



The prevalence of cost-focused innovation in the development of products for low income markets

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ABSTRACT

Cost-focused innovation is perceived as the primary approach that Western companies should adopt when entering emerging markets, as their standard approaches are usually unsuitable for these environments. Although many of the principles of cost-focused innovation are relevant to these markets, companies should be wary of blindly copying previous entrants with regard to how they develop products for these markets. Each industry and product set will need to deal with a different set of factors, especially in developing environments that are constantly evolving. The aim of this research study is to gauge the prevalence of a cost-focused innovation approach in developing products for emerging markets.

A quantitative approach was used in order to determine if there is statistical evidence that confirms that a cost-focused innovation methodology is prevalent in designing products for low income markets. The mobile phone industry was selected for investigation as handset manufacturers have successfully created mobile phones for both developed and developing markets.

The major findings were that cost-focused innovation is not significantly prevalent in developing mobile phones for low income markets. Furthermore, there is evidence that suggests that a combination of innovation approaches may be used to counter the traditional trade-offs between price and functionality in order to create low cost, high value products for both developing and developed markets.

KEYWORDS: cost-focused innovation; low income markets; product development

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.

Mellisa Naidoo

9 November 2011

Date

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To all the saints and angels whose prayers have kept me sane and given me the patience and courage when it was needed most.

To Mom: Thank you for accepting that I needed to do this.

To Dad: Thank you for encouraging me to take this on.

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*To everything there is a season, and a time to every purpose under the heaven
(Ecclesiastes 3:1).*

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CHAPTER 1

1.1. Definition of the Problem

CEOs and top management teams of large corporations, particularly in North America, Europe and Japan, acknowledge that globalisation is the most critical challenge they face today (Khanna, Palepu & Sinha, 2005). With developed world markets becoming increasingly saturated, multinational corporations (MNCs) have turned to emerging economies such as India, Indonesia, Brazil, China, and Mexico, as key locations for future growth (London & Hart, 2004).

When entering these emerging economies, most companies have stuck to the strategies they have traditionally deployed, which emphasise standardised approaches to new markets while sometimes experimenting with a few local twists (Khanna et al., 2005). This approach to a large extent has not been successful, because their experience in their home markets have generally not prepared them to meet the aggressive price/performance ratios required by emerging contexts (Hang, Chen & Subramian, 2010). Companies following the Bottom of the Pyramid (BoP) proposition often fail because they overestimate the purchasing power of poor people and set prices too high (Karnani, 2007).

Instead the firms and value chains which are likely to be most successful in these dynamic new markets are those which are emerging in China and India and other developing countries, disrupting global corporate and locational hierarchies of innovation (Kaplinsky et al., 2009). Their approach

is cost-focused, and the strategy is to offer customers around the world dramatically more for less (Zeng & Williamson, 2007).

Taking insights from these emerging companies, the global trend in product innovation for low income countries is to create products that are available in smaller packages, have less functionality and most importantly are affordable. Part of the cost-focused school of thought is the concept of 'reverse innovation' where instead of adding ever more bells and whistles, they strip the products down to their bare essentials (The Economist, 2010). Govindarajan and Trimble (2009) argue that "reverse innovation will become more and more common, and that it presents a formidable organisational challenge for incumbent multinationals head quartered in the rich world." It is widely accepted that a disruptive innovation approach that emphasises the creation of good-enough products to meet basic consumer needs is a sound strategy to reach resource-constrained consumers in emerging markets (Hart & Christensen, 2002). This frame of thinking is substantiated by Table 1 below, which consists of a list of companies, whose products have been successfully in BoP markets.

Table 1: Companies that have been successful in low income markets

Company	Product	Price of product	Conventional price	Reference
GE	Portable Ultrasound Machine	\$15000-\$100000	\$100 000-\$350 000	(Immelt, Govindarajan, and Trimble, 2009)
Tata Nano	Vehicle	\$ 2 200	\$6500	(Tiwari & Herstatt, 2011)
Nokia	Nokia 1100 mobile phone	\$ 15-\$20	\$20 upward	(Sehgal, Dehoff, and Panneer, 2010)
Galanz	Microwave	\$100-\$200	\$500-\$700	(Sull, 2005)
Godrej & Boyce	Fridge	\$70	\$180	(Tiwari & Herstatt, 2011)

Many of the above companies have followed a similar approach to product development as prescribed by Prahalad (2006):

1. The innovation must result in a product or service of world-class quality.
2. The innovation must achieve a significant price reduction — at least 90% off the cost of a comparable product or service in the West.
3. The innovation must be scalable: It must be able to be produced, marketed, and used in many locales and circumstances.
4. The innovation must be affordable at the bottom of the economic pyramid, reaching people with the lowest levels of income in any given society.

Using these guidelines as a proxy other multi-nationals have attempted to enter the emerging market space with the hopes of increasing their market share and revenues while alleviating poverty. However, this ‘cost-focused recipe’ for success does not seem to be a winning formula.

In the mid-1990s Monsanto decided to reinvent the agricultural industry through genetic engineering. As part of this effort, Monsanto saw an opportunity to use genetically modified organisms (GMOs) to address the food and nutrition needs in low-income markets in the developing world (London & Hart, 2004). What Monsanto failed to realise, however, was that low-income farmers in emerging economies typically rely on using saved seed for the next planting season (London & Hart, 2004). As a result, Monsanto's strategy to use sterilised seeds to prevent pirating of the firm's intellectual property upset both these farmers and NGO activists (London & Hart, 2004). Add the negative press and public outcry in Europe around GMOs and the project was bound to fail. This suggests that care should be taken when developing products for low income markets. Price is critical, but product/service design issues cannot be ignored.

1.2. Motivation for the research

Emerging economies with their vast, untapped markets present new growth opportunities for multinational companies willing to accommodate the particular needs of these markets (Hang et al., 2010). As global competition increases, organisations ought actively to pursue the tremendous opportunities for strategic success in emerging economies (Cherian, Crooker & Knight, 2010).

However, doing business with the world's four billion poorest people will require radical innovations in technology and business models (Prahalad & Hart, 2002). Those that have succeeded in emerging markets use different kinds of innovations that have different competitive effects and produce different kinds of

markets (Markides, 2006). Similarly, the contingency theory suggests that there is no optimal strategy for all organisations and posits that the most desirable choice of strategy variables alters according to certain factors (Zott & Amit, 2008). In a resource-constrained environment with volatile factors, circumstances can change dynamically. Companies preparing to enter an emerging market should take insights from their predecessors but should be cognisant that the same approach or strategy may not work in their favour.

The need for this research study is to determine if there is prevalence toward one type of innovation approach when dealing with an emerging/low income market. Even if global companies remain uninterested in the growth offered by the world's lowest income consumers, they will have to pay attention (Sehgal, Dehoff & Panneer, 2010) as products developed for underserved, resource-constrained consumers in emerging markets can move up market to serve consumers in developed countries (Hang et al., 2010). These products are beginning to compete with goods sold in developed countries, a trend that is likely to continue (Sehgal et al., 2010). If Western companies do not develop strategies for engaging across their value chains with developing countries, they are unlikely to remain competitive for long (Khanna et al., 2005).

1.3. Research Scope

The scope of this research study encompasses the type of innovation approach used by mobile handset manufacturers when developing phones for an emerging market. Mobile telephony is one of the few industries that have been successful in both low and high income markets. In particular, this study will

focus on the manufacturers that supply handsets to MTN, one of the leading mobile operators in South Africa.

1.3.1. Emerging Markets

An emerging market (EMs) nation is a developing country whose income levels, gross domestic product (GDP) per capita, human development indices, market institutions, technological sophistication and production efficiencies have not reached developed country standards (Veliyath & Brouthers, 2010). However, unlike most other developing countries, EMs have sizeable domestic demand bases, rapid rates of economic growth and development, institutions capable of supporting expanding market-oriented economies, large human capital bases, and the ability to absorb and assimilate technology (Veliyath & Brouthers, 2010).

Goldman Sachs (2003) predicted that over the next few decades, the growth generated by the large developing countries, particularly the BRICs countries, namely Brazil, Russia, India and China, could have a much larger impact on the world economy than it is now. Between 2000 and 2005, the BRICs contributed roughly 28% of global growth in US dollar terms, and 55% in Purchasing Power Parity (PPP) terms (Goldman Sachs, 2005).

1.3.2. Mobile telephony in Sub-Saharan Africa

Across urban-rural and rich-poor divides, mobile phones connect individuals to individuals, information, markets, and services (Aker & Mbiti, 2010). This is particularly dramatic in rural Africa, where in many places mobile phones have represented the first modern telecommunications infrastructure of any kind (Aker & Mbiti, 2010). Mobile phones have greatly reduced communication costs,

thereby allowing individuals and firms to send and to obtain information quickly and cheaply on a variety of economic, social and political topics (Aker & Mbiti, 2010).

By 2008, 60% of the African population (477 million people) had mobile phone coverage, and an area of 11.2 million square kilometres had mobile phone service – equivalent to the United States and Argentina combined (Aker & Mbiti, 2010). By 2012, most villages in Africa will have coverage, with only a handful of countries – Guinea Bissau, Ethiopia, Mali and Somalia – relatively unconnected from (GSMA, 2008 as cited by Aker & Mbiti, 2010).

South Africa is one of the fastest growing mobile communications markets in the world (South Africa's Telecommunications, 2011). As of 2009, there were over 46.4 million mobile users in South Africa, ranking the country 26th in terms of subscriber numbers (South Africa's Telecommunications, 2011). The mobile landscape is dominated by multinational companies Vodacom and MTN, with the smaller Cell C coming in third position (South Africa's Telecommunications, 2011).

1.3.3. MTN

Incorporated in 1994, MTN Group Limited is a multi-national telecommunications group offering voice and data communications products and services to individuals and businesses (MTN, 2010). MTN has Global System for Mobile Communication (GSM) licences in 21 countries and internet service provider businesses in 13 countries, spanning three continents (MTN, 2010). At the end of December 2010, it had 141.6 million subscribers and

revenue of R114.7 billion (MTN, 2010). MTN's vision is to be the leading telecommunications provider in emerging markets (MTN, 2010). MTN currently operates in 21 countries - South Africa, Swaziland, Zambia, Uganda, Rwanda, Botswana, Nigeria, Ghana, Cameroon, Congo-Brazzaville, Côte d'Ivoire, Benin, Guinea-Bissau, Guinea Conakry, Liberia, Iran, Syria, Sudan, Afghanistan, Yemen, and Cyprus. All of these markets are classified as emerging markets and have both prepaid and postpaid mobile subscribers (MTN, 2010). In South Africa the average prepaid to postpaid customer ratio for MTN is 80:20 (MTN, 2010), indicating that most of the South African market is predominantly prepaid due to the majority of the population fitting into the low income category.

1.3.4. Cost-focused innovation

Cost-focused innovation is an overarching concept that refers to innovation that is emerging from products and services built in an emerging market or built for the emerging market. It is not a scheme to boost profit margins by squeezing the bones out of suppliers' bones (Sehgal et al., 2010). Instead cost discipline is an intrinsic part of the process. Rather than simply cutting existing costs (Sehgal et al., 2010) this approach is cost-focused in terms of design from the outset. It seeks to avoid needless costs in the first place and recognises that merely removing features from existing products to sell them cheaper in emerging markets is a losing game (Sehgal et al., 2010).

Cost-focused innovations typically result in products that may seem inferior compared with established technologies, in that they may not offer a wide range of features, or they may be smaller or made of less expensive materials (Hang

et al., 2010). However, these products are characterised by other features, such as low cost, small size, or simplicity of use, that make them accessible and attractive for a lower-end market or niche market (Hang et al.,2010). This innovation approach can provide sustained growth, but it requires imagination and flexibility in creating products that meet these consumers' needs at a price they can afford (Hang et al., 2010).

1.4. Conclusion

Consumers in emerging/low income markets want quality products and any company that can supply those products at the right price will gain their business (Pitta, Guesalaga & Marshall 2008). Companies based in these markets already have a 'home-town advantage' with their competencies grounded in a resource-constrained environment. These aspiring giants are about much more than low cost (Williams, Omar & Ensor, 2011). The best of the pack are proving as innovative and expertly run as any in the business, astutely absorbing global consumer trends and technologies and getting new products to market faster than their competitors (Williams et al., 2011). This research investigates the processes needed to develop successful products for low income consumers.

Chapter 2: Literature Review

2.1. Introduction

Low-income markets present a prodigious opportunity for the world's wealthiest companies to seek their fortunes and bring prosperity to the poor (Prahalad & Hart, 2002). However, a new philosophy of product development and innovation that reflects the realities of the BoP markets will be needed (Prahalad, 2006). This philosophy must represent a different perspective from those that we have grown accustomed to serving in Western markets (Prahalad, 2006).

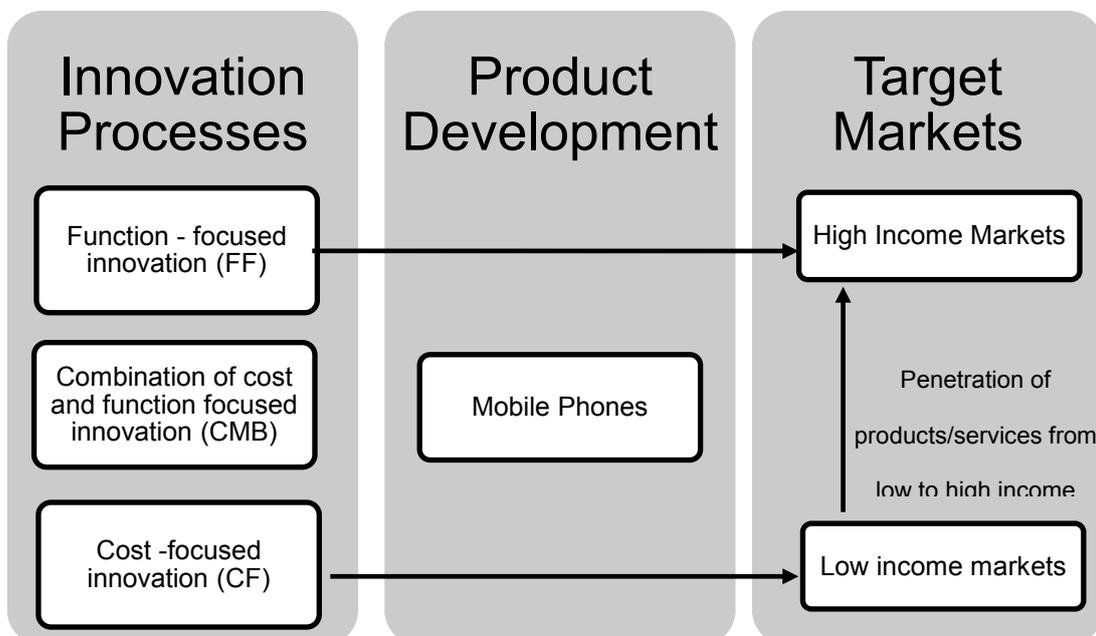
Unlike the new product development process that is practiced in industrialised countries, international companies wanting to be successful in less developed countries should start with the customers' affordability and value-added point of view and then work backwards to develop products/services for these countries (Chandra & Neelankavil, 2008). Even with this alternative approach to developing products for low income markets, there has been a strange disconnect: low income consumers have shown little interest in companies' basic-needs products. This happens even when companies send anthropologists and research and development (R&D) teams into slums and villages to create products and business models tailored to local conditions (London & Hart, 2011).

