrices differ.

However, SPSS Inc (2010) recommends the running of Discriminant Analysis by using separate group co-variances matrices to determine if the classification results differ by much. The classification results did not change from the 81.1% result, which was correctly classified, thus the Discriminant Analysis was conducted by using the within group co-variances.

7.2.1.4 Group membership is assumed to be mutually exclusive and collectively exhaustive

Since the research has two categories of prepaid subscribers, namely those subscribers that spend less than R15,00 a month on prepaid service, and those that spend more than R15,00 a month on prepaid service, no subscriber can belong to more than one group, as each subscriber is unique to a specific group. Thus, the assumption that group membership is assumed to be mutually exclusive is not violated.

In addition, each subscriber if a member of a group, and the group membership is collectively exhaustive within the subsample of 419 subscribers who churned

in the last 12 months from date of interview. Thus, the assumption is not violated that group membership is assumed collectively exhaustive.

Furthermore, Burns and Burns (2008) noted that Discriminant Analysis was most effective when group membership was a truly categorical variable. Group membership in the research was a truly categorical variable with one binary variable for two categories.

7.2.1.5 The values of each predictor have a normal distribution

The factors that were considered important by churned subscribers when choosing a mobile-service provider were obtained by using a rating scale. The rating scale resulted in the data being skewed and peaked, indicating that the data was not normally distributed. Since the data was not normally distributed this violated the assumption that each predictor should have a normal distribution.

Table 5.43 provides the skewness and kurtosis for each factor. Six factors are peaked and skewed indicating an abnormal distribution, with the exception of the following three factors:

- Network quality
- Access to mobile content and location services
- Brand reputation

However, as long as the sample sizes are large, group sizes are about equal, and outliers are minimal, Discriminant Analysis is robust in tolerating violations of this assumption (Burns & Burns, 2008).

The above statement is true for the research data, since it is a large sample set of 419 selected cases. In addition, the Discriminant Analysis was conducted using the function of “all groups equal” which assumes equal prior probabilities for all groups instead of using observed group sizes in the sample to determine the prior probabilities of group membership.

While the data does not follow a normal distribution, the sample size, adjusting for group sizes using equal prior probabilities and the absences of outliers the Discriminant Analysis was still conducted although the assumption of normality was violated.

7.2.2 Discriminant model

As noted, Discriminant Analysis is used for predictive Discriminant Analysis and group classification, which address the question of how to assign new cases to groups.

The following sections will focus on the discriminant function coefficients that are used to predict usage groups of churn subscribers by using factors that they consider important when choosing a mobile-service provider.

7.2.2.1 Canonical discriminant functions

Table 5.44 provides information on the discriminant function that was produced. The maximum number of discriminant functions produced is one, as there are only two groups.

The canonical correlation is the multiple correlation between the predictors and the discriminant function (Burns & Burns, 2008). The canonical correlation

provides an index of overall model fit, which is interpreted as being the proportion of variance, explained by R^2 (Burns & Burns, 2008).

From Table 5.44 a canonical correlation of 0.550 suggests that the model explains 31% of the variation in the grouping variables, and that the model is reasonable in prediction. A perfect classification model will have a canonical correlation of 1 (Levine, 1977).

7.2.2.2 Wilks' lambda

Wilks' lambda indicates the significance of the discriminant function. Table 5.45 indicates a highly significant function as the test statistic is less than the significant level of 0.05 for the function, and provides the proportion of total variability not explained, i.e. it is the converse of the squared canonical correlation (Burns & Burns, 2008).

A significant function confirms the alternative hypothesis that the model produces a significant discriminant function.

7.2.2.3 Standardised canonical discriminant function coefficients

The interpretation of the discriminant coefficients (or weights) is like that in multiple regression (Burns & Burns, 2008). Table 5.46 provides an index of the importance of each factor to discriminant function. The importance of each factor is like the standardised regression coefficients (beta's) in multiple regression (Burns & Burns, 2008), and the sign indicates the direction of the relationship.

The following are the strongest predictors for the model in descending order of importance:

1. Promotions
2. Prepaid airtime and starter-pack availability
3. Mobile tariffs
4. Network quality
5. Mobile tariff plans
6. Brand reputation
7. Access to mobile content and location services
8. Loyalty programmes
9. Customer service quality

7.2.2.4 Structure matrix

The structure matrix provides another way of indicating the relative importance of the factors used by churned subscribers when choosing a mobile-service provider.

