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THE ROLE OF MOBILE PHONE WEB UTILISATION IN CREATING ECONOMIC GROWTH IN SOUTH AFRICA

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ABSTRACT

Mobile phone web utilisation is relatively new in South Africa, and not only does it provide more convenience to existing Internet users, but it can potentially overcome the access problems that are attendant in the utilisation of the web by most South Africans. This could go a long way to bridging the Digital Divide and contribute to South Africa's economic growth. It is therefore important to understand the role that the South African mobile phone web utilisation cluster may play in creating national competitive advantage.

This exploratory research study focuses on understanding the role of mobile phone web utilisation in creating economic growth in South Africa. It uses a combination of empirical evidence on the mobile phone web utilisation cluster, academic theory around Porter's Diamond Model of the Micro Economics of Competitiveness, and pre-existing international and local research. The question that was considered was "Does the Mobile phone web utilisation cluster represent a source of competitive advantage for South Africa?" To support this investigation the following areas were explored;

- What is the universe of the mobile phone web utilisation cluster?
- Are the related and supporting industries conducive to competition?
- Are firm strategies, structures and competitive rivalry conditions conducive to competitiveness in this cluster?
- Are demand conditions conducive to global and local competitive growth?
- Are factor conditions conducive to competitiveness?
- What is the role of Government?

The research found that in most aspects, this cluster has the potential to play a role in creating competitive advantage and contributing to South Africa's economic growth.



Declaration

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

Kate Elphick

Date

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1. Introduction to the research problem

In the early stages of the rollout of any new technology, market signals can be unreliable. New technologies trigger rampant experimentation, by both companies and customers, and experimentation is often economically unsustainable. As a result, market behaviour is distorted and must be interpreted with caution (Porter 2001).

The ability to access the web on mobile phones came about in 1999, when Wireless Application Protocol (WAP) became available on mobile phones. This enabled users to access and utilise the Internet on their mobile phones. All new mobile phones have been equipped with WAP since 2001 (World Bank 2001).

This exploratory research study focuses on understanding the role of mobile phone web utilisation in creating economic growth in South Africa. It will use a combination of empirical evidence on the cluster, academic theory and pre-existing international and local research.

1.1. The need for this research

The World Bank classifies South Africa as an “upper middle income” country. However, its sophisticated industrial economy has developed alongside an underdeveloped “informal” economy. With a Gini Coefficient of between 0.57 and 0.59, South Africa has one of the highest levels of income inequality in the world (JSE 2006).

The South African Deputy President, Phumzile Mlambo-Ngcuka (Foreign Affairs, 2007, p. 56) is quoted as saying “If South Africa is to reach its full potential, it cannot afford to leave any of its citizens behind on the margins of the country's dynamic economy”.

In South Africa, institutional and policy failures, as well as the adjustment of the economy to ongoing transformation and restructuring, have affected growth performance. The present growth does not address the problem of poverty or social inequalities. The private sector's ability to absorb, adapt and develop new technologies is a necessary condition in ensuring that the economy will grow (Holden, 2005).

Technological progress plays a role on the per capita GDP. Information Technology (IT) is a capital asset that supports productivity and reduces bottlenecks because it eases individuals' access to public knowledge available on the Internet (Becchetti and Di Giacomo, 2007).

The Digital Divide marks the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to use the Internet for a variety of activities (OECD, 2001 cited in Selhofer and Hüsing, 2002).

Due to the growing use of information and communication technologies (ICTs) in all areas of private, public and economic life, the ability and skills to operate these technologies and the means to access them are regarded as important prerequisites and components of social inclusion (Selhofer and Hüsing, 2002) in the mainstream economy.

South Africa has shown a record uptake of mobile phones and this market continues to grow, with subscriber figures of over 30 million for the country (Esselaar & Gillwald 2006), but South Africa has only about 5.1 million Internet users (est. 2005) out of a population of about 45 million, which is just over 10 per cent (CIA 2007).

The low levels of Internet penetration in South Africa may be overcome with the introduction of new third generation (3G) technologies (Africa Research Bulletin, 2007). 3G is an umbrella term for a bundle of technologies that can bring the equivalent of a broadband Internet connection to mobile phones.