Although low price is a requirement to secure the business of low income consumers, consumers want more than the bare essentials. With the economic crisis, the reverse may also be true. Wealthier customers who traditionally sought out products or services for their functionality may find themselves becoming more sensitive to price.

The question therefore is whether there is only one innovation approach that applies to low income markets, as prescribed by BoP experts, or whether there are alternative approaches. The same applies to high income or developed markets, as products being created in emerging markets are successfully making their way to developed markets. Examples include the Tato Nano, GE's handheld electrocardiogram and freight containers from the China International Marine Containers Group (CIMC).

The ability to develop new products efficiently has become an important consideration in the current atmosphere of constrained budgets and fast-changing environments (Nunez & Lynn, 2010), making firms from countries like China and India increasingly competitive in both developing and developed markets.

Figure 1: Summary of literature review

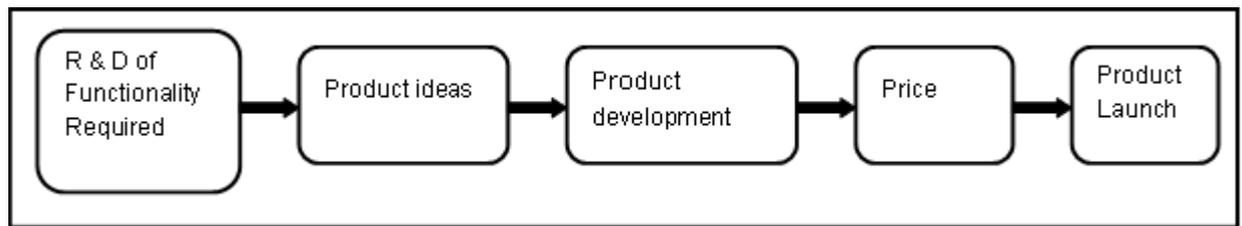


2.2. Innovation in developed markets: a function-focused approach (FF)

Historically, product development and innovation have been the strong points of companies from fully industrialised countries who through R&D or merger and acquisitions are able to introduce new products that were then marketed globally (Chandra & Neelankavil, 2008). According to Pitta et al., (2008), the “top of the pyramid” (ToP) approach is at the heart of Western business practices which mainly focuses on identifying and exploiting existing market opportunities (London & Hart, 2011). The innovation process used in these industrialised countries is based on exploiting a company’s current competencies and resources by using specific information that provides a deeper understanding of current customers and competitors to ensure efficiency of organisational actions (Kim & Gima, 2010).

Once the opportunity is identified by an observant entrepreneur or firm, standard business development approaches apply (London and Hart, 2011). Referred to as Mode 1 or supply side innovation, producers make guesses (sometimes more informed than others) on what they think their final users will value (Kaplinsky et al., 2009). On the supply side, a firm’s technologies enable it to provide certain benefits through the attributes of its products (Danneels, 2002).

Figure 2: Function-focused innovation



Source: (Adapted from Chandra & Neelankavil, 2008: Figure 2, Product Development Process)

Function-focused innovation systems are dominant in developed countries, and are used by multinationals to create new products. An implicit premise of this approach is that more functionality means higher prices. When products are targeted for less developed markets certain functionality is removed from the company's existing products in order to make them more affordable for developing markets.

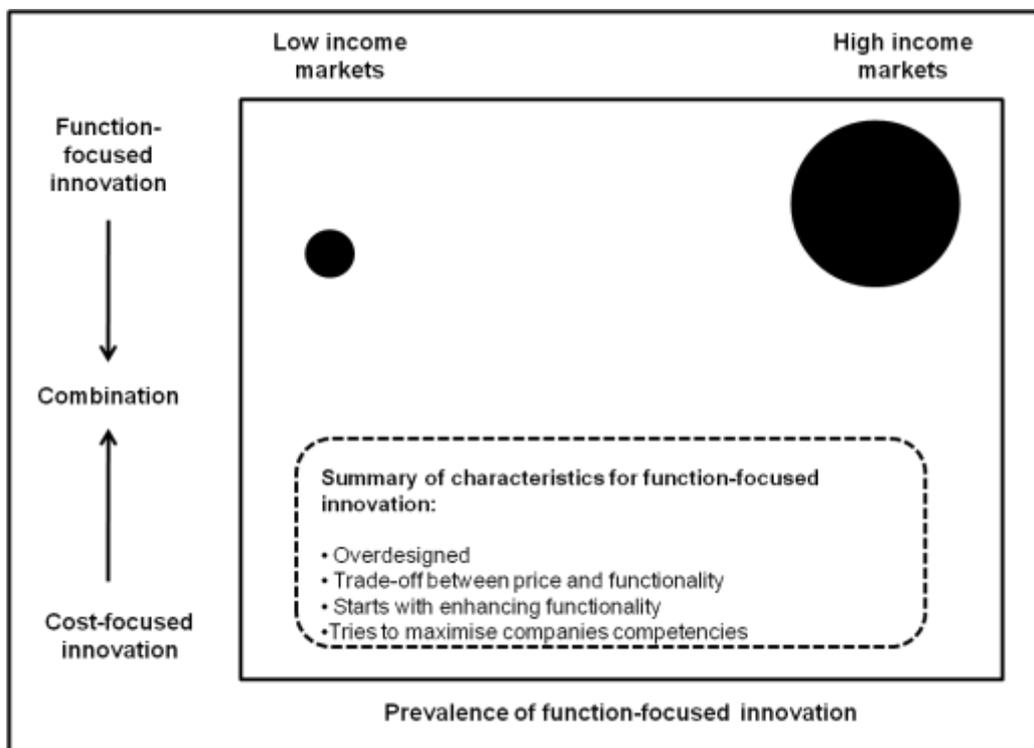
According to Kaplinsky et al. (2009), this approach is somewhat ignorant of the needs of consumers at the bottom of the pyramid and often demonstrates a lack of the technologies and organisational structures needed to meet these needs effectively. Low-end products are often simply a poorer version of a more luxurious one: they pretend to keep the same meaning as their more affluent siblings, but their functions and quality are simply debased (Verganti, 2009).

CEMEX's Patrimonio Hoy, for example started with an approach based primarily on incrementally modifying its top-of-the-pyramid business model (London & Hart, 2011). The venture's first pilot, based on conversations with its existing distributor network, involved providing its existing product in smaller

and more affordable sizes (London & Hart, 2011). The launch was a complete failure.

However, there have been instances in the BoP market where this approach has worked, for example the idea of selling in sachets to BoP has been popularised by Hindustan Lever Limited (HLL), the Indian unit of the Anglo-Dutch consumer products group, Unilever. HLL's strategy was to develop a rural network of women who sold several of their products, typically soap and detergent in small sachets door-to-door in more than 100,000 villages (Subrahmanyam & Arias, 2008). The approach that worked for one company in a low-income market does not necessarily mean success for another company using the same approach.

Figure 3: Summary of function-focused innovation



Recognising that the functionality required in products or services in the BoP market might be different from that available in the developed markets is a critical starting point. In fact developers must start from this perspective and look for anomalies from their prior expectations based on their experiences with developed markets (Prahalad, 2006).

2.3. Innovation in developing markets: a cost-focused approach (CF)

Over the past few years, a second generation of approaches with a markedly different orientation and value proposition has emerged (London & Hart, 2011), which focuses on delivering high value products at low costs for low income markets.

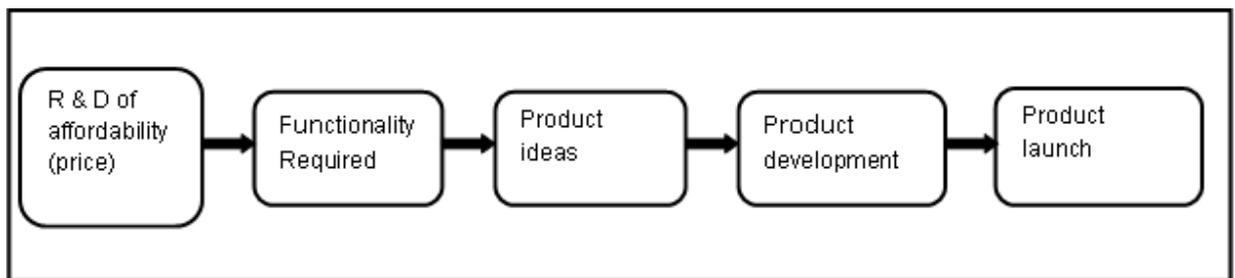
International companies like Tata Motors and Toyota that have also been successful in developing new products for developing countries, have followed a simple rule. How can they design products that are inexpensive to make and affordable to consumers who have limited budgets? (Chandra & Neelankavil, 2008). There simply are not enough resources for the four billion people at the base of the pyramid to mimic 'Western' approaches to economic development (London & Hart, 2004). Companies from resource constrained environments like China and India, have adapted their innovative systems and business models in line with these limited resources and are still able to develop quality, functionally-rich products at a fraction of the cost of products produced in developed countries.

Other companies that have accomplished this feat seem to originate in low income markets or else have production/research facilities in those environments. Companies like General Electric (GE) and Tata Consultancy

Services (TCS) are doing something more exciting than fiddling with existing products: they are taking the needs of the poor consumers as a starting point and working backwards (The Economist, 2010). This is also commonly referred to as “frugal innovation”, the “Gandhian innovation” or “constraint-based innovation” (Tiwari & Herstatt, 2011).

Chandra and Neelankavil (2008) argue that the single biggest constraint in developing products for less developed countries is affordability (price). This is reiterated in Lim, Han and Ito (2009), where they argue that setting a strategic price point from the beginning to attract a large pool of customers is important. However, in order to offer a “cheap” price product for the BoP market, a company should be able to produce a product at “cheap” cost (Lim et al., 2009). Hence the need for a cost-focused approach such as reverse innovation which takes the customer’s affordability into account before deciding on the functionality required or what manufacturing process will be used.

Figure 4: Cost-focused innovation



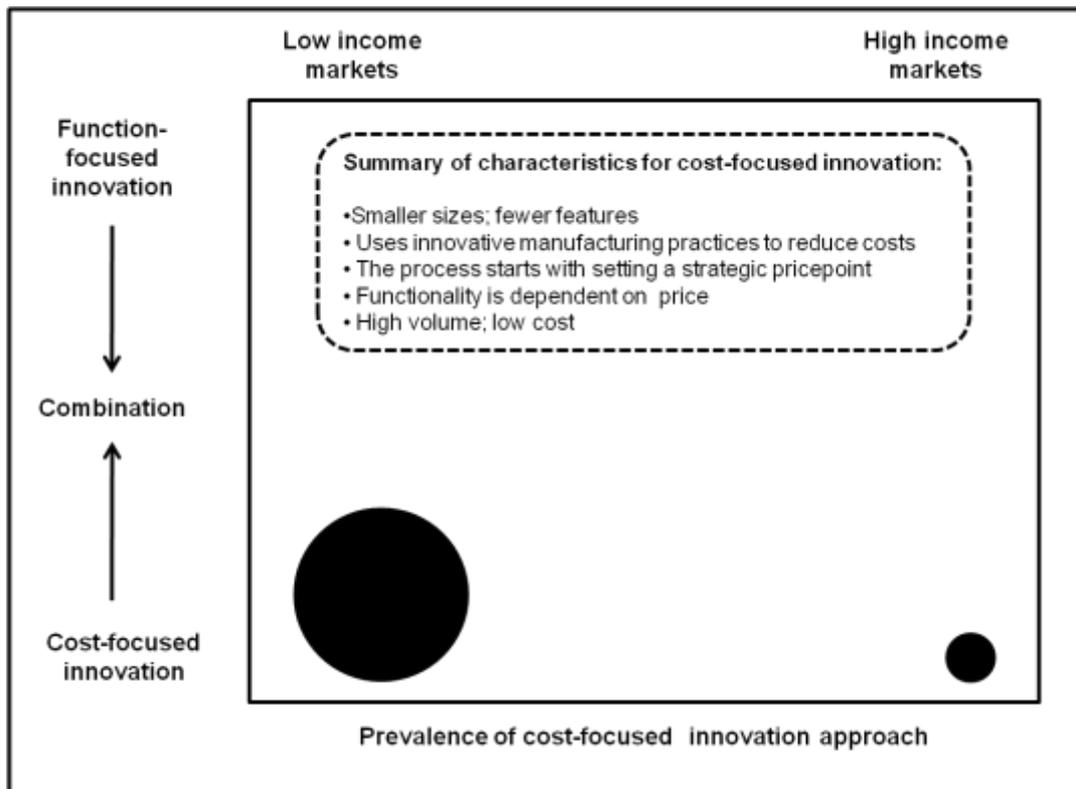
Source: (Adapted from Chandra & Neelankavil, 2008: Figure 2, Product Development Process)

An example of this approach was Nokia’s penetration into the Chinese market. In China, mobile phones with sales prices under 1,000 and 500 Renminbi

(RMB) accounted for 75% and 23% market, respectively (Chang & Horng, 2010). For a low-price mobile phone market, Nokia penetrated the high-quality low-price market in China with several crucial factors including an international name brand, cutting edge R&D on mobile phones, near-zero inventory supply chain business model, reformed channel strategy and bundle service package strategy with telecom operators (Chang & Horng, 2010). Nokia, with the said advantageous position, was able to release mobile phones at 238 RMB while Motorola and Samsung released mobile phones at 300 to 600 RMB (Kao, 2009 as cited in Chang & Horng, 2010).