The structure matrix in Table 5.47 shows the correlations of each variable with each discriminate function. The Pearson coefficients in Table 5.47 are structure coefficients or discriminant loadings and notwithstanding problem dimensionality and data scaling 0.30 is the cut-off between important and less important variables (Burns & Burns, 2008).

In order of importance, as is evident from Table 5.47, factors that have structure coefficients equal to 0.30 or greater are the following:

1. Network quality
2. Access to mobile content and location services
3. Prepaid airtime and starter-pack availability
4. Brand reputation
5. Mobile tariffs
6. Promotions

7.2.2.5 Canonical discriminant function

The canonical discriminant function coefficients in Table 5.48 provide the unstandardised coefficients that were used to create the discriminant function or equation (Burns & Burns, 2008).

From Table 5.48 the following equation is created for the discriminant model to predict usage groups of churn subscribers by using factors that they consider important when choosing a mobile-service provider:

Churned subscribers usage group = (0.144 X network quality) + (-0.408 X mobile tariffs) + (0.178 X mobile tariffs plans) + (-0.240 X prepaid airtime and starter-pack availability) + (-0.238 X promotions) + (0.099 X loyalty programmes) + (-0.209 X customer service quality) + (0.126 X access to mobile content and location services) + (0.152 X brand reputation) + 5.089

7.2.3 Discriminant classification model

7.2.3.1 Classification processing summary

The discriminant classification model processed 861 cases (see Table 5.41). However, only 419 cases created the discriminant classification model. The 419

cases were subscribers who churned within the previous 12 months from the date of the interview.

The minimum ratio of valid cases to independent variables for Discriminant Analysis is 5 to 1, with a preferred ratio of 20 to 1 (Burns & Burns, 2008). In the analysis, there were 419 valid cases and 9 independent variables (after the reduction that was made in Section 7.2.1.2). Thus the ratio of cases to independent variables is 46.56 to 1, which satisfies the minimum requirement, as well as the preferred requirement. Thus, the sample size is more than adequate to conduct Discriminant Analysis.

7.2.3.2 Prior probabilities for groups

As noted in Section 7.2.1.5, the Discriminant Analysis was conducted with “all groups equal”, which assumes equal prior probabilities for all groups, as opposed to using observed group sizes in the sample to determine the prior probabilities of group membership.

Equal prior probabilities for all groups was used to compensate for the data not been normal. In Table 5.50 the prior probabilities are split equally for the two groups.

Discriminant Analysis requires that there be a minimum number of cases in the smallest group defined by the dependent variable. In addition, the number of cases in the smallest group must be larger than the number of independent variables, and must preferably contain 20 or more cases (Burns & Burns, 2008). From Table 5.50 the smallest group has 84 cases, which is larger than the 9 independent variables and contains more than the preferred 20 cases.

7.2.3.3 Classification function coefficients

Fisher's classification function coefficients are used to create a classification equation that classifies cases. In addition, a separate set of classification function coefficients is obtained for each group (SPSS Inc, 2010).

Using the function coefficients (see Table 5.51) of the factors that were considered by churned subscribers when choosing a mobile-service provider the following equations were created to classify the two groups, which are based on average monthly spending.

7.2.3.3.1 Less than R15,00 a month spent on prepaid service

Classification equation: Less than R15,00 a month spent on prepaid service = (0.690 X network quality) + (9.388 X mobile tariffs) + (0.540 X mobile tariff plans) + (1.381 X prepaid airtime and starter-pack availability) + (1.285 X promotions) + (-0.340 X loyalty programmes) + (12.135 X customer service quality) + (0.128 X access to mobile content and location services) + (0.026 X brand reputation) -120.564

Notably from the above equation is that customer service has the highest function coefficient. This is not surprising, considering that churned subscribers rated customer service quality, based on mean, as the most important factor that was considered when choosing a mobile-service provider. Considering subscribers who churned within the previous 12 months would indicate that the customer service quality at the previous mobile-service provider was substandard that they considered customer service quality as the highest mean rated factor.

Mobile tariffs had the second highest function coefficient , which relates back to mobile tariffs being rated as the second most important factor that was considered by churned subscribers when choosing a mobile-service provider. Taking into consideration that on average this group spent less than R15,00 a month on their prepaid mobile service, it would indicate that these subscribers were price sensitive, and would churn out of their current mobile-service provider if they were offered cheaper tariffs accompanied by good customer service quality.

Prepaid airtime and starter-pack availability have the third-highest function coefficient, while promotions have the fourth-highest function coefficients. These factors respectively were rated third and fourth in importance when they were considered by churned subscribers for choosing a mobile-service provider.