Mobile phone web utilisation as a young industry is similar to other emerging industries in that it is characterised by a large number of uncertainties at different levels, in particular concerning technology, business strategy and consumer demand (Camponovo and Pigneur, 2002).

Skiba *et al.* (2000) (cited in Lehner and Watson, 2001) describe mobile-commerce as “the use of mobile hand-held devices to communicate, inform, transact and using text and data via connection to public or private networks”. This is any service that can be provided through the use of a mobile device including commercial, communication and information services.

For the purpose of this exploratory research, the mobile device mentioned above will be limited to the mobile phone, as this is the hand held device with the largest penetration in South Africa (Esselaar & Gillwald, 2006). The services that will be covered in this research will be limited to those accessed using the Internet, because of the importance of the Internet to the economy (Selhofer and Hüsing, 2002).

The market will be limited to the consumer market. The research will also touch on those conditions that will lead to web utilisation by the South African consumer, using a mobile phone.

In his book *On Competition* (1998), Michael Porter proposes the “Diamond Model” which is a tool with which to evaluate conditions within a country and how they interact to create a negative or positive environment for competitiveness in a particular cluster. This model systematically covers each of the elements that contribute towards a nation’s ability to compete globally. A fundamental premise of the model is that domestic competition is the precursor of global competitiveness.

There are a number of publications on mobile commerce sometimes labelled as research. But most of these works are market studies or benchmarks; they highlight aspects such as the number of prospective consumers, the estimated market volume, etc., which do not provide deeper insights. Sources for this information are Merrill Lynch, Gartner, Forrester and others. They estimate the perspectives of the mobile market(s) by using figures on mobile phone penetration, short message service (SMS) usage, mobile Internet access, etc. Many of the remaining publications are technically oriented or surveys. What is missing are concepts and guidelines for developing the mobile cluster (Lehner and Watson, 2001).

Since Lerner and Watson wrote this in 2001, a number of authors have attempted the task of developing mobile business models, using Value Chain Analysis (Osterwalder and Pigneur, 2002), by developing a Mobile Market Scorecard and mBusiness Application Framework (Camponovo and Pigneur, 2002) or adapting eBusiness models for mBusiness (Yuan and Zhang, 2003).

1.2. Research objectives

This is exploratory research and will attempt to gain an understanding of the dimensions (Zikmund, 2003) of the South African mobile phone web utilisation cluster within the national economic context.

The author believes that mobile phone web utilisation could potentially be very important for the future economic development of South Africa: as it evolves, more and more of the historically disadvantaged population may enter the economic mainstream through access to the Internet using their mobile phones. It is therefore important to understand how the role players in this field are creating competitive advantage in mobile phone web utilisation, both in South Africa and globally. This may lead to further research into how the majority of the population could access mobile commerce in the future.

This study focuses on the South African mobile phone web utilisation cluster, and uses academic theory to create a framework for understanding this cluster and its role in creating national competitive advantage. There are two elements to this research paper;

- the definition of the cluster; and
- the analysis in terms of the conditions in South Africa for contributing to the creation of competitive advantage required for economic growth.

A combination of quantitative and qualitative research methodologies will be used and triangulated using artefacts which the researcher has gathered from industry players and off the Internet. This methodology is further explained in Chapter 4.

The mobile phone web utilisation cluster will be defined using Cluster theory, the Mobile Commerce Lifecycle (Varshney and Vetter, 2001 (cited in Lehner. and Watson 2002)) and the inputs of key informants.

Then the cluster will be analysed using Porter's Diamond Model as a framework for understanding its role in South Africa's future economic growth, using qualitative data gathered from in-depth interviews with key informants, together with artefacts which supplement and complement the data. A Mobile Business (mBusiness) Application Framework as defined by Camponovo and Pigneur, (2002) will also be developed.

1.3. Research scope

The focus of this study is business, rather than technical, of mobile phone web utilisation. Although the focus is not technical, technical advancement is an integral part of mobile phone web access and cannot be entirely excluded.