In contrast to Nokia's success in China, Proctor & Gamble (P&G) suffered massive losses with its water purification product PUR. PUR's powder-based technology was packaged in single-use sachets, a packaging format to which low-income consumers in many developing countries were accustomed (London & Hart, 2011). BoP proponents view sachets and other small packages as an ideal way to tap low-income markets (Jaiswal, 2007). One sachet, which could purify 10 litres of water, retailed for \$0.10 – a price point that was thought to fall within the means of those in the BoP (London & Hart, 2011). The purification process demanded little more than stirring in the packet's contents and waiting five minutes before filtering the water through a clean cloth (London & Hart, 2011). Yet despite hitting on all of the innovation buzzwords that are supposed to deliver success at the BoP, P&G's PUR was a resounding commercial failure (London & Hart, 2011).

Figure 5: Summary of cost-focused innovation



Realising that a cost-focused approach for BoP markets may not be a winning formula poses further challenges for companies attempting to enter low-income markets. Since this is new territory for most companies including those in developing countries, which approach will be successful? It means that organisations will have to engage in exploratory market learning, which entails going beyond their current product knowledge and in doing so offers a variety of strategic choices that provides the firm with greater environmental adaptability (Kim & Gima, 2010).

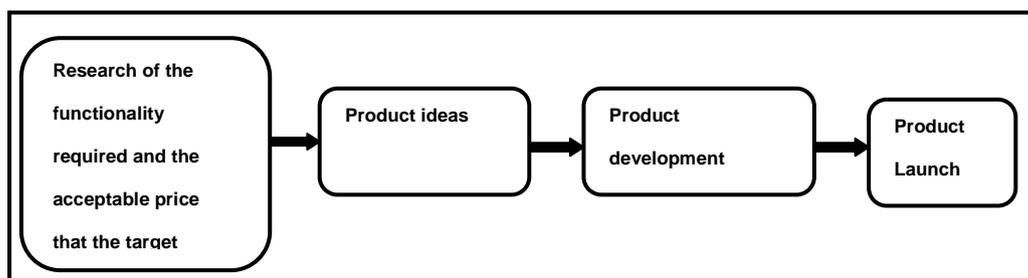
2.4. Combining function-focused and cost-focused innovation (CMB)

In a study conducted by London and Hart (2004) of 24 case studies involving multi-national corporations' successes and failures in emerging markets, they

noted that in successful ventures, the emphasis was on maximising the functionality of the product offering. This often included having the product and business model co-evolve.

This combination of function-focused and cost-focused innovation seems to cancel out the trade-offs between the two approaches. In the function-focused approach, the trade-off is between functionality and price i.e. the more functionality you require the higher the price. Cost-focused innovation is based on innovative processes and materials that yield 'high value, low cost' products that must be sold in high volumes. This combining of innovation techniques is defined by Frenz and Lambert (2010) as 'mixed modes of innovation' which explicitly refer to a set or bundle of activities which are done together by a firm to bring about and market a new product or service, or improve on production, delivery and business processes. By combining the two processes, costs are reduced initially by eliminating and reducing the factors an industry competes on, and later as economy of scale savings due to increased volume materialise (Williams et al., 2011).

Figure 6: A combination of cost and function focused innovation



Source: (Adapted from Chandra & Neelankavil, 2008: Figure 2, Product Development Process)

This approach allows companies like China International Marine Containers Group (CIMC) to own 55% of the global market share of shipping containers (Zeng & Williamson, 2007). Having secured its scale and cost advantages in the production of standard containers (Zeng & Williamson, 2007), CIMC moved onto more sophisticated containers and are able to offer clients a variety of specialist models at low cost.

Another example of using a combined innovation approach is Geely's successful progression within the automobile industry. Unlike the approach followed by other Chinese companies, where components from best selling foreign cars were reverse engineered and copied, the approach pioneered by Geely differed from traditional copying in one important respect: the architecture of the copied product was progressively altered in such a way that the high-level mixing-and-matching of components from different sources become possible (Wang & Kimble, 2010). One of the results is that the engine produced by Geely can now fit into bodies derived from several different foreign models each produced by different manufacturers at one-third of the price (Wang & Kimble, 2010).

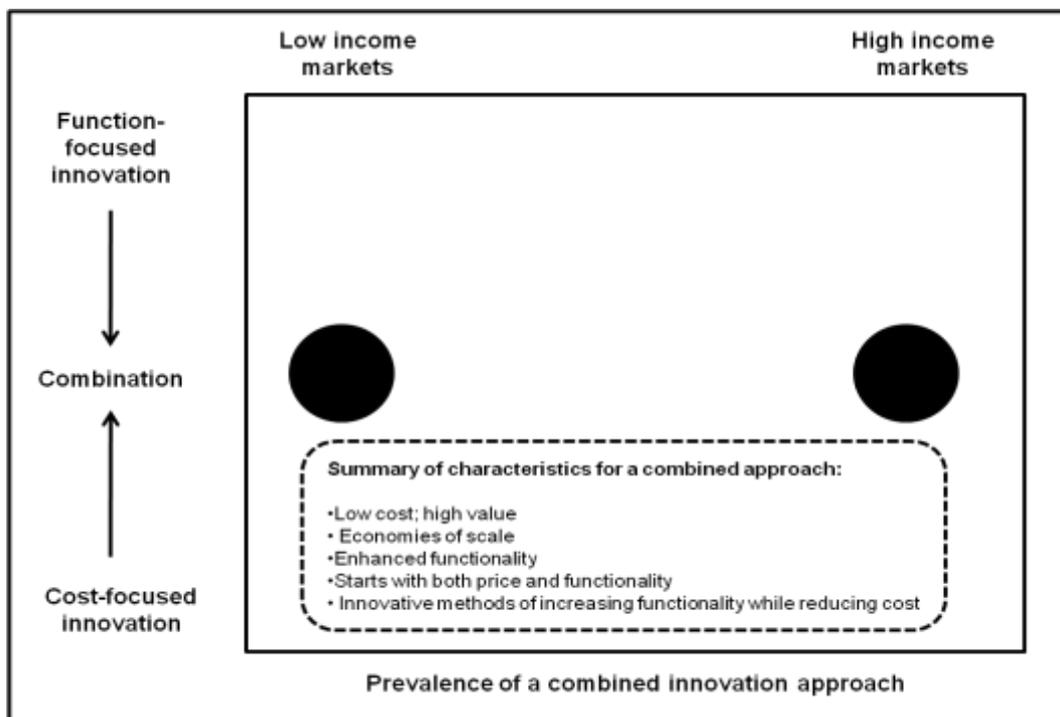
Needless to say, the new product built for the BoP market is higher in quality and provides a better price-performance proposition than its competitors (Prahalad, 2006). When Ratan Tata decided to provide a safe alternative to scooters in India, he understood that the cheapest car available would easily cost five times what a scooter did (Johnson, Christensen & Kagermann, 2008). He also recognised that Tata Motors' current business model could not be used

to develop such a product at the needed price point (Johnson et al., 2008) and so frugal and out-of-the-box engineering were used to create the Tata Nano.

Offering an affordable, safer, all-weather alternative for scooter families was a powerful value proposition, one with the potential to reach tens of millions of people who were not yet part of the car-buying market (Johnson et al., 2008).

The car was introduced in the Indian market in 2008 and costs less than half any other car in the Indian market, including cars from American, European, and Japanese automobile companies being sold in India (Sara & Jackson, 2010). Today, Tata Motors exports its passenger vehicles to Asian and African markets, and is targeting European market with its Tata Nano (Kale, 2011).

Figure 7: Summary of the combination of cost and function focused innovation



The concept of combining innovation approaches challenges the assumption that there is only one approach for developing products for BoP markets. Managing “trade-offs” is a natural element of good product or service creation to achieve the right value proposition for the customer and shareholder (Hull & Collins, 2006). But why make unnecessary trade-offs? In an earlier era, we learned to emphasise speed, quality, or cost, typically at the expense of one another (Hull & Collins, 2006). In a dynamic world, only firms who are able to continually build new strategic assets faster and cheaper than their competitors will earn superior returns over the long term (Danneels, 2002).

2.5. Mobile phone development

Mobile phones are spreading ubiquitously across the planet (Kalba, 2008). With more than three billion subscribers around the world, mobile phones have out-diffused virtually every prior technology, whether television sets, radios, wrist watches, wallets, wire line phones, or bicycles, and have done so in the past 25 years. Mobile phones are now used by about half of the world’s population (Kalba, 2008).

Product innovation in the global mobile phone market has followed a clear pattern (Koski & Kretschmer, 2006). Innovations on the system level (e.g. infrastructure, technological standards) were followed by rapid innovation in various technological components enabling more user friendly product characteristics such as lower weight and longer talk time (Koski & Kretschmer, 2006). As innovations surrounding these characteristics stagnated, a flurry of additional features (e.g. games, ringtones) was introduced (Koski & Kretschmer, 2006).

The dominant handset features arise primarily from two generic product development strategies available for firms (Koski & Kretschmer, 2006) namely vertical or horizontal strategies, which is where function or costs are adapted according to the target market being served. These two strategies are further explained below (Koski & Kretschmer, 2006):

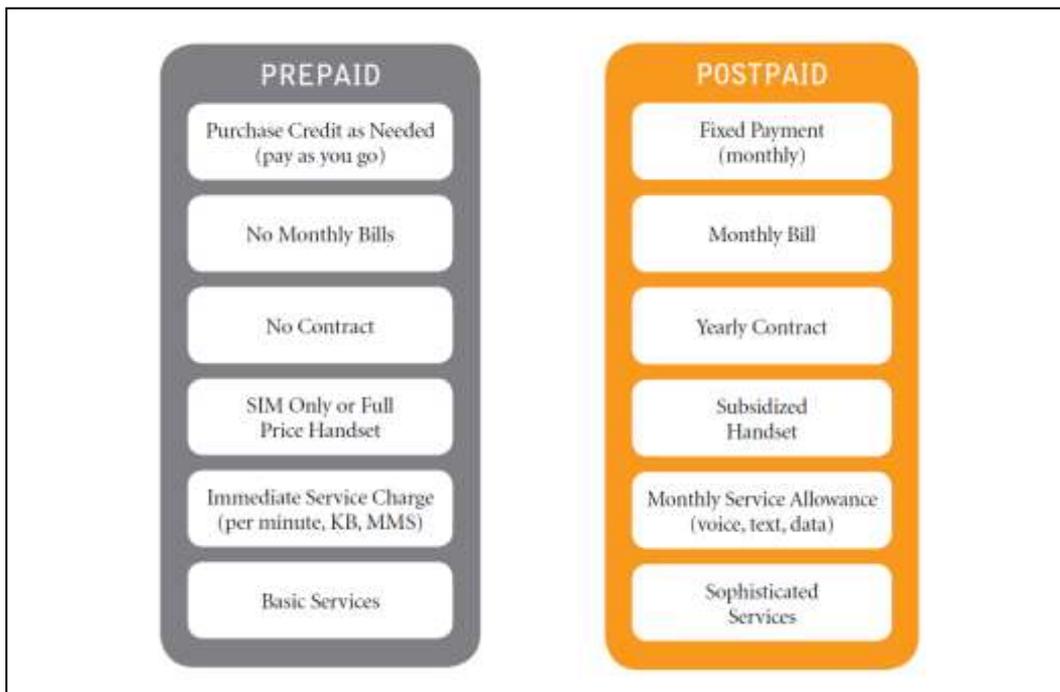
- *Vertical innovation (VI)* establishes a clear quality ranking in the eyes of all consumers; a better product is the one with better individual characteristics. Assuming equal prices therefore, all buyers would choose a product with the attribute(s) of higher “quality” (comparable to a computer with a faster processor).
- *Horizontal innovation (HI)* is less straightforward in its implications for consumer preferences; two products with different added product features (e.g. different styles and colours) appeal to different consumer groups. That is, a specific horizontal innovation will increase the willingness to pay only for some consumers.

Both these development strategies would be used in cost-focused and function-focused innovation. However the degree to which each plays a part in developing phones for low income markets is likely to be dependent on the innovation approach used by a respective firm.

In the emerging market context, handset manufacturers have to develop phones for two distinct markets – prepaid and postpaid (see Figure 8). The

prepaid market is characterised by low income customers who require basic services, using low cost handsets coupled with use of prepaid subscriptions that allow better expenditure control (Barrantes & Galperin, 2008). The reason for this is that low-income consumers have low disposable incomes and therefore do not consume at all or are infrequent buyers of products and services (Anderson & Markides, 2007). On the other hand the postpaid market is characterised by high income customers who require sophisticated services and have a stable income to afford a monthly mobile subscription.

Figure 8: Prepaid and postpaid characteristics for mobile telephony



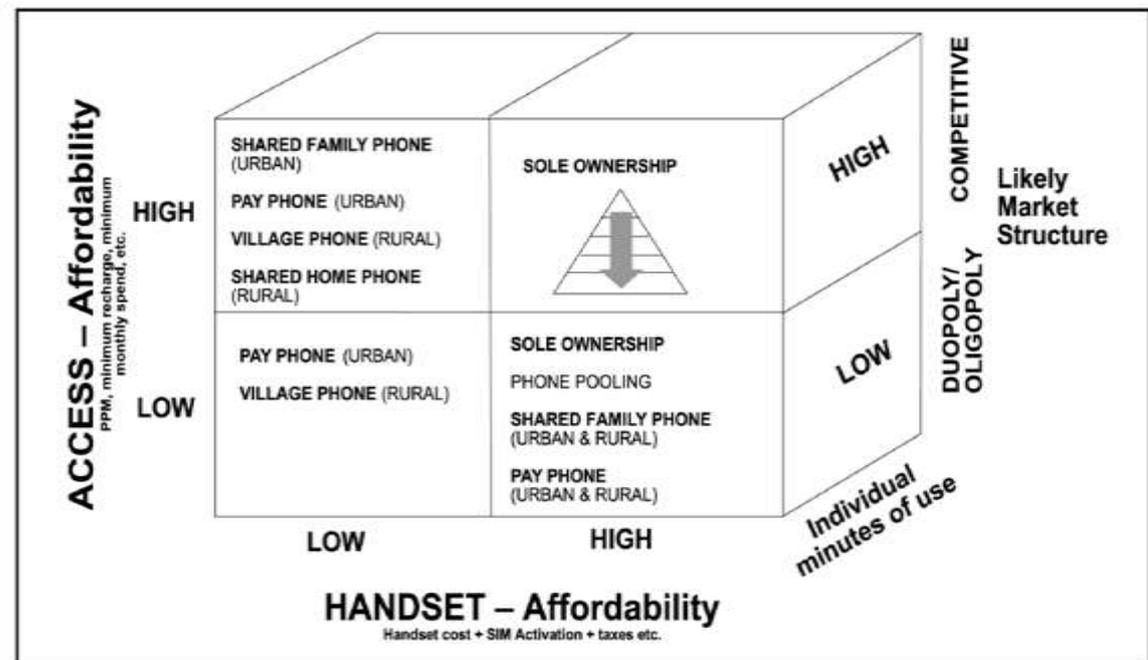
Source: (Amdocs, 2009)

Initially the cost of mobile handsets has been targeted as a significant barrier for poor consumers, but experience from other sectors reveals that this aspect might well have been over-hyped (Anderson, 2007). In countries such as Brazil

and China the ownership of white goods and consumer electronics products such as refrigerators and televisions amongst the poor is quite widespread, helped largely by innovations in consumer credit (especially instalment payments) and a willingness of the poor to allocate spend to life-style enhancing utilities (Anderson, 2007).