In summary: Given the relative size of the function coefficients of customer service quality, mobile tariffs, prepaid airtime and starter-pack availability and promotions would indicate that mobile subscribers who churned are very sensitive to these factors, and would most likely churn again if these factors are not met. Customer service quality and mobile tariffs are especially sensitive, considering the function coefficients, thus customer service quality and mobile tariffs that do not meet the expectations of subscribers, and could result in subscribers churning out of current a mobile-service provider.

7.2.3.3.2 More than R15,00 a month spent on prepaid service

Classification equation: More than R15,00 a month spent on prepaid service = (0.926 X network quality) + (8.717 X mobile tariffs) + (0.832 X mobile

tariffs plans) + (0.986 X prepaid airtime and starter-pack availability) + (0.894 X promotions) + (-0.177 X loyalty programmes) + (11.792 X customer service quality) + (0.335 X access to mobile content and location services) + (0.275 X brand reputation) -113.924

Similar to churned subscribers who spend less the R15,00 a month on their prepaid service, subscribers that spend more than R15,00 a month on their prepaid service had high function coefficients for customer service quality, mobile tariffs, prepaid airtime and starter-pack availability.

7.2.3.4 Function coefficients between groups

Network quality

Subscribers that spend more than R15,00 a month on their prepaid service (Group 2) had a higher function coefficient than subscribers that spend less than R15,00 a month on their prepaid service (Group 1). This would indicate through variance of 0.24 on function coefficient that Group 2 perceived network quality as a higher factor when choosing a mobile-service provider.

Mobile tariffs

Group 1 had a higher function coefficient than Group 2. This would indicate through variance of 0.67 on function coefficient that subscribers that spend less than R15,00 a month on their prepaid service (Group 1) are more sensitive to mobile tariffs when choosing a mobile-service provider.

Mobile tariff plans

Group 2 had a higher function coefficient than Group 1. This would indicate through variance of 0.29 on function coefficient that subscribers that spend more than R15,00 a month on their prepaid service (Group 2) are influenced a lot more by the types of mobile tariff plans that are offered by a mobile-service provider when choosing a service provider.

Prepaid airtime and starter-pack availability

Group 1 had a higher function coefficient than Group 2. This would indicate through variance of 0.40 between function coefficients that subscribers that spend less than R15,00 a month on their prepaid service (Group 1) are influenced a lot more by the prepaid airtime and starter-pack availability offered by a mobile-service provider when choosing a service provider.

Promotions

Group 1 had a higher function coefficient than Group 2. This would indicate through variance of 0.39 between function coefficients that subscribers that spend less than R15,00 a month on their prepaid service (Group 1) are influenced a lot more by the promotions offered by a mobile-service provider when choosing a service provider.

Loyalty programmes

Group 2 had a higher function coefficient than Group 1. This would indicate through variance of 0.16 between function coefficients that subscribers that spend more than R15,00 a month on their prepaid service (Group 2) are

influenced a lot more by loyalty programmes offered by a mobile-service provider when choosing a service provider.

Customer service quality

Group 1 had a higher function coefficient than Group 2. This would indicate through variance of 0.34 between function coefficients that subscribers that spend less than R15,00 a month on their prepaid service (Group 1) are influenced a lot more by the customer service quality of a mobile-service provider when choosing a service provider.

Access to mobile content and location services

Group 2 had a higher function coefficient than Group 1. This would indicate through variance of 0.21 between function coefficients that subscribers that spend more than R15,00 a month on their prepaid service (Group 2) are influenced a lot more by the mobile content and location services offered by a mobile-service provider when choosing a service provider.

Brand reputation

Group 2 had a higher function coefficient than Group 1. This would indicate through variance of 0.25 between function coefficients that subscribers that spend more than R15,00 a month on their prepaid service (Group 2) are influenced a lot more by the brand reputation of a mobile-service provider when choosing a service provider.

7.2.3.5 Classification results

The classification table is a table in which the rows are the observed categories of the dependent, and the columns are the predicted categories (SPSS Inc, 2010). When the prediction is perfect all cases will lie on the diagonal and the percentage of cases on the diagonal is the percentage of correct classifications (SPSS Inc, 2010).

The cross-validated set of data is a more honest presentation of the power of the discriminant function than that provided by the original classifications, and often produces a poorer outcome (SPSS Inc, 2010).

The classification results from Table 5.52 reveal that 81.1% of selected original grouped cases correctly classified churned subscribers that spend less than R15,00 monthly, and more than R15,00 monthly, on prepaid service in the respective groups.