1.4. Summary

Mobile phone web utilisation could potentially go a long way to bridging the Digital Divide and contribute to South Africa's economic growth. It is therefore important to understand this context and the role that the South African mobile phone web utilisation cluster may play in creating national competitive advantage.

2. Literature review

This section provides a brief insight into the relevance of Internet utilisation to the economy, the Mobile Commerce Life Cycle which is used to define the role players in the mobile phone web utilisation market, and Porter's Diamond Model which will be used to understand the competitiveness of this cluster. Porter's Diamond Model will be broken down into the conditions that he recommends for consideration when evaluating competitiveness, and the relevant theories and models will be discussed under each factor in turn.

There is very little relevant academic literature on mobile phone web utilisation as such, and therefore this has been complemented by literature on Internet uptake and mCommerce.

As this is an exploratory research study, the literature required constant revision as the research process continued and data was analysed. One of the primary advantages of qualitative research is that it is open to adjustment and refinement of the research ideas as the study progresses (Trucker, Powell and Meyer, 1995).

2.1. The relevance of the Internet to South Africa's economy

2.1.1. *The Digital Divide*

The concept of the Digital Divide provides the background to why it is important that mobile phone web utilisation in South Africa be studied.

The Digital Divide marks "the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies and to their use of the Internet for a wide variety of activities" (OECD, 2001 (cited in Selhofer and Hüsing, 2002)).

Due to the growing use of information and communication technologies (ICTs) in all areas of private, public and economic life, the ability and skills to operate these technologies and the means to access them are regarded as important prerequisites and components of social inclusion (Selhofer and Hüsing, 2002).

The concept of the "Digital Divide" directly relates to the spiral of uneven access to and use of information and communication technologies and the socio-economic rebound this causes.

The principal reasons for encouraging digital participation by all are encapsulated in the following points (Selhofer and Hüsing, 2002):

Digital inclusion

- improves and secures employability: basic skills in computing and using the Internet are a requirement for a growing number of jobs. Counteracting the digital divide should have a positive impact on the level of employability in the population;
- ensures equal participation of citizens in the information society: as an increasing number of day-to-day life transactions are performed over digital networks, people who do not have access to these networks will be disadvantaged;
- is important for economic reasons: demand side economics bring “off-liners” and non ICT-literate populations online, which could also have positive effects on the economy. A growing number of consumers on the Internet could trigger enterprises toward e-business, which is commonly assessed as advantageous for the region's economy.

There are differing opinions on how to deal with the Digital Divide. One school of thought, the Technological Determinists, assumes that greater access to phones or computers will reduce inequality. Warschauer (2003) details the physical, digital, human, and social resources needed to break down the digital divide.

Connectivity means affordable Internet access (Lucas, Sylla and Sylla, 2003). Moreover the scale of a country's computing power dramatically affects its capacity to improve

productivity and foster innovation. Although it is not yet clear if access to new technologies will be sufficient to prevent the widening of the Digital Divide, it is commonly accepted thinking that access to the Internet is in principle advantageous and therefore desirable for all (Selhofer and Hüsing, 2002).

In contrast, Social Determinists adopt a strategic restructuring perspective to explain how the information revolution has produced different outcomes in different places (Wilson, 2004 cited in Lucas *et. al.* , 2003). They contend that the revolution is being driven institutionally as well as technologically. They believe that it is fundamentally a social process, whereby electronic technologies are acquired, adapted, and diffused with varying outcomes in different social settings.

In this context, this study will focus on the full spectrum of the mobile phone web utilisation based on the Mobile Commerce Life Cycle (Varshney and Vetter, 2001) in order to go beyond the technical challenges of mobile web utilisation and examine how the demand factors may create national competitive advantage (Lehner and Watson, 2002).

2.1.2. The role of ICT on the GDP

Technological progress plays a role on the *per capita* GDP. ICT is a capital asset that supports productivity and reduces bottlenecks to ease access to information available on the Internet (Becchetti and Di Giacomo, 2007).

There is a strong correlation between *per capita* GDP and Internet user intensity (Liu and San, 2006). There are other factors besides economic development that determine the degree of Internet diffusion. Attempts to increase Internet uptake should include social as

well as technical interventions, such as content design, demographic and behavioural considerations as well as education (Liu and San, 2006).