This concurrent development of prepaid business models and the development of low cost handsets have made it possible for mobile operators in emerging countries to offer mobile telephony to both low and high income customers by using a combination of business models to those found in Figure 9.

Figure 9: Mobile phone usage models in developing markets



Source: (Anderson, 2007)

Mobile handset manufacturers have responded and oriented production into two distinct processes (Mudambi, 2008). In the first, they build the internal components of the handset, the so-called 'engine' (Mudambi, 2008). In the

second process, the raw engines are customised to the requirements of different service providers and markets (Mudambi, 2008).

This research study will focus on the conceptual stages of the product development process to determine whether prepaid and postpaid phones follow the same innovation development process to be commercialised due to the same company producing goods for two different markets. Product development is defined by Krishnan and Ulrich (2001) as the transformation of a market opportunity and a set of assumptions about product technology into a product available for sale. As discussed in the above, the assumptions regarding the development of prepaid and postpaid phones will be analysed in regards to the markets which they are created for.

2.6. Penetration of products from low to high income markets

In May 2009, General Electric announced that over the next six years it would spend \$3 billion to create at least 100 health care innovations that would substantially lower costs, increase access, and improve quality (Immelt et al., 2009). This was after the success of their handheld electrocardiogram and PC-based ultrasound machine which were highly compact and cost effective whereas previous versions were not. They are also extraordinary because they were originally developed for markets in emerging economies and are now being sold in the United States, where they are pioneering new uses for such machines (Immelt et al., 2009).

Just as all products have meanings, those meanings are not restricted to a particular segment (Verganti, 2009). Some managers confuse design and luxury, thinking that meanings are important only in high-end market segments

or in a thriving economy (Verganti, 2009). In line with this thinking is Theodore Levitt's concept of 'marketing myopia' which focused on the railway industry and its demise due to a lack of keeping up with changing technology and limiting their market. He affirmed that to continue growing, companies must ascertain and act on their customers' needs and desires, not bank on the presumptive longevity of their products (Levitt, 1975) or their markets.

In 1980, the prominent car designer Giugietto Giugiaro was asked to design a low-cost vehicle for Fiat. He created the Fiat Panda a "no frills, big thrills car" (Verganti, 2009). The unconventional styling, simple seating and a cloth interior allowed for rapid assembly and low costs but also gave the car a clear identity, suggesting an all-terrain wagon ready to be used in the country-side (Verganti, 2009). When asked to comment on the success of the Panda, Giugiaro said that "I assumed that people on a limited income would purchase it as their only car. But, from the day it came out, I found that it appealed to professionals as well as elegant ladies from the Turin hills" (Verganti, 2009, p.105).

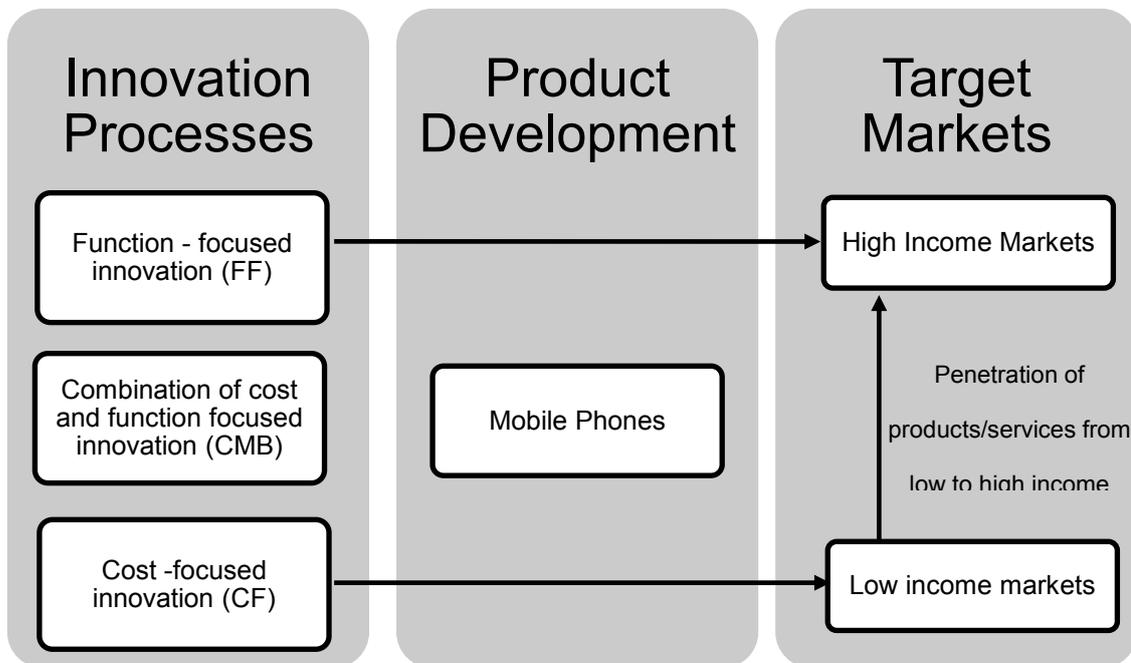
2.7. Conclusion

As illustrated in the above examples, cost-focused innovation is about creating low cost products with great value that are moving upstream from low income to high income markets. In future if companies do intend to use this approach, critical attention to low cost should always be accompanied by a commitment to maximising customer value (Sehgal et al., 2010).

Chapter 3: Research Hypotheses

In Chapter 2, three types of innovation processes were discussed. The first being function-focused innovation which theoretically is found in high income or developed markets. The second process focuses on cost-focused innovation that has prevalence in low income or emerging markets. The third process is a combination of function and cost-focused innovation a recent development in combining innovation processes.

Figure 1: Summary of literature review



When firms enter the BoP space is cost-focused innovation the only approach to use in these markets or are there other options available? In order to test this assumption three hypotheses were developed.

Hypothesis 1: Cost-focused innovation (CF) is prevalent in the development of prepaid mobile phones.

H1₀: CF ≠ PRE

H1_A: CF = PRE

Hypothesis 2: Function-focused innovation (FF) is prevalent in the development of postpaid mobile phones.

H2₀: FF ≠ POST

H2_A: FF = POST

Hypothesis 3: A combination of cost and function focused innovation (CMB) is present in the development of prepaid and postpaid phones

H3₀: CMB ≠ PRE + POST

H3_A: CMB = PRE + POST

Chapter 4: Research Methodology

4.1. Introduction

The objective of the proposed research is to determine if there is prevalence toward a cost-focused innovation approach when developing products for low income markets. Therefore a descriptive, quantitative methodology was used to determine if there is a preference toward a particular innovation approach.

A descriptive study tries to discover answers to the questions who, what, when, where and sometimes how (Blumberg, Cooper & Schindler, 2008). The quantitative aspect provides evidence of the breadth of the proposed hypotheses.

4.2. Motivation for the selected methodology

Mobile handset manufacturers make products for both high and low income markets and have been successful in both spaces. The requirements of each market are different and therefore the innovation process used is assumed to be aligned to these differences. In South Africa there are two segments of customers that are differentiated by their payment options for mobile phones, known as prepaid and postpaid customers.

Prepaid customers are predominantly found in lower income markets that have limited disposable income and prefer to be in control of their spending. They pay for devices and services upfront so as to reduce the occurrence of debt. The devices usually designed for this market have less functionality and therefore are cheaper than their postpaid counterparts.

Postpaid customers are predominantly found in higher income markets or the business sector. These consumers value access and convenience over budget control and will usually sign a contract with a mobile service provider for around 24 months. Handset manufacturers add features and variants to their ranges for this market, as functionality and not price is the qualifying criteria for this market.

In contrast to exploratory studies more formalised studies are typically structured with clearly stated hypothesis or investigative questions (Blumberg et al., 2008). Hence, the selection of a descriptive, quantitative methodology so that the hypotheses previously stated in Chapter 3 could be tested in order to verify the prevalence of a particular approach of innovation in the development of mobile phones for low income markets i.e. phones for prepaid consumers.

4.3. Unit of analysis

The unit of analysis describes the level at which the research is performed and which objects are researched (Blumberg et al., 2008). The unit of analysis for this study was conducted at a mobile handset level. As previously described, this study will focus on prepaid and postpaid handsets in order to determine if there is a disparity with regards to how each handset is developed in relation to their target market.

4.4. Sampling method and sampling size

There are a limited number of mobile handset manufacturers globally, the following companies presently operate in South Africa and are suppliers to the various mobile operators including MTN.

Table 2: Mobile phone manufacturers in South Africa 2010

LG	ZTE
Samsung	Huawei
HTC	Sony Ericsson
Blackberry	Motorola
Nokia	Apple

Most of the companies in Figure 3 have developed phones for both the prepaid and postpaid markets. Both Blackberry and Apple were excluded from the sample as they focus specifically on developing phones for high income customers. ZTE and Huawei were also excluded, as they declined to participate in this research study due to sensitivities around their innovation process. The remaining six handset manufacturers were approached for this study. Of the six companies that were approached only three were able to make the deadline. The companies that participated were Nokia, HTC and Motorola.

4.5. Questionnaire design

Two or three representatives of each company were requested to complete a questionnaire (Appendix A) on six prepaid and six postpaid phones which their respective companies had launched in South Africa during 2010. The representatives were from different functional roles, and were chosen because they may have had somewhat different perspectives on the innovation process.

The questionnaire was designed using literature about the three approaches from Chapter 2. The questionnaire was divided into two parts. Part A consisted

of a 7-point Likert scale which required respondents to answer various statements that were meant to correspond to the three innovation processes under investigation. Part B required respondents to rank the most likely innovation approach used to develop a particular handset. They were given a list of three options that had to be ranked, the first being the most prevalent approach (1), the second was the approach probably used (2) and third was the least likely approach to be used (3).

The prepaid and postpaid handsets were randomly selected from the MTN database for mobile phones sold in 2010. The motivation for choosing handsets from 2010 was that it would still be top-of-mind for the respondents and there would be less sensitivity with regards to the handset manufacturers sharing their company knowledge. The questionnaire was designed to be as brief as possible, so as not to cause respondent fatigue. Many of the respondents had to answer questionnaires on more than one handset.

4.6. Research instrument

The research instrument used in the questionnaire was a 7-point Likert scale. The Likert scale is the most frequently used variation of the summated rating scale (Blumberg et al., 2008). Summated scales consist of statements that express either a favourable or unfavourable attitude toward an object of interest (Blumberg et al., 2008). Because behaviour seems so difficult to assess directly, attitudes are assumed to provide a way of understanding behaviour as it appears (Domino & Domino, 2006). The 7-point scale will allow for more clearly defined options, so that responses have less chance of being

ambiguous. Furthermore, the weighting of each of the values on the scales will be the same.

Each of the three hypotheses were tested using two to three questions framed according to three constructs that represent the three innovation processes. Furthermore, two additional questions were added in order to gauge the perceived level of performance of each handset within their respective segments. This will indicate whether there is any correlation between the innovation process used and the perceived performance of the handset under review.

4.7. Data collection

The questionnaires were delivered via email to the respondents, as many of them had indicated that this was the most accessible method of getting them to respond to the questionnaire. Since the same respondent had to answer questions on more than one phone, the questionnaires were printed out, completed at their leisure and physically collected from their offices. The number of respondents and their questionnaires are listed below:

Table 3: Summary of data collected

Company	Prepaid	Postpaid	Respondents	Number of Cases
Nokia	6	6	3	36
Motorola	6	6	2	24
HTC	6	6	2	24
<i>Total</i>	18	18	7	84

4.8. Data Cleaning

Each of the questionnaires was then assessed for missing data. Part A of the questionnaire did not have any missing data, however not all of the respondents seemed to understand Part B as they did not rank all three processes. They did choose at least one process which they considered the most likely option that was used to design a particular phone. Therefore Part B was coded according to whether respondents chose process A, B or C and appears as Question 11 on the data results.

4.9. Data coding

Once the data was collected it was captured into SPSS software. The prepaid phones were assigned the number 1 and postpaid phones were assigned the number 2 in order to distinguish between the two independent samples. The numeric values of the Likert scale responses from Question 1-10 were captured as is. Part B was coded as 1: cost-focused innovation; 2: function-focused innovation and 3: combination of cost and function focused innovation.

4.10. Data analysis

Data analysis usually involves reducing accumulated data to a manageable amount, developing summaries, looking for patterns and applying statistical techniques (Blumberg et al., 2008).

Of the 84 cases, 42 prepaid and 42 postpaid qualify for statistical analysis using the 'central limit theorem.' This refers to the normality of the data so that certain characteristics may be tested and predicted according to predefined guidelines. Most analysts suggest that $n \geq 30$ as a rule of thumb (Albright, Winston &

Zappe, 2009) is the approximate number of observations/items that qualify a set of data as being 'normal' and therefore the central theorem may be applied.

The following statistical techniques were used on the data using SPSS software:

a) Descriptive statistics were used to describe the basic features of the data in the study (Albright et al., 2009):

- Mean – the average of observations
- Variance – measure of variability between the observations
- Standard deviation – the measure of variability in same units as observations
- Minimum – smallest value
- Maximum – largest value

b) Frequency analysis

The frequency distribution is a record of the number of scores that fall within each response category. This indicated any initial prevalence of the type of innovation that is between the two samples. Cross-tabulations were used in order to understand the relationships between combinations of nominal-level and ordinal-level variables (Blaikie, 2003). Such tables set out, category by category, the extent to which two variables are or are not related (Blaikie, 2003).

c) Cronbach's Alpha

The Cronbach's alpha coefficient was then used to test the internal consistency of the three constructs to determine if they would yield reliable results. If the Cronbach's alpha estimate among the respondents is low, then this implies that the majority of variance in the total composite score is really due to error variance and not true score variance (Osbourne, 2008).

d) Factor Analysis

Factor analysis is designed to identify underlying factors or latent variables present in the patterns of correlations among a set of measures (Blaikie, 2003). The values appear as the factor loadings of the various questions, which is a measure of the contribution an item makes to a particular factor (Blaikie, 2003). It is recommended that only loadings of 0.4 upwards are taken into consideration.

e) Two sample T-test

The t-test is used to test differences in means between two samples. The t-test can be used even if sample sizes are very small, as long as the variables within each group are normally distributed and the variation of scores within the two groups is equal (no reliable differences).