However, as noted above, SPSS Inc (2010) recommends using the cross-validated set of data. The cross-validated set of data has 80.2% of selected cross-validated grouped cases correctly classified into churned subscribers that spend less than R15,00 monthly, and more than R15,00 monthly, on prepaid service.

Burns and Burns (2008), note that the independent variables could be characterised as useful predictors of membership in the groups defined by the dependent variable, if the cross-validated classification accuracy rate were significantly higher than the accuracy attainable by chance alone. Operationally, the cross-validated classification accuracy rate should be 25% or more higher than the proportional by chance accuracy rate (Burns & Burns, 2008).

The proportional by chance accuracy rate is calculated by squaring and summing the proportion of cases in each group (Burns & Burns, 2008). The proportional by chance accuracy rate is 50% ($0.50^2 + 0.50^2 = 0.005$) for the classification analysis.

The cross-validated accuracy rate is 80.1%, which is greater than proportional by chance accuracy criteria of 50%, implying that the criterion for classification accuracy is satisfied.

In summary Discriminant, analysis was conducted to predict the groups churned subscribers belong too by using the factors that were considered important by churned subscribers when choosing a mobile-service provider.

The following were predictor factors:

- Promotions
- Prepaid airtime and starter-pack availability
- Mobile tariffs
- Network quality
- Mobile tariff plans
- Brand reputation
- Access to mobile content and location services
- Loyalty programmes
- Customer service quality

Significant mean differences were observed for most of the factors, while the other factors were removed because there was no significant mean difference between them.

The log determinants were not very similar and the Box's M indicated that the assumption of equality of covariance matrices was violated. However, given the large sample of 419 selected cases, the problem was not regarded as serious.

The discriminate function revealed an association (R^2) of 0.55 between groups and all predictors, accounting for 30.3% of between group variability.

The structure matrix revealed six predictors, namely network quality, access to mobile content and location service, prepaid airtime and starter-pack availability, brand reputation, mobile tariffs and promotions.

The cross-validated accuracy rate was 80.1%, which was greater than proportional by chance accuracy criteria of 50%, implying that the criterion for classification accuracy was satisfied.

8. Conclusion

As stated in the research objective, the benefits derived from conducting the research were the following:

- Adding to the knowledge on prepaid subscriber retention in the high mobile churn market of South Africa
- Adding to the knowledge on prepaid subscriber acquisition in the high mobile churn market of South Africa
- Adding to the knowledge on optimal resource allocation of limited business resources

The above benefits were dependent on reaching the following research results:

- Determining the factors that were statistically significant when churned prepaid subscribers changed a mobile-service operator
- Determining the factors that churned prepaid subscribers considered to be equal when choosing a mobile-service provider, and similarly the factors that they did not consider equal
- Creating a classification discriminant model that is based on monthly spending categories, to predict and classify the groups to which churned prepaid subscribers will belong by using the factors that they consider important when choosing a mobile-service provider

Determining factors that are statistically significant when churned prepaid subscribers change a mobile-service operator

The following factors in order of their decreasing importance were established, and given in Section 7.1:

1. Customer service quality
2. Mobile tariffs
3. Prepaid airtime and starter-pack availability
4. Promotions

The above were the four factors that were considered the most important by churned subscribers when choosing a mobile-service provider. These factors are considered to be similar in importance to what mobile subscribers in Malaysia (Rahman, Haque, & Ahmad, 2010) and mobile subscribers in Bangladesh (Haque, Rahman, & Rahman, 2010), consider being important. Both Malaysia and Bangladesh are developing and unsaturated markets like South Africa.

By listing, customer service quality as the most influential factor it would imply that the previous service provider's customer service quality was not perceived as acceptable for churned subscribers. In addition, considering that the top two mobile-service providers both have very similar churn rates, this implies that their customer service quality is very similar as perceived from within the survey group. Thus, there is an opportunity for mobile-service providers to differentiate themselves by effecting improvements in their customer service quality.

Similarly, improvement in customer service quality, while keeping all other factors the same, will in turn lead to improvement in subscriber acquisition. However, it may be argued that customer service quality is a retention factor, as

opposed to being a primary acquisition factor, because the survey group listed customer service quality as the most important factor for choosing a service provider (Brodie, Whittome, & Brush, 2009).

Mobile tariffs were the second most important factor that was considered important by churn subscribers when choosing a mobile-service provider. Considering that subscribers churned from their previous service provider to a new service provider based on mobile tariffs would indicate that mobile tariffs are an acquisition factor.

However, using mobile tariffs as an acquisition factor, while keeping all other factors the same, would only be a cyclic short-term strategy that could lead to short-term results, as it would be easy for service providers to replicate and marginally improve on mobile tariffs for the subscribers to churn, and join yet another new service provider.

Considering that in Section 7.1.4.1, the research statistically concluded that churned subscribers rated customer service quality and mobile tariffs equally when choosing a mobile-service provider, it is recommended that these two factors be leveraged for acquisition and retention. For example, by decreasing mobile tariffs, a mobile-service provider could acquire subscribers from another service provider, while simultaneously improving the customer service quality that these acquired subscribers would receive could result in retaining the acquired subscribers for a longer period.

Prepaid airtime and starter-pack availability is, among other things, a function of the distribution strength of a service provider, and, with all other factors

remaining the same, the service provider that has the better distribution would likely acquire more subscribers.

While airtime and starter-pack availability is important to acquire subscribers, promotions can act both as acquisition and retention factors. However using promotions for acquisitions is a short-term strategy, and thus benefits will be a short-lived solution, as subscribers may churn to the service provider that offers the better promotion in the market, if all other factors are equal and perceived as such.

In order of decreasing importance, the other 7 factors that were considered important by churned subscribers are given as follows in Section 7.1:

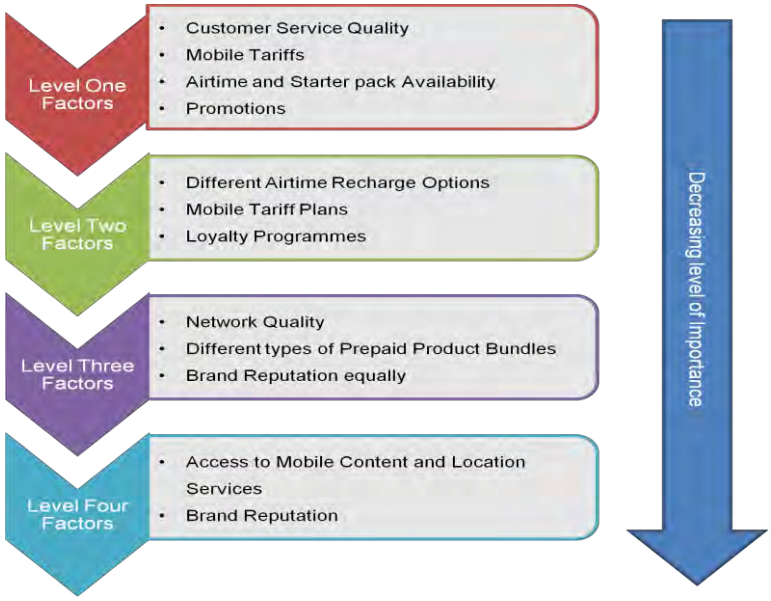
5. Different airtime recharge options
6. Loyalty programmes
7. Mobile tariff plans
8. Different types of prepaid product bundles
9. Network quality
10. Brand reputation
11. Access to mobile content and location services

Factors that were considered equal by churned prepaid subscribers when choosing a mobile-service provider, and similarly, factors that were not considered by them to be equal

Customer service quality, mobile tariffs, airtime and starter-pack availability and promotions can be summarised as Level 1 Factors (see Figure 8.1) that are considered by churn subscribers when choosing a mobile-service provider.

These were the four most important factors from Section 7.1.2, that churned subscribers considered, and they can therefore be grouped together as the primary value proposition that churned subscribers consider when choosing a mobile-service provider.

Figure 8.1: Four level of factors that churned subscribers consider important when choosing a mobile-service provider



Source: Adapted from section 7.1 of research

As concluded in Section 7.1.4.5, churned subscribers, rate different airtime recharge options, mobile tariff plan types and loyalty programmes on a par when choosing a mobile-service provider. These factors are summarised as Level 2 Factors (see Figure 8.1) that churn subscribers consider when choosing a mobile-service provider.

In addition, the above factors are classified as essential product offerings that are required by churned subscribers. These factors, however, can be replicated, and do not provide a competitive differentiate. With the exception of loyalty

programmes (which is a retention factor), the others are considered acquisition factors (Kotler & Keller, 2009).

Level 3 Factors (see Figure 8.1) include network quality, different types of prepaid product bundles and brand reputation. Churned subscribers as concluded in Section 7.1.4.6 rate them equally. Brand reputation was listed equally with access to mobile content and location services. Brand reputation and network quality relate to the competency of the service provider and act both as retention and acquisition factors. Furthermore, these factors are differentiating factors, which a service provider can control, and can increasingly build competencies into.