This will allow us to verify the hypotheses stated in Chapter 3.

4.11. Research limitations

Firstly this particular study focuses on the mobile phone industry, and is therefore limited to inferences within this sector. Secondly, even though the suppliers are multinationals that have operations in other developing countries, the data collected pertains to the South African market only. Although the choice of which phone to deploy in which country is a knowledge intensive process, and although typically there is some localisation, the actual design of the phones does not take place in South Africa. Thirdly, some of the respondents may not have sufficient knowledge and understanding of the innovation approaches being investigated. Finally, there may be respondent bias with regards to participants being subjectively positive toward their company and its products.

Chapter 5: Results

5.1. Introduction

There were six handset manufacturers in total that were approached to participate in this study. Each company was requested to complete a questionnaire (Appendix A) for six prepaid and six postpaid phones which their companies had launched in South Africa during 2010. At the cut-off date only three companies' questionnaires were completed. A summary of the companies and their responses appear in the table below.

Table 3: Summary of data collected

Company	Prepaid	Postpaid	Respondents	Number of Cases
Nokia	6	6	3	36
Motorola	6	6	2	24
HTC	6	6	2	24
<i>Total</i>	18	18	7	84

5.2. Reporting of the results

As described in Chapter 4, the questionnaire (Appendix A) consisted of Part A and Part B. The first 10 questions (Part A) were categorised according to the following segmentation in Figure 10 to indicate what construct they are meant to measure. Part B or Question 11 is an additional indicator of whether perceived performance correlates to a particular innovation approach.

Figure 10: Categorisation of questionnaire into hypotheses constructs

		MODEL: <i>Phone X</i>	Strongly disagree			Neither		Strongly agree	
		QUESTIONS	1	2	3	4	5	6	7
CF	1	The (<i>X Phone</i>) was created for a specific target market using the price as a starting point for developing the phone.							
	2	The (<i>X's</i>) functionality was dependent on the price that the target market was willing to pay for it.							
	3	The (<i>X's</i>) functionality had to be redesigned in order to meet the price point that was acceptable to the target market.							
FF	4	The (<i>Phone X</i>) was developed for the target market using the functionality they required from a mobile phone as a starting point.							
	5	The (<i>Phone X</i>) price was dependent on the functionality that was given to the phone.							
	6	The (<i>X</i>) was developed without considering what the costs of manufacturing would be.							
CMB	7	The (<i>X</i>) was developed for a specific target market using both the price and functionality requirements the starting point.							
	8	While developing the (<i>X Phone</i>), innovative ways of increasing functionality were developed while reducing costs at the same time.							
P	9	The (<i>X's</i>) performance exceeded expectations.							
	10	The (<i>X</i>) performed better than other competitor phones in the same segment.							

CF – cost focused innovation; FF – function focused innovation; CMB – combination of cost and function focused innovation; P – Performance

5.3. Descriptive Statistics

5.3.1. Question 1: Price was used as a starting point for developing the handset

Table 4: Descriptive statistics for Question 1

Report

Q1: Innovation process started with price

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.40	42	1.466	2.149	1	7
Postpaid	4.81	42	1.851	3.426	1	7
Total	5.11	84	1.686	2.844	1	7

The prepaid and postpaid groups both have 42 cases each. The prepaid mean of 5.4 is higher than the postpaid mean of 4.81 for this question. The minimum value is 1 and the maximum value is 7 for both groups. The variance score for prepaid of 2.149 is lower than the postpaid score of 3.426 indicating a wider variance in responses for the postpaid group than the prepaid group.

Table 5: Cross-tabulation for Question 1

Cross tabulation

Count

		Q1: Innovation process started with price							Total
		1	2	3	4	5	6	7	
Prepaid or Postpaid	Prepaid	2	1	0	7	3	23	6	42
	Postpaid	3	4	2	8	4	14	7	42
Total		5	5	2	15	7	37	13	84

The following table indicates the frequencies of the responses for prepaid and postpaid. In the strongly agree category of 6-7 there are 29 responses for prepaid and 21 for postpaid.

5.3.2. Question 2: The functionality of the phone was dependent on the price that the target market was willing to pay

Table 6: Descriptive statistics for Question 2

Report

Q2: Functionality was dependent on price

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.36	42	1.605	2.577	1	7
Postpaid	4.83	42	1.873	3.508	1	7
Total	5.10	84	1.754	3.075	1	7

For the second question the prepaid mean of 5.36 is higher than the postpaid mean of 4.83. The standard deviation of the responses from the mean within each group is similar. However, the variance scores of 2.577 and 3.508 for prepaid and postpaid respectively indicate that the responses are varied, particularly for the postpaid group.

Table 7: Cross-tabulation for Question 2

Cross tabulation

Count

		Q2:Functionality was dependent on price							Total
		1	2	3	4	5	6	7	
Prepaid or Postpaid	Prepaid	3	1	0	6	2	24	6	42
	Postpaid	5	0	4	7	5	14	7	42
Total		8	1	4	13	7	38	13	84

The cross-tabulation for Question 2 indicates that in categories 6-7 for high agreement on whether functionality was dependent on price, the combined scores for prepaid and postpaid are 30 and 21 respectively.

5.3.3. Question 3: Functionality had to be redesigned in order to meet the price point

Table 8: Descriptive statistics for Question 3

Report

Q3:Functionality had to be redesigned to meet the required pricepoint

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	4.64	42	1.394	1.943	1	7
Postpaid	4.67	42	1.408	1.984	2	7
Total	4.65	84	1.393	1.940	1	7

The prepaid group has a minimum value of 1 and maximum of 7 whereas the postpaid group has a minimum value of 2 and a maximum value of 7. In this instance the postpaid mean of 4.67 is higher than the prepaid mean of 4.64. The variances for both groups are similar indicating that the responses for the two groups will have similar patterns.

Table 9: Cross-tabulation for Question 3

Cross tabulation

Count

		Q3:Functionality had to be redesigned to meet the required pricepoint							Total
		1	2	3	4	5	6	7	
Prepaid or Postpaid	Prepaid	2	1	3	14	7	14	1	42
	Postpaid	0	4	4	12	6	14	2	42
Total		2	5	7	26	13	28	3	84

As mentioned in the above, the frequency analysis shows a similar pattern for both groups of responses. At the high end of the scale in the 'strongly agree' categories 6-7, the prepaid and postpaid groups have a count of 15 and 16 respectively. On the lower end of the scale of 'strongly disagree' prepaid has 6 counts and postpaid has 8 counts.

5.3.4. Question 4: Functionality was used as a starting point for developing the handset

Table 10: Descriptive statistics for Question 4

Report

Q4:Innovation process started with functionality

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.62	42	1.125	1.266	3	7
Postpaid	5.67	42	1.074	1.154	3	7
Total	5.64	84	1.094	1.196	3	7

For both groups the minimum value is 3 and the maximum is 7. This mean is close to the prepaid mean of 5.62 being slightly lower than the postpaid mean of 5.67. The variance scores however indicate that there is more variance within the prepaid group. Both variance scores are lower than previous questions indicating a clustering around the respective means.

Table 11: Cross-tabulation for Question 4

Cross tabulation

Count

		Q4: Innovation process started with functionality					Total
		3	4	5	6	7	
Prepaid or Postpaid	Prepaid	4	4	1	28	5	42
	Postpaid	1	7	6	19	9	42
Total		5	11	7	47	14	84

The frequency distribution for Question 4 in Table 5.8.2 shows a high count in the 'strongly agree' categories 6-7. Prepaid handsets have 33 case counts, while postpaid handsets have 28. Close to 73% of the sample indicates that they perceive the innovation process for both prepaid and postpaid phones starts with functionality.

5.3.5. Question 5: The price of the phone was dependent on the functionality that the target market required

Table 12: Descriptive statistics for Question 5

Report

Q5: The price was dependent on the functionality required

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.50	42	1.436	2.061	1	7
Postpaid	5.60	42	1.547	2.393	1	7
Total	5.55	84	1.484	2.203	1	7

The postpaid mean of 5.6 is higher than the prepaid mean of 5.5, with the postpaid standard deviation and variance values being higher than the prepaid group. Both groups had minimum values of 1 and maximum values of 7.

Table 13: Cross-tabulation for Question 5

Cross tabulation

Count

		Q5: The price was dependent on the functionality required						Total
		1	3	4	5	6	7	
Prepaid or Postpaid	Prepaid	2	0	8	4	19	9	42
	Postpaid	2	3	4	1	21	11	42
Total		4	3	12	5	40	20	84

The cross-tabulation for Question 5 indicates that on the lower end of the scale of 'strongly disagree' there are 2 counts for prepaid and 5 for postpaid. On the high end of 'strongly agree' there are 28 prepaid phones and 32 postpaid phones, indicating a strong agreement in both groups that price is perceived to be dependent on functionality.

5.3.6. Question 6: The phone was developed without considering the cost of manufacturing

Table 14: Descriptive statistics for Question 6

Report

Q6:Developed without considering the cost of manufacturing

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	3.69	42	1.932	3.731	1	7
Postpaid	4.67	42	1.896	3.593	1	7
Total	4.18	84	1.965	3.859	1	7

The postpaid mean of 4.67 is higher than the prepaid mean of 3.69. The variance scores are high in both groups indicating a high variance in the responses of both groups.

Table 15: Cross-tabulation for Question 6

Cross tabulation

Count

		Q6:Developed without considering the cost of manufacturing							Total
		1	2	3	4	5	6	7	
Prepaid or Postpaid	Prepaid	8	5	8	5	4	11	1	42
	Postpaid	6	1	3	4	9	15	4	42
Total		14	6	11	9	13	26	5	84

The frequency distribution for Question 6 shows two main indicators. On the lower end of the scale for 'strongly disagree' in categories 1-3, there are 21 cases for prepaid and 10 cases for postpaid. On the other end of the scale in categories 6-7 of 'strongly agree' the count is 12 for prepaid and 19 for postpaid.

5.3.7. Question 7: Both price and functionality were used as a starting point for developing the phone

Table 16: Descriptive statistics for Question 7

Report

Q7: Innovation process started with both price and functionality

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.64	42	.850	.723	3	7
Postpaid	5.48	42	1.174	1.377	3	7
Total	5.56	84	1.022	1.045	3	7

The descriptive statistics for Question 7 indicate a minimum value of 3 and a maximum value of 7 for both groups of phones. The prepaid mean of 5.64 is higher than the postpaid mean of 5.48. The standard deviation for prepaid is relatively low indicating that most of responses do not deviate too far from the mean and the variance score of 0.723 confirms a clustering of the responses around the mean.

Table 17: Cross-tabulation for Question 7

Cross tabulation

Count

		Q7: Innovation process started with both price and functionality					Total
		3	4	5	6	7	
Prepaid or Postpaid	Prepaid	1	4	7	27	3	42
	Postpaid	2	9	6	17	8	42
Total		3	13	13	44	11	84

The frequency analysis for Question 7 indicates 30 cases in prepaid and 25 in postpaid that 'strongly agree' that the innovation process started with price and functionality. That equates to 65% of the total number of phones that were used in the study.

5.3.8. Question 8: Innovative ways of increasing functionality were developed while reducing costs

Table 18: Descriptive statistics for Question 8

Report

Q8: Innovative ways of increasing functionality were developed while reducing costs

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.64	42	1.265	1.601	1	7
Postpaid	5.48	42	1.292	1.670	3	7
Total	5.56	84	1.274	1.623	1	7

The descriptive statistics for Question 8 reveal similar results and the same means in the prepaid and postpaid groups as found in Question 7. However, the standard deviation and variances are higher than in the previous question. Furthermore the postpaid minimum value is 3 for this question with a maximum value of 7.

Table 19: Cross-tabulation for Question 8

Cross tabulation

Count

		Q8: Innovative ways of increasing functionality were developed while reducing costs						Total
		1	3	4	5	6	7	
Prepaid or Postpaid	Prepaid	1	3	2	4	25	7	42
	Postpaid	0	6	2	9	16	9	42
Total		1	9	4	13	41	16	84

Similar to Question 7 there are a high number of cases toward categories 6-7 on the scale that indicates 'strong agreement'. In the prepaid group there are 32 cases and in the postpaid group there are 25 cases indicating that the case

responses have a high level of perceived agreement that functionality was increased while reducing costs for both groups of phones.

5.3.9. Question 9: The phone's performance exceeded expectations

Table 20: Descriptive statistics for Question 9

Report

Q9:The phone's performance exceeded expectations

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.52	42	1.174	1.377	3	7
Postpaid	5.29	42	1.312	1.721	3	7
Total	5.40	84	1.243	1.545	3	7

Both groups have a minimum value of 3 and a maximum value of 7 for this question. The mean for prepaid of 5.52 is higher than the mean for postpaid of 5.29. However, the variance of 1.377 for prepaid is lower than for postpaid at 1.721 indicating a higher variance in the postpaid group.

Table 21: Cross-tabulation for Question 9

Cross tabulation

Count

		Q9:The phone's performance exceeded expectations					Total
		3	4	5	6	7	
Prepaid or Postpaid	Prepaid	1	10	7	14	10	42
	Postpaid	5	9	4	17	7	42
Total		6	19	11	31	17	84

The frequency analysis of Question 9 shows a high number of cases in both groups within the 'strongly agree' categories 6-7. There are 24 cases for both prepaid and postpaid. This indicates a 57% agreement that the phones exceeded expectations.

5.3.10. Question 10: The phone performed better than other competitor phones in the same category

Table 22: Descriptive statistics for Question 10

Report

Q10: The phone performed better than other competitor phones in the same category

Prepaid or Postpaid	Mean	N	Std. Deviation	Variance	Minimum	Maximum
Prepaid	5.45	42	1.173	1.376	3	7
Postpaid	5.43	42	1.532	2.348	3	7
Total	5.44	84	1.356	1.840	3	7

The prepaid mean of 5.45 is slightly higher than the postpaid mean of 5.43. Both groups have a minimum value of 3 and a maximum value of 7. The postpaid group has a higher variance value of 2.348 indicating that the responses are spread across the scale.