Churned subscribers rate access to mobile content and location services and brand reputation similarly as is concluded in Section 7.1.4.10. The above are grouped as Level 4 Factors. These factors do not provide long-term differentiation, but act as short-term acquisition factors. The uniqueness of the product offering will diminish as other competitors build up their competencies, and offer the same suit of products.

Having determined the factors that are important, the factors that are equal to each other, and the factors that are not equal when churned prepaid subscribers change a mobile service operator, the research was able to add to the knowledge relating to retention and acquisitions of prepaid churned subscribers. Figure 8.2 summarises those acquisition and retention factors which are concluded from the survey sample, and which prepaid subscribers consider when choosing a mobile-service provider

Figure 8.2: Acquisition and retention factors that prepaid subscribers consider when choosing a mobile-service provider in decreasing order of importance

Factor	Retention	Acquisition
Customer service quality	Yes	
Mobile tariffs		Yes
Prepaid airtime and starter pack availability		Yes
Promotions		Yes
Different airtime recharge options		Yes
Loyalty programmes	Yes	
Mobile tariffs plans		Yes
Different types of prepaid product bundles		Yes
Network quality	Yes	
Brand reputation	Yes	Yes
Access to mobile content and location services		Yes

Source: Derived from analysis of the research analysis in Sections 7.1

Discriminant model, based on monthly spending categories, to predict and classify the groups that churned prepaid subscribers will belong to by using the factors that they consider important when choosing a mobile-service provider

The research established two classification equations in Section 7.2.3.3 to classify the groups, based on monthly spending categories that churn subscribers, will belong to by using the factors that they consider important when choosing a mobile-service provider.

With a cross-validated accuracy rate of 80.1%, the classification equations established that the discriminant model correctly classifies churned subscribers into the two groups (R< R>15). In addition, Section 7.2.3.4 established the following difference between factors of the two groups:

- **Network quality:** Subscribers who spend more than R15,00 a month on their prepaid service perceived network quality as a higher factor when choosing a mobile-service provider
- **Mobile tariffs:** Subscribers who spend less than R15,00 a month on their prepaid service are more sensitive to mobile tariffs when choosing a mobile-service provider
- **Mobile tariff plan types:** Subscribers who spend more than R15,00 a month on their prepaid service are influenced a lot more by the types of mobile tariff plan types offered by a mobile-service provider when choosing a service provider
- **Prepaid airtime and starter-pack availability:** Subscribers who spend less than R15,00 a month on their prepaid service are influenced a lot more by prepaid airtime and starter-pack availability of a mobile-service provider when choosing a service provider
- **Promotions:** Subscribers who spend less than R15,00 a month on their prepaid service are influenced a lot more by the promotions offered by a mobile-service provider when choosing a service provider
- **Loyalty programmes:** Subscribers who spend more than R15,00 a month on their prepaid service are influenced a lot more by loyalty programmes offered by a mobile-service provider when choosing a service provider
- **Customer service quality:** Subscribers who spend less than R15,00 a month on their prepaid service are influenced a lot more by customer service quality of a mobile-service provider when choosing a service provider

- **Access to mobile content and location services: S**ubscribers who spend more than R15,00 a month on their prepaid service are influenced a lot more by mobile content and location services offered by a mobile-service provider when choosing a service provider
- **Brand reputation:** Subscribers who spend more than R15,00 a month on their prepaid service are influenced a lot more by the brand reputation of a mobile-service provider when choosing a service provider

Taking the above into consideration, one has to conclude that given service, providers have limited resources and competencies will not be able to address all the factors that are considered important by churned subscribers when choosing a mobile-service provider. Thus, service providers have to make decisions about their portfolios of subscriber bases, and how to optimally address them, given their resources and competencies, by understanding the factors that are important to them when choosing a mobile-service provider.

The research was able to provide equations on both how to predict and classify churned subscribers into groups based on monthly spending on usage. Based on these equations the mobile-service providers will be able to optimally address the mix of their subscriber base.

Furthermore, apart from addressing the desired subscriber mix, mobile-service providers can align tactical and strategic actions by positioning themselves to reach their targeted subscriber mix based on the factors that subscribers consider important when choosing a mobile-service provider.

8.1 Limitations of the study

- The data used in the research violated assumptions of a normal distribution. However, the tests that were conducted by using the data were robust to the violations of a normal distribution
- The research used the subscribers from one service provider for the sample. However statistical tests were limited to subscribers who churned to one specific provider in the previous 12 months from the date of the interview
- The research did not test whether there was a significant difference between the factors why subscribers churned and the factors considered for choosing first time a mobile service provider

8.2 Future research recommendations

The research has established the factors that were considered important by churned mobile subscribers when choosing a mobile-service provider. However, these factors need to be explored in more detail, since the underlying factors that drive the primary factors that were established in the research are not sufficiently understood. Future research should explore the following:

- Customer service quality expectations of prepaid mobile subscribers
- Customer service quality reputation of mobile-service operators
- Mobile tariff expectations of prepaid mobile subscribers
- The influence of mobile tariffs on the reputation of mobile-service providers
- Prepaid airtime and starter-pack availability, and its influence on prepaid mobile subscribers

- The effective use of promotions to increase the retention of prepaid mobile subscribers

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10. Appendixes

10.1 Churn reduction financial model

Table 10.1: Churn reduction financial model using Vodacom information for financial years 2009 and 2010

			Base Case		Scenario Case	Formula	Remarks
Year	**2009**		**2010**		**2010**		
Subscribers (thousands)	23 679	j	21 765		21 765	a	Reported by Vodacom
Subscriber net adds (thousands)			-1 914		-1 914	b	Reported by Vodacom
Subscribers gross adds (thousands)			8 523		8 523	c	Reported by Vodacom
Churn subscribers (thousands)			10 437		9 490	j x d	
Churn percentage			44%		40%	d	Reduced churn by 4%
Subscribers less churn (thousands)			13 242		14 189	j-(j x d)	
Average revenue generating subscribers (thousands)			18 026	l	18 539	f	Average revenue generating subscribers increased due to reduced churn
ARPU			R 70		R 70	k	Reported ARPU by Vodacom
Revenue			R 15 141 525 000		R 15 572 482 800	f x k x 12 (months) x 1000	Revenue increases by 2.8%
Average prepaid acquisition cost					R 45	e	
Acquisition cost					R 42 622 200	(f - l) x e	
EBITDA			R 14 790 000 000	k	14 832 622 200	k + ((f - l) x e)	EBITDA increases by 0.3% due to reducing churn by 4%

Source: (Vodacom Group Limited, 2010), (Govender, 2011)

10.2 Questionnaire

Good day, my name is Ethesen Mankum. I am a MBA student from GIBS, the business school of the University of Pretoria, student number 10665392. In completion of my master thesis, I am conducting research to understand the usage of your prepaid mobile service. Your input into the research will be greatly appreciated.

If you approve, I will ask you a series of questions, which should take about 15 minutes of your time. The completion of the questionnaire will be conducted telephonically and if at any time, you wish to cancel the interview you may do so.

Please note that your personal details will not be shared during the reporting of the research results, and information shared will be collectively reported upon. Thus, your responses to the questionnaire will be kept in strict confidence.

In addition, the completion of your questionnaire, storing of results and reporting of results will be done in strict compliance of the rules and regulations of GIBS.

Yes	
No	

1 . Is your mobile phone prepaid or contract?

Prepaid	
Contract	

If contract close interview

Q2A. Have you recently (past 12 months) switched from mobile service provider?

a) Yes	
b) No	

If no skip to Q3

Q2B. Why did you switch

Reasons for switching	
a) Voice Network Performance (e.g. Call quality, Drop calls, Geographical coverage)	
b) Data Network Performance (e.g. Internet browsing – Facebook or receiving e-mails)	
c) Price of Prepaid charges (e.g. The price of voice calls, the price of data & the price of sms)	
d) Different type of tariffs plans (e.g. per second, per minute, flat tariffs, peak and off peak tariffs)	
e) Product availability (e.g. sim purchases)	
f) Airtime recharge options (e.g. Pin less, vouchers, USSD, ATM, Internet)	

g) Promotions	
h) Loyalty programmes	
i) Customer service quality	
j) Prepaid product bundles (e.g. sms bundles, data bundles, music bundles)	
k) Access to content based services (e.g. Video broadcast, Multimedia services, News, Gaming, Internet browsing, Music download)	
l) Access to location-based (e.g. GPS navigation, Weather alerts, Traffic updates, Restaurant reviews/info, Locating nearby convenience services)	
m) Brand perceptions/reputation of service provider	
n) Store image	
o) Market share	
p) Innovative services / products	

.