Table 23: Cross-tabulation for Question 10

Cross tabulation

Count

		Q10: The phone performed better than other competitor phones in the same category					Total
		3	4	5	6	7	
Prepaid or Postpaid	Prepaid	2	9	7	16	8	42
	Postpaid	7	7	4	9	15	42
Total		9	16	11	25	23	84

As per Question 9 the case counts are the same for both prepaid and postpaid with 24 cases in each group.

5.3.11. Question 11: The most likely innovation process used

Question 11 was found in Part B of the questionnaire, where respondents were asked to select the most likely innovation approach used and was given three options to choose from. The number of cases is 84(N) and the range was limited to 1-3. The mean value is 1.82 which closely represents function-focused innovation which was allocated the number 2. The standard deviation of 0.76 indicates a clustering around the mean or function-focused innovation. The variance of 0.629 indicates little variance amongst the responses.

Table 24: Descriptive statistics for Question 11

Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Q11: The most likely innovation process used	84	1.00	3.00	1.8214	.76301	.582
Valid N (listwise)	84					

The frequency analysis for Question 11 reveals the most likely used innovation approach amongst the two groups. For prepaid handsets there are 19 cases for cost-focused innovation, 15 for function-focused innovation and 8 for a combination of the previous two processes. In the postpaid group there are 14 cases under cost-focused innovation, 18 under function-focused innovation and 10 under the combined process. The highest number of cases appears under both cost-focused and function-focused innovation with 33 cases each. The combined innovation process only has 18 counts.

Table 25: Cross-tabulation for Question 11

Cross tabulation

Count

		Q11: The most likely innovation process used			Total
		A) Cost Focused Innovation (CF)	B) Function Focused Innovation (FF)	C) Combination of Cost and Function Focused Innovation (CMB)	
Prepaid or Postpaid	Prepaid	19	15	8	42
	Postpaid	14	18	10	42
Total		33	33	18	84

5.4. Testing the construct reliability using Cronbach's alpha

The next phase of data analysis involved testing each of the constructs using Cronbach's alpha. Each if the constructs consists of multiple items as described in Chapter 4, as a multiple item construct is more reliable than a single item construct. Each individual item must measure something that has an underlying, quantitative measurement continuum (Gliem and Gliem, 2003), and add some weighting to the construct under study.

The first construct that was tested using Cronbach's alpha was for cost-focused innovation which consisted of Questions 1-3. The result of 0.818 indicates a strong internal consistency amongst the items used for the cost-focused innovation construct.

Table 26: Cronbach's alpha score for cost-focused innovation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.818	.814	3

The item statistics for the 'cost-focused innovation' construct in Table 5.16.2 indicates that Cronbach's alpha would be reduced if Questions 1 and 2 were deleted, indicating that they contribute to this construct in some way. However, if Question 3 is deleted then the Cronbach's alpha would increase indicating that either this question does not fit well into this construct or could be sharing its factor loading with another construct in the questionnaire.

Table 27: Item statistics for cost-focused innovation

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1: Innovation process started with price	9.75	7.852	.697	.608	.723
Q2: Functionality was dependent on price	9.76	6.762	.816	.684	.585
Q3: Functionality had to be redesigned to meet the required pricepoint	10.20	10.525	.533	.340	.875

The second construct to be tested for reliability was function-focused innovation which consisted of Questions 4-6 in the questionnaire. Cronbach's alpha is 0.170 which is a weak internal consistency score.

Table 28: Cronbach's alpha score for function-focused innovation

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.170	.178	3

On further investigation the item statistics in Table 5.16.4 reveal that two of the questions have negative scores which violate reliability model assumptions. Furthermore if Question 5 is deleted then Cronbach's alpha increases, indicating that it is either sharing its factor loading with another construct or should not be part of this construct.

Table 29: Item statistics for function-focused innovation

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q4: Innovation process started with functionality	9.73	5.719	.243	.179	-.120 ^a
Q5: The price was dependent on the functionality required	9.82	6.799	-.105	.021	.513
Q6: Developed without considering the cost of manufacturing	11.19	2.927	.208	.165	-.322 ^a

The final construct for a combination of cost- and function-focused innovation only consisted of two items, Questions 7-8. Cronbach's alpha was not run on this construct as there were needs to be between three or more items to accurately test for internal consistency.

5.5. Factor analysis

In light of the Cronbach's alpha results the items were run through a factor analysis which is designed to identify underlying factors or latent variables present in the patterns of correlations among a set of measures (Blaikie, 2003). The results appear in Table 5.17 with the factor loadings of the various questions, which are a measure of the contribution an item makes to a particular factor (Blaikie, 2003). The factor analysis included a varimax rotation which excludes items of below 0.4 that may appear to contribute to more than one factor (Blaikie, 2003).

Table 30: Factor analysis-rotated component matrix

Rotated Component Matrix^{a,b}

	Construct			
	1 -CF	2-CMB	3-NEW	4-FF
Q1: Innovation process started with price	.832			
Q2: Functionality was dependent on price	.883			
Q3: Functionality had to be redesigned to meet the required pricepoint	.659			
Q4: Innovation process started with functionality			-.631	.526
Q5: The price was dependent on the functionality required		-.780	.424	
Q6: Developed without considering the cost of manufacturing				.943
Q7: Innovation process started with both price and functionality		.859		
Q8: Innovative ways of increasing functionality were developed while reducing costs			.878	

The grouping revealed four constructs. Construct 1 contains the factor loadings for Questions 1-3 which corresponds to the cost-focused (CF) innovation construct. Construct 2 only has the factor loading from Question 7 which uses price and functionality as a common starting point and is representative of the combined innovation construct (CMB). Construct 3 (NEW) is a new edition and consists of Question 5 and Question 8. Construct 4 has the factor loadings for Questions 4 and 6 which corresponds to the function-focused innovation construct (FF).

The factor analysis has proposed four constructs whereas the initial hypotheses were designed to test three specific constructs. Therefore Construct 3 (NEW)

which consists of Questions 5 and 8 will be excluded from further statistical analysis but does warrant further discussion in Chapter 6.

5.6. T-test for independent samples

Due to the regrouping of the questions the following means were tested using a t-test to determine if there was a variance between the prepaid and postpaid phones.

- Question 1-3 (Cost-focused innovation)
- Question 4 and 6 (Function-focused innovation)
- Question 7 (Combination of cost and function focused innovation)

Table 31: T-test for cost-focused innovation (CF)

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Cost-focused innovation (Q1-Q3)	Equal variances assumed	2.176	.144	1.412	82	.162
	Equal variances not assumed			1.412	78.030	.162

The F statistic for cost-focused innovation is 2.176 with a significance value of 0.144. The p value is 0.162 which means the null hypothesis cannot be rejected.

Table 32: T-test for function-focused innovation (FF)

		Independent Samples Test				
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Function-focused innovation (Q4+Q6)	Equal variances assumed	.107	.744	-1.517	82	.133
	Equal variances not assumed			-1.517	81.720	.133

The F-statistic for function-focused innovation is 0.107 with a significance value of 0.744. The p-value of 0.133 is above the 0.001-0.005 level of confidence, therefore the null hypothesis may not be rejected. However, the descriptive statistics showed that the relationship is as expected, and given the relatively limited sample, it is likely that the p-value could have been significant with a greater number of responses.

Table 33: T-test for a combination of cost and function focused innovation (CMB)

		Independent Samples Test				
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Q7: Innovation process started with both price and functionality	Equal variances assumed	8.237	.005	.745	82	.458
	Equal variances not assumed			.745	74.744	.458

This t-test has a high F-statistic of 8.237 with a significance value of 0.005. The p-value is 0.458, which indicates that the null hypothesis cannot be rejected.

5.7. Lack of correlation between perceived performance and the innovation process used in development

Table 34: Correlation matrix for Question 9, 10 and 11

Correlations

		Q9:The phone's performance exceeded expectations	Q10:The phone performed better than other competitor phones in the same category	Q11:The most likely innovation process used
Q9:The phone's performance exceeded expectations	Pearson Correlation	1	.708**	.141
	Sig. (2-tailed)		.000	.202
	Sum of Squares and Cross-products	128.238	99.024	11.071
	Covariance	1.545	1.193	.133
	N	84	84	84
Q10:The phone performed better than other competitor phones in the same category	Pearson Correlation	.708**	1	.100
	Sig. (2-tailed)	.000		.364
	Sum of Squares and Cross-products	99.024	152.702	8.607
	Covariance	1.193	1.840	.104
	N	84	84	84
Q11:The most likely innovation process used	Pearson Correlation	.141	.100	1
	Sig. (2-tailed)	.202	.364	
	Sum of Squares and Cross-products	11.071	8.607	48.321
	Covariance	.133	.104	.582
	N	84	84	84

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation scores between perceived performance and the innovation process indicate two results. The first score being obvious and confirms the correlation between exceeding expectations and outperforming competitors. While the second set of scores of 0.202 and 0.364 indicates no correlation between perceived performance and the type of innovation process that was used.

5.8. Summary of results

In summary the table below depicts the frequency of the cases with regards to the type of innovation selected for each group of phone.

Figure 11: Bar graph of Question 11

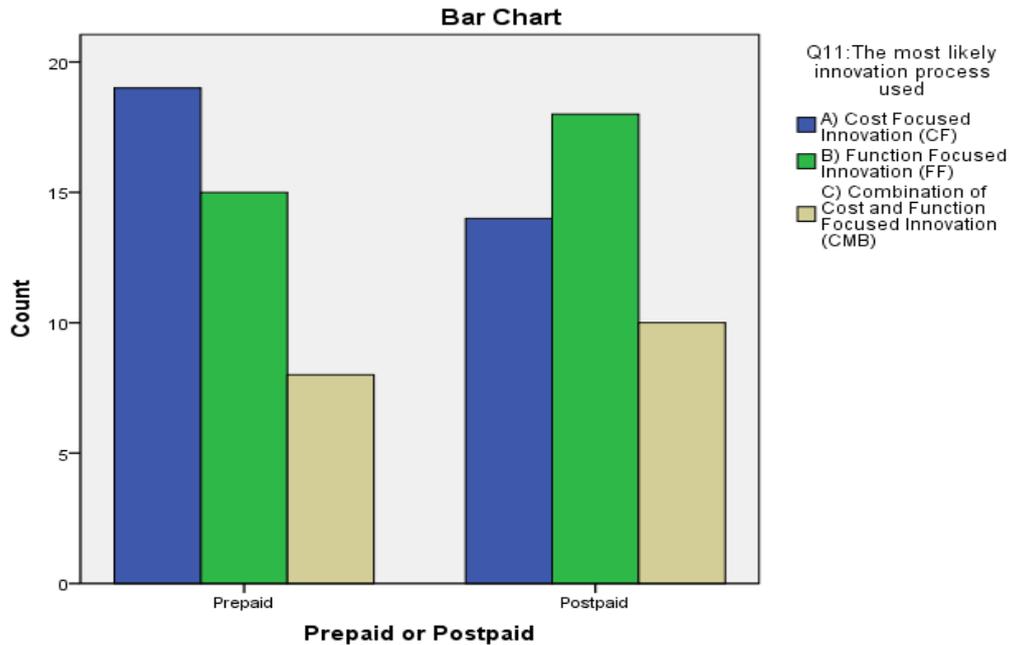


Table 35: Summary of results

Hypothesis	Result
Hypothesis 1: Cost-focused innovation is prevalent in the development of prepaid mobile phones	Do not reject the null hypothesis
Hypothesis 2: Function-focused innovation is prevalent in the development of postpaid mobile phones.	Do not reject the null hypothesis
Hypothesis 3: A combination of cost- and function-focused innovation is present in the development of prepaid and postpaid phones	Do not reject the null hypothesis

Chapter 6: Discussion of the Results

6.1. Introduction

The purpose of this chapter is to determine possible insights and explanations that correspond to the results found in Chapter 5. The data will be unpacked using the literature review in Chapter 2 in order to draw inferences. Furthermore, any challenges experienced with the data will also be discussed.

6.2. Challenges with data

From the results that appear in Chapter 5, there seems to be a few challenges with regards to the data collected for this research study. Each of those challenges will now be discussed.

6.2.1. Participant-initiated error

Participant-initiated error occurs when participants fail to answer fully and accurately – either by choice, or because of inaccurate or incomplete knowledge (Albright, et al., 2009). In this case some respondents were unclear that they had to rank all three innovation approaches for Part B of the questionnaire. Most respondents chose at least one approach, however this altered how the data was analysed for the final results. To some degree the respondents were unable to clearly ‘agree’ or ‘disagree’ with certain statements because of lack of knowledge regarding the innovation processes used in their companies. This is plausible, as most handset manufacturers are not based in South Africa.

6.2.2. Bias toward a particular group of handset manufacturers

Since only three of the six manufacturers participated in this study the results would be skewed toward those specific companies. Furthermore, the individual respondents of those companies may have deliberately answered more favourably as it was their own company's handsets that were under investigation.

6.2.3. Cronbach's alpha

Even though Cronbach's alpha indicated a high level of internal consistency for the cost-focused innovation construct (Question 1-Question 3), the item statistic identified that Question 3 had some trouble fitting into the construct. The question revolved around redesigning functionality to meet a specific price point. Although this was assumed to be prevalent for prepaid phones it could also have been interpreted to be prevalent for postpaid phones as in the case of 'function-focused innovation' which has the underlying premise that greater price equals greater functionality.

6.2.4 Emergence of an additional construct

By conducting the factor analysis a new measure emerged that includes both cost and functionality. The factor analysis highlighted that a combined innovation approach can have two variants. The first is where cost and functionality are both used at the outset of the innovation process and the second is a co-evolution of a product by the constant interaction between functionality and cost.