Q3. How would you rate the overall importance when choosing a mobile service provider regarding the following statements by using a scale from 0 to 10, where 0 means „Totally Unimportant' and 10 means „Extremely Important', you may also choose any number in between:

	0 Totally Unimportant	1	2	3	4	5	6	7	8	9	10 Extremely Important	D/K	N/A
a) **Network quality** (e.g. Call quality, Drop calls, Geographical coverage, Internet browsing – Facebook or receiving e-mails)													
b) **Mobile tariffs** (e.g. The price of voice calls, the price of data & the price of sms)													
c) **Different types of Mobile tariffs plans** (e.g. per second, per minute, flat tariffs, peak and off peak tariffs)													
d) Prepaid airtime and starter pack availability													
e) **Different airtime recharge options**													

	0 Totally Unimportant	1	2	3	4	5	6	7	8	9	10 Extremely Important	D/K	N/A
(e.g. Pin less, vouchers, USSD, ATM, Internet)													
f) Promotions													
g) Loyalty programmes													
h) Customer service quality													
i) **Different types of prepaid product bundles** (e.g. sms bundles, data bundles, music bundles)													
j) **Access to mobile content and location services** (e.g. Video broadcast, Multimedia services, News, Gaming, Internet browsing, Music download. GPS navigation, Weather alerts, Traffic updates, Restaurant reviews/info, Locating nearby convenience services))													
k) Brand perceptions/reputation of service provider													

Q4. Out of the following statements regarding the "Network quality" which of the following statement is most important to you, second most important to you and third most important to you when choosing a mobile service provider:

	1 Most Important, 2 Second Most Important, 3 Third Most Important, 4 Do not know
a) Call quality	
b) Drop calls	
c) Geographical coverage	

Q5. Out of the following statements regarding the "Price of prepaid" which of the following statement is most important to you, second most important to you and third most important to you when choosing a mobile service provider:

	1 Most Important, 2 Second Most Important, 3 Third Most Important, 4 Do not know
a) The price of voice calls	
b) The price of data calls	
c) The price of sms	

Q6. Out of the following statements regarding the "Tariff Plans" which of the following statement is most important to you, second most important to you and third most important to you when choosing a mobile service provider:

.	1 Most Important, 2 Second Most Important, 3 Third Most Important, 4 Do not know
a) Per second tariff plan	
b) Per minute tariff plan	
c) Peak and off peak tariff plan	
d) Flat tariff plan	

Q7. Out of the following statements regarding the "Prepaid Product Bundles" which of the following statement is most important to you, second most important to you and third most important to you when choosing a mobile service provider:

	1 Most Important, 2 Second Most Important, 3 Third Most Important, 4 Do not know
a) Prepaid service with SIM only offering	
b) Prepaid service with SIM and phone offering	
c) Prepaid service with SIM and free airtime offering	
d) Prepaid service with SIM bundle offering	
e) Prepaid service with data bundle offering	
f) Prepaid service with music downloads	

Q8. Out of the following statements regarding the "Mobile Content/Services" which of the following statement is most important to you, second most important to you and third most important to you when choosing a mobile service provider:

	1 Most Important, 2 Second Most Important, 3 Third Most Important, 4 Do not know
a) Access to mobile video	
b) Access to mobile banking	
c) Access to music downloads	
d) Access to ringtones downloads	
e) Access to instant messaging (such as blackberry, mix it)	

Q9. Out of the following statements regarding the "Product availability" which of the following statement is most important to you, second most important to you and third most important to you when choosing a mobile service provider:

	1 Most Important, 2 Second Most Important, 3 Third Most Important, 4 Do not know
a) Product available through food retail store	
b) Product available through clothing retail store	
c) Product available through local neighbourhood stores/ corner stores	
e) Product available through mobile service provider branded stores	

D1. What is your personal monthly income before tax and deductions?

a) Less than R 1 000	Continue
b) Between R1 000 and R3 000	Continue
c) Between R3 001 and R5 000	Continue
d) Between R5 001 and R10 000	Continue
e) Between R10 001 and R20 000	Continue
f) More than R20 000	Continue
g) Refused	Continue

D2. Gender of respondent

c) Male	
d) Female	

D3. How old are you?

a) 16-24 years old	
b) 25-29 years old	
c) 30-34 years old	
d) 35-39 years old	
e) 40-44 years old	
f) 45-49 years old	
g) 50-54 years old	
h) 55-59 years old	
i) 60 or older	

D4. Which Province do you live in?

a) Gauteng	
b) Eastern Cape	
c) Western Cape	
d) Northern Cape	
e) Limpopo	
f) Mpumalanga	
g) North West	
h) Free State	
i) Kwazulu-Natal	