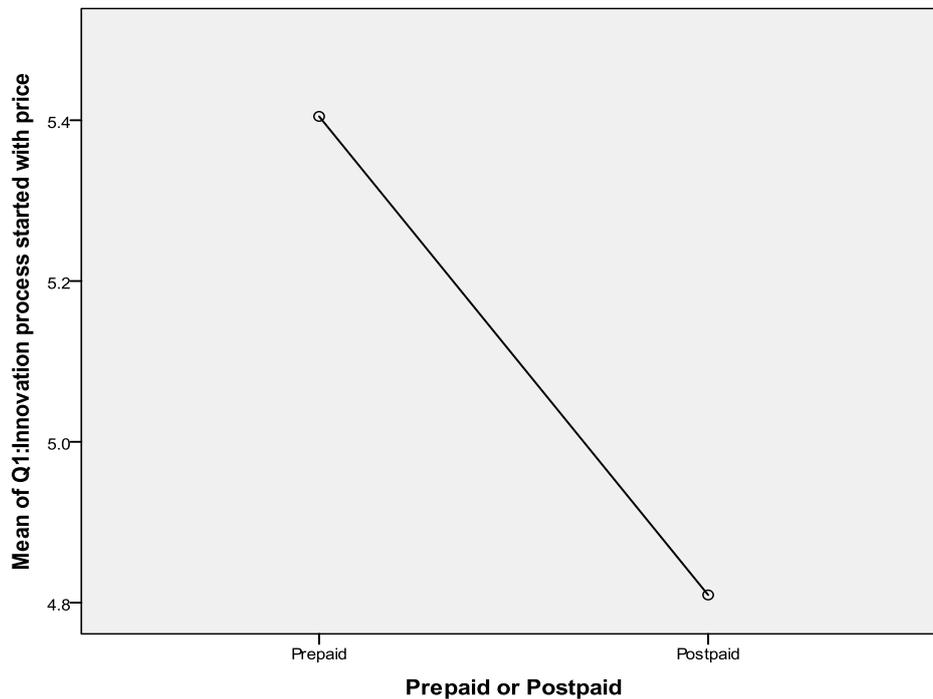
6.2.5 Sample size

Even though a sample size of 42 cases was used for both prepaid and postpaid the variances in the means identified through descriptive statistics was not conclusively confirmed through the t-test results. This could indicate that a larger sample size is required to show a significant level of confidence that there is variance between innovation processes used to develop prepaid and postpaid phones.

6.3. Hypothesis 1: Cost-focused innovation is prevalent in the development of prepaid mobile phones

The resulting p-value for this construct was 0.162, not low enough to reject the null hypothesis which implies that cost-focused innovation is not prevalent in prepaid phones. However, if you deconstruct this factor into its individual questions a different view unfolds. For instance, the mean plot for Question 1 below clearly shows that the perceptions of the respondents regarding whether the innovation process started with price is more prevalent in the prepaid group.

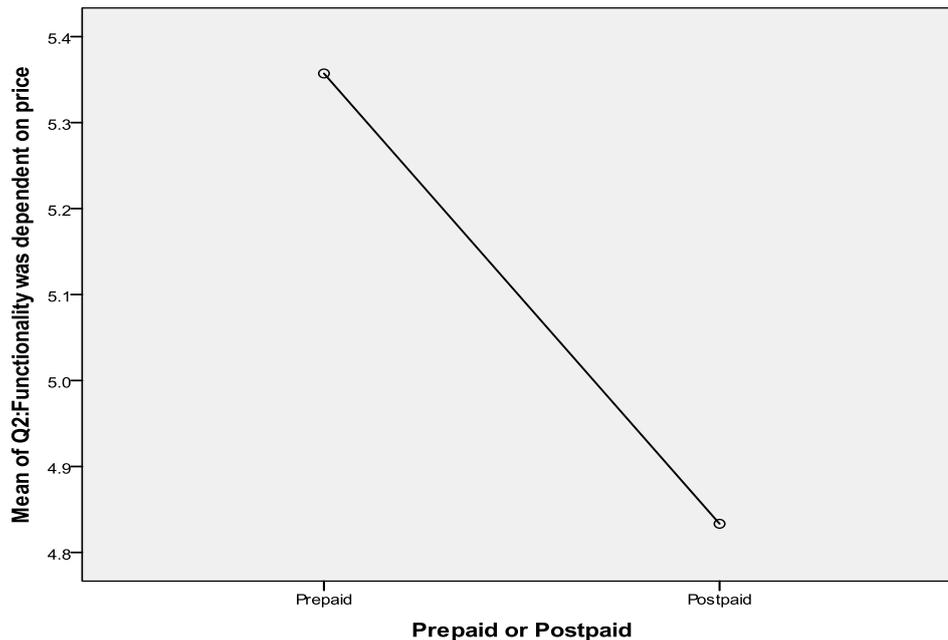
Figure 12: Mean plot for Question 1



This outcome was expected as argued in Chapter 2 by Chandra and Neelankavil (2008), that the single biggest constraint in developing products for less developed countries is affordability (price) and the solution offered by Lim et al. (2009) was that setting a strategic pricepoint from the beginning set the necessary activities into motion to deliver a product at that price.

Similarly when looking at the mean plot for Question 2 in Table 6.3.2, the same pattern is seen of the prepaid group being more prevalent than the postpaid group with regards to functionality being dependent on price.

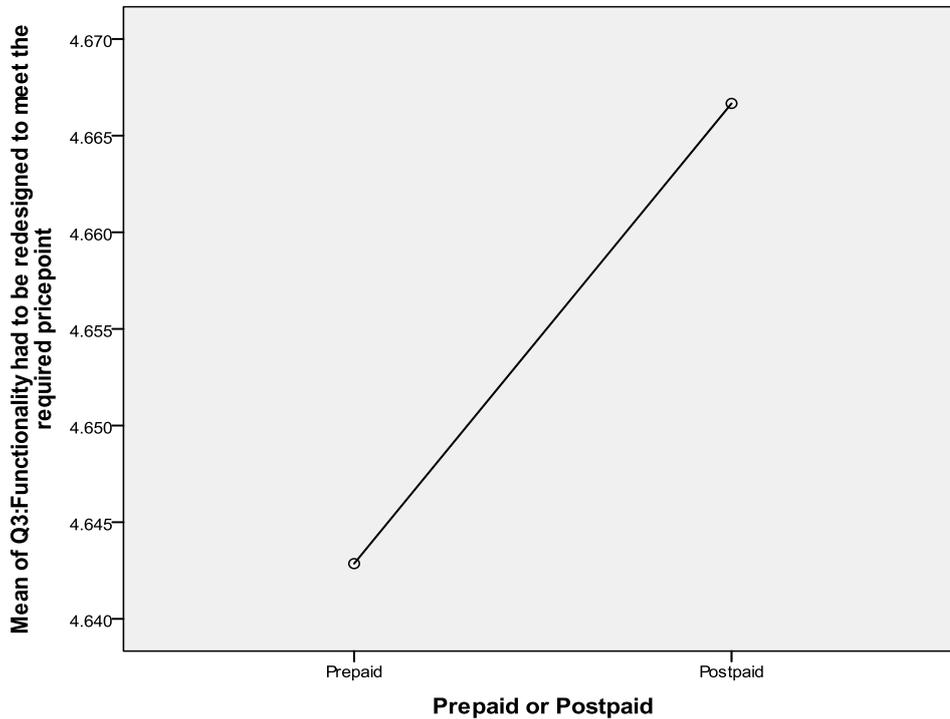
Figure 13: Mean plot for Question 2



As discussed under cost-focused innovation, processes like ‘reverse innovation’ are being used to cater to low income markets by reducing functionality to meet the price point that customers can afford. This process was described in The Economist (2010) as stripping down the products to their bare essentials, instead of adding ever more bells and whistles.

However, when looking at the mean plot for Question 3, a different pattern can be seen. The slope is reversed and the postpaid mean is now higher than the prepaid mean.

Figure 14: Mean plot for Question 3



This is contradictory to what companies are doing in China and India, where they are designing products that are inexpensive to make and affordable to consumers who have limited budgets (Chandra & Neelankavil, 2008). Furthermore, this is also contrary to the characteristic of a cost-focused innovation approach. This explains the high Cronbach’s alpha reliability score, which indicates that this question is suitable for this construct. However, the item statistic picked up that this item gives a conflicting result when deleted. Instead of reducing alpha it increases the alpha value which may suggest that respondents misinterpreted the question.

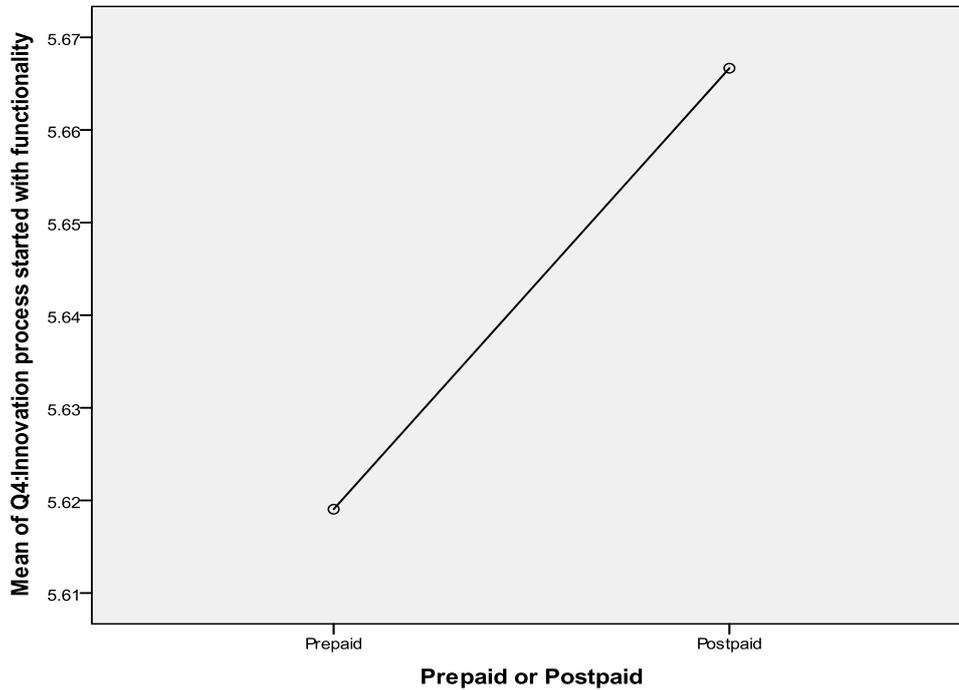
The results of the t-test indicate that there is not a statistically significant prevalence of cost-focused innovation in prepaid phones. The mean scores however suggests that costs do matter. Although they indicate some prevalence

of cost-focused innovation in prepaid phones they are not significant enough to reject the null hypothesis. An alternate explanation could be that handset manufacturers do not distinguish between the two types of phones from an innovation point of view but more from a manufacturing and operational perspective, which was not covered in the scope of this research and is an important avenue for future research.

6.4. Hypothesis 2: Function-focused innovation is prevalent in the development of postpaid mobiles phones

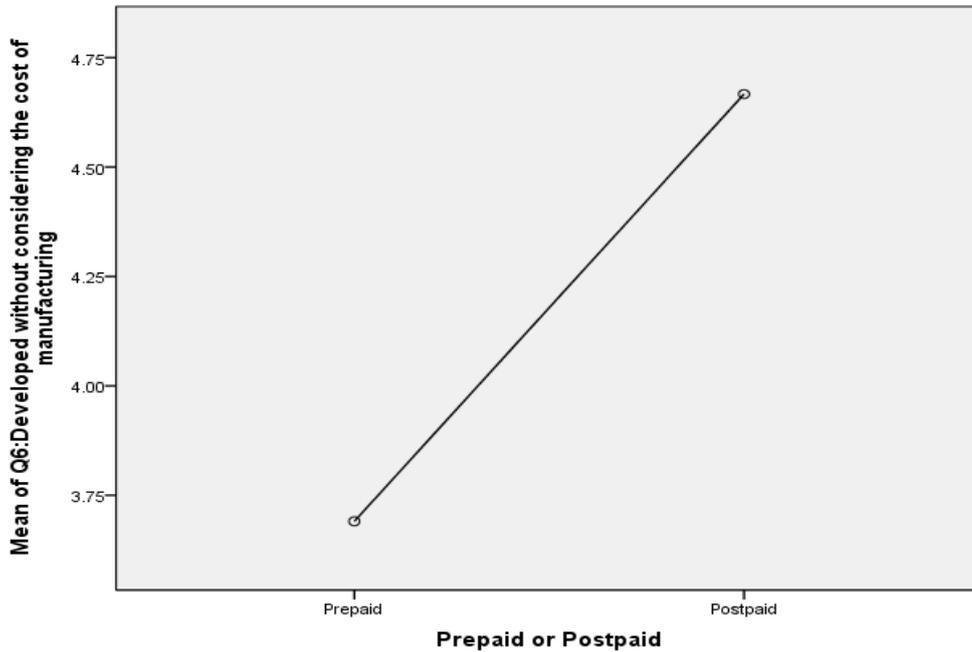
The p-value for function-focused innovation was 0.133 which is not significant enough to reject the null hypothesis. This result seems to suggest that function-focused innovation is not prevalent in postpaid phones. However, when looking at the mean plots of Question 4 and Question 6 the expected variance can be seen. So although the relationship is not statistically supported it is in line with proposed hypothesis. Question 5 is excluded from this discussion due to the regrouping of the factor analysis in Chapter 5.

Figure 15: Mean plot for Question 4



The mean plot for Question 4 indicates prevalence toward the postpaid group. In Chapter 2 under function-focused innovation Pitta et al. (2008) discuss the 'ToP' approach which focuses on identifying and exploiting existing market opportunities such as improving functionality on existing products which high income consumers would be willing to pay for as in the case of postpaid phones. The reason that the mean scores can be expected to be lower on the prepaid side is that price and affordability are of paramount importance to this market over and above quality or functionality.

Figure 16: Mean plot for Question 6



The mean plot for Question 6 once again highlights prevalence toward the postpaid phone group. This outcome was expected as the assumption in Western markets is that if you produce a product there are people who will purchase it regardless of the manufacturing costs. This of course does not apply to low income markets where in order to offer a “cheap” price product for the BoP, a company should be able to produce a product at “cheap” cost (Lim et al., 2009). This result indicates that the cost of manufacturing is more highly considered when developing prepaid phones than when developing postpaid phones.

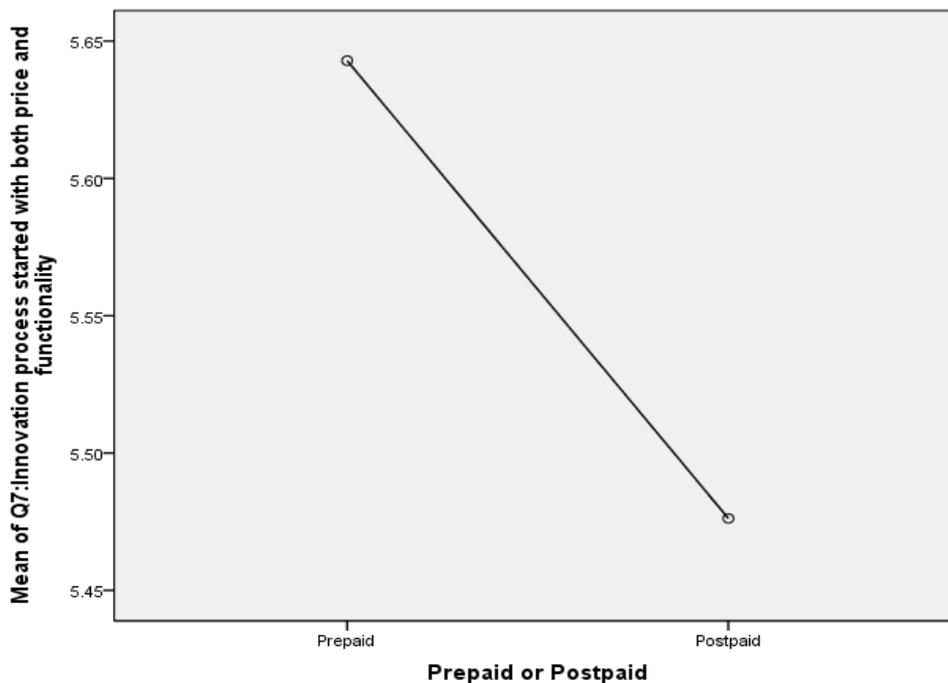
Although the results discussed were expected, the low p-value implies that the evidence was not significant enough to reject the null hypothesis. Firstly, this could have occurred because only two questions were used to test this construct and perhaps a third question would have assisted to strengthen the

results. Secondly, a larger sample size may have also assisted with improving the outcome.

6.5. Hypothesis 3: A combination of cost and function-focused innovation is present in the development of prepaid and postpaid phones

The p-value for the last hypothesis was 0.458, higher than the previous hypotheses. However, there was only one question used to analyse this construct as the regrouping done by the factor analysis removed one of the questions and placed it into another construct. This could indicate that this item did not match the construct it was initially placed into or was sharing its factor loading between two or more constructs.

Figure 17: Mean plot for Question 7



The results are interesting as the assumption would be that both price and functionality would have equal importance in developing both prepaid and postpaid phones. However, it does make sense that prepaid phones would be more dominant in this innovation process. The justification is that handset manufacturers understand that they have to increase functionality while keeping the cost of the device low for the prepaid market. As described by Frenz and Lambert (2010) companies are starting to look at 'mixed modes of innovation' to assist them in improving on production, delivery and business processes. Needless to say companies like the China International Marine Containers Group (Zeng & Williamson, 2007) and Tata Motors (Johnson et al., 2008) have already had major advances in innovation where they have not traded-off functionality for price. These companies have been successful because they paid critical attention to low cost while committing to maximise customer value (Sehgal et al., 2010).

Construct 3(NEW) that emerged from the factor analysis in Chapter 5 introduces a variance to the combined innovation approach that was initially postulated. The grouping of Question 5 and Question 8 seem to suggest a co-evolutionary approach where cost and functionality is permuted throughout the innovation process. An example of this approach would be the Geely case study where the architecture of the copied product was progressively altered in such a way that the high-level mixing-and-matching of components from different sources become possible (Wang & Kimble, 2010).

Both these approaches pose a challenge for companies in general who are novices with combining innovation approaches as high-value, low cost goods are gradually making their way from low income markets to high income

markets as in the cases of GE's handheld cardiogram (Immelt et al., 2009) and Fiat's 'Panda' (Verganti, 2009).

The p-value for testing this construct indicates that the null hypothesis cannot be rejected. However, the mean plot for Question 7 does give an indication that this approach is more dominant with prepaid phones. The contradicting indicators seem to suggest that a larger sample would have assisted with producing statistically significant results for this hypothesis.

6.6. Lack of correlation between perceived performance and the innovation process used in development

Although this was not a hypothesis, it was included in the questionnaire. The results revealed that there was no correlation between the 'most likely' innovation process used and the perceived performance of the phone. This could suggest that there is no difference in terms of perceived performance and the type of innovation approach used. However, the more likely reason for this is the respondent's bias with regard to their own company's products.

This is indicated in the correlation score for both Questions 9 and 10 at a 90% significance level. Interestingly Question 9 refers to the phone in question exceeding performance expectations and Question 10 refers to outperforming competitor phones in the same category. Since all the manufacturers have competitor phones in each category it does not make sense that they could all outperform each other. Both questions have relatively high means indicating strong agreement amongst the respondents that each of their company's

phones exceeded expectations and outperformed their competitors. A suggestion may be to conduct a future research study on comparing perceived and actual performance against a particular innovation approach.

6.7. Conclusion

Although the results of the three hypotheses were inconclusive in rejecting the null hypothesis, there is an indication that with more evidence the null hypothesis would have been rejected for hypothesis 1 and 2. The current evidence for a combination of cost and function focused innovation indicates that this approach is prevalent in prepaid phones. The initial research question was whether cost-focused innovation was the only approach used to develop products for low income markets. The results to some extent indicate that both cost-focused innovation and a combination of cost and function focused innovation is used in developing phones for low income markets.

Chapter 7: Conclusion

7.1. Introduction

The purpose of this research study was to determine the prevalence of cost-focused innovation in the development of mobile phones for low income markets. Although theory suggests that this is the approach to use when entering low income markets, the results of the study could not confirm this conclusively. The following discussion will include the main findings of the study, recommendations for business, the limitations and implications for future research.

7.2. Main findings

Firstly, the results revealed that cost-focused innovation was not significantly prevalent in the development of prepaid phones. Even though there was some variance between the two samples that were tested there was no convincing indicator that this hypothesis was beyond question.

Interestingly, the second finding for function-focused innovation yielded similar results in that there was no significant indicator to confirm that this was the approach used to develop postpaid phones. These two findings seem to contradict theory and present the suggestion that perhaps the same approach is used to develop both prepaid and postpaid phones for a particular handset manufacturer.

The third finding was that a combination of cost- and function-focused innovation was used in the development of both prepaid and postpaid phones.

The preliminary indicators do however suggest that this approach is more dominant in the development of prepaid phones.

7.3. Recommendations for business

As more companies from developed countries start to enter emerging markets they need to understand how to adapt their products and business models to suit the needs of these markets. Prahalad (2006) mentions four guidelines to product development which have been successful in some instances. This approach is based on the concept of cost-focused innovation which many companies presume to be a winning formula for low income markets. The recommendation to business is to carefully investigate the price-performance expectation that customers in those markets have for a particular product before developing products using cost-focused approaches. Chances are that a combination approach of innovation may be required to successfully enter this market.

The assumption that low income markets want cheaper versions of products with less functionality is a fallacy. This is especially prevalent when it comes to technology – low income markets want the same product with the same functionality at a fraction of the price. Companies will need to investigate new innovation processes and business models to make this happen.

Countries in emerging economies are disrupting global corporate and locational hierarchies of innovation (Kaplinsky et al., 2009) making them competitive in both their own markets and developed markets. This poses a threat to Western organisations that operate in saturated markets and sell high-priced goods. The

onus would be for these companies to invest in R&D and new combinations of innovation processes in order to remain competitive.

Finally, more work needs to be done in order to understand the cost/functionality relationship in relation to business. There seems to be a fundamental difference in the way an organisation is designed and operated when the two factors are a goal from the outset to when they organically emerge when trying to achieve the highest possible functionality at the lowest cost.

7.4. Limitations of the study

Firstly, some of the individuals actively involved in product development were unable to be interviewed as they are based in other countries. This limits the results to the perceptions of respondents who have limited knowledge of how products are developed within their companies.

Secondly, some of the concepts may not have been understood by the respondents. This is prevalent by their selection of the ‘most likely innovation process used’ in Part B of the questionnaire. There was no consistency in their responses of the two samples; instead they seemed to randomly select one of the three options.

Thirdly, this study focuses on the mobile phone industry that innovates rapidly and is highly technical. Therefore the results may not be applicable to products found in other industries.

7.5. Implications for future research

Further research should be conducted by replicating the study with other products from different industries. This will create a wider scope for cost-focused innovation approaches.

In the discussion of the results in Chapter 5 it was pointed out that perhaps handset manufacturers do not distinguish between the two types of phones from an innovation point of view but more from a manufacturing and operational perspective. Further research could be conducted as to where exactly in the innovation process is there a decision made about whether to focus predominantly on costs or on functionality, and in the South African context, whether a phone is more suitable for the prepaid or postpaid market.

Another avenue would be to determine if there is a positive correlation between the innovation process used and the market performance of the product in relation to other innovation processes.

Finally, research should be carried out on the variations of combined modes of innovation and how these create competitive advantages for firms in both developed and developing markets.

7.6. Conclusion

In conclusion, contingency theory suggests that there is no optimal strategy for all organisations and posits that the most desirable choice of strategy variables alters according to certain factors (Zott & Amit, 2008). This certainly is prevalent in emerging markets whose changing landscape and people require companies to use different methods of innovation in order to achieve success in those

environments. Companies from these emerging economies have developed and honed these competencies in ‘cost-focused innovation’ in their own markets, and are now using them to compete on a global scale. Companies from developed countries who are not able to compete will be ruined.

The objective of this research was to identify prevalence of cost-focused innovation in the development of products for low income markets. The evidence suggests that cost-focused innovation is not significantly prevalent and that there are alternative methods of innovation that may be used when developing products for low income markets.

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Appendix A

Dear Respondent

Thank you for taking the time to complete this survey. I am conducting research for my MBA thesis, which focuses on the type of innovation process used in developing products for low income markets. For the purposes of the study, I am looking at how prepaid/postpaid mobile phones are developed prior to the manufacturing process. Your participation will provide valuable insight into how companies innovate and develop products/services for low income markets. The questionnaire will not take you more than 30mins to complete. Your participation is completely voluntary and you may withdraw at any time. All the information you provide is completely confidential. If you are unsure of any questions or have any concerns please do not hesitate to contact me or my supervisor.

Researcher: Mellisa Naidoo

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Supervisor: Professor Helena Barnard

Email: barnard.h@gibs.co.za

Cell: 0826574470

Signature of respondent

Date

Signature of researcher

Date

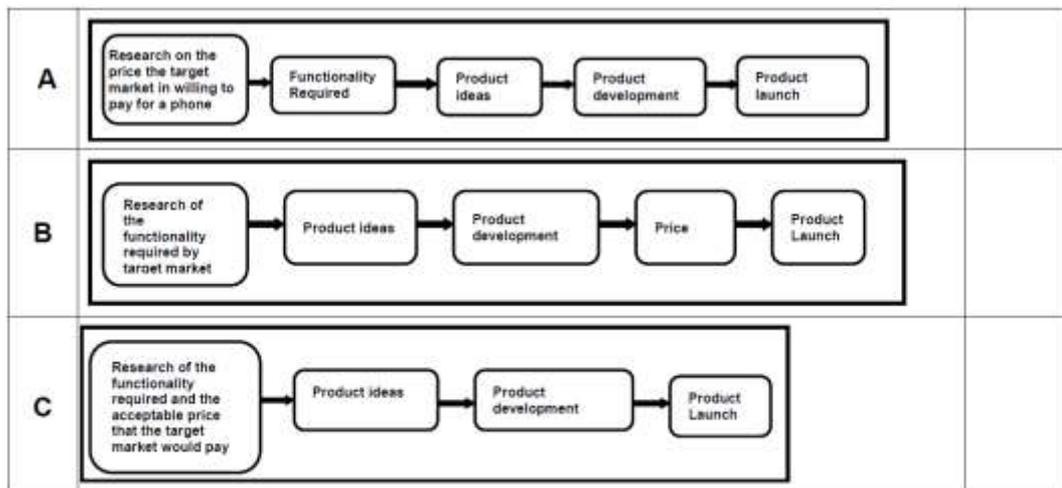
A) The following questionnaire uses a Likert-scale which measures your level of agreement or disagreement with regards to a series of statements. This is dependent on your knowledge of your company's innovation process and how a particular model of mobile phone was developed. Please only choose 1 option per question. (1 = strongly disagree and 7 = strongly agree)

PRE
x

		MODEL: <i>Phone X</i>	Strongly disagree			Neither		Strongly agree	
		QUESTIONS	1	2	3	4	5	6	7
CF	1	The (<i>X Phone</i>) was created for a specific target market using the price as a starting point for developing the phone.							
	2	The (<i>X's</i>) functionality was dependent on the price that the target market was willing to pay for it.							
	3	The (<i>X's</i>) functionality had to be redesigned in order to meet the price point that was acceptable to the target market.							
FF	4	The (<i>Phone X</i>) was developed for the target market using the functionality they required from a mobile phone as a starting point.							
	5	The (<i>Phone X</i>) price was dependent on the functionality that was given to the phone.							
	6	The (<i>X</i>) was developed without considering what the costs of manufacturing would be.							
CMB	7	The (<i>X</i>) was developed for a specific target market using both the price and functionality requirements the starting point.							
	8	While developing the (<i>X Phone</i>), innovative ways of increasing functionality were developed while reducing costs at the same time.							
P	9	The (<i>X's</i>) performance exceeded expectations.							
	10	The (<i>X</i>) performed better than other competitor phones in the same segment.							

B) Please rank the following innovation processes from 1 to 3 according the most likely approach used to develop *Phone X* to your knowledge.

- Number 1: the most likely innovation approach used
- Number 2: the innovation process that could have been used
- Number 3: the innovation process that was least likely to be used



A) The following questionnaire uses a Likert-scale which measures your level of agreement or disagreement with regards to a series of statements. This is dependent on your knowledge of your company's innovation process and how a particular model of mobile phone was developed. Please only choose 1 option per *question*. (1 = strongly disagree and 7 = strongly agree)

POST
y

MODEL: Phone Y(POSTPAID)		Strongly disagree			Neither		Strongly agree	
QUESTIONS		1	2	3	4	5	6	7
1	The (Y) was created for a specific target market using the price as a starting point for developing the phone.							
2	The (Y) functionality was dependent on the price that the target market was willing to pay for it.							
3	The (Y) functionality had to be redesigned in order to meet the price point that was acceptable to the target market.							
4	The (Y) was developed for the target market using the functionality they required from a mobile phone as a starting point.							
5	The (Y's) price was dependent on the functionality that was given to the phone.							
6	The (Y) was developed without considering what the costs of manufacturing would be.							
7	The (Y's) was developed for a specific target market using both the price and functionality requirements the starting point.							
8	While developing the (Y), innovative ways of increasing functionality were developed while reducing costs at the same time.							
9	The (Y's) performance exceeded expectations.							
10	The (Y) performed better than other competitor phones in the same segment.							

B) Please rank the following innovation processes from 1 to 3 according the most likely approach used to develop *Phone Y* to your knowledge.

- Number 1: the most likely innovation approach used
- Number 2: the innovation process that could have been used
- Number 3: the innovation process that was least likely to be used