2.1.3. *The role of the Internet in abolishing social inequities*

There are a number of arguments both for and against the Internet's role in dissolving economic inequalities (Lucas *et. al.* 2003).

The non-hierarchical nature of the Internet, together with the declining cost of computing technologies and increasing user-friendliness, have been considered to be socially levelling and as undermining existing patterns of class, race and gender inequalities (Tambini, 2000 cited in Lucas *et. al.*, 2003). Some authors view the Internet as a tool for networking and accessing services that will democratise both consumption and civic participation. Bell (1973, cited in Lucas *et. al.*, 2003) saw new information technologies as paving the way for a more merit-based and open society, stratified along knowledge and scientific/technological skills, rather than gender, race and class.

According to Lucas *et. al.*, (2003) Three centuries ago there was far less economic inequality among the world's major regions and societies than there is today. From then to the present, the gap in average income per person between rich and poor societies became wider. Economists are not in agreement on the reason for this. Some believe that major technological innovations associated with the industrial revolution catapulted some nations and world regions ahead of others. They suggest that history gives us reasons for optimism about closing the gaps opened by the industrial revolution. Proponents of this view see advantages in being a latecomer to industrialisation. Latecomers often grow faster than industrial pioneers, whose innovations they can implement without having to

develop them. This view assumes that the world's stock of state-of-the-art technology is relatively unchanging, so that latecomers can avoid the costs incurred by pioneers, and then by growing faster than the pioneers, eliminate the income gaps between them.

These optimistic interpretations have been criticised for ignoring social relations that influence the social distribution and impact of the Internet. Despite of the widening opportunities for networking, the use of such technologies is restricted to those at the top of existing social hierarchies (Dawson and Foster, 1998 and Wolf, 1998 cited in Lucas *et. al.*, 2003). Due to increasing commercial application, the new digital technologies function as commodities, and their distribution tends to follow existing divisions of class, race and gender. Therefore, rather than assisting with equalisation, they reinforce social inequality, and lead to the formation of socially and technologically disadvantaged and excluded individuals (Golding 1996; Zappala 2000 cited in Lucas *et. al.*, 2003).

A newer view of modern economic history reaches more pessimistic conclusions about the possibilities for reducing gaps between the rich and the poor (Wills and Tranter cited in Lucas *et. al.*, 2003). In this view, the economic gaps that emerged over the past two centuries resulted from waves of network technologies and network innovations. The innovators who took advantage of network effects rapidly moved far ahead of others so that gaps in relative incomes grew.

The Internet and mobile phone web access are examples of network technologies. Early network technologies include financial systems in the seventeenth and eighteenth centuries, transportation networks in the eighteenth and nineteenth centuries, and modern transportation and electrical networks which began in the nineteenth and twentieth centuries. Each of these historical network breakthroughs can be associated with the

industrialisation of the modern world and the resultant income gaps among nations and world regions to which 'selective' industrialisation led.

Unlike many other technologies, mobile phones have been extraordinarily successful in South Africa (Esselaar and Gillwald, 2006). The distribution in many instances has by passed socio-economic inequities and made mobile communication accessible to 72% of South Africa's Population, with a national average of 33.1% of households having cell phones of as calculated by the HSRC in 2007 based on 2003 data (HSRC, 2007).

The author believes that as a network technology, mobile phones and their use in web utilisation could lead to the economic breakthrough that South Africa needs in order to overcome the historical barriers to economic growth, such as poor infrastructure, etc.

2.2. Theoretical models that provide a structure for analysis

This section will look at a number of theoretical models and concepts use to understand what the mobile phone web utilisation cluster looks like, and specific conditions for competitiveness. These models are primarily based on the work of Michael Porter and serve to provide the framework for the research in this paper. The research will use theory on defining a cluster and then Porter's Diamond model (Porter, 2003) in order to create a framework to analyse the cluster's conditions for competitiveness.

2.2.1. Defining the universe

2.2.1.1. Cluster Theory

Clusters, or geographic concentrations of interconnected companies, are a feature of almost every national, regional, state and metropolitan economy, especially in more advanced nations (Porter, 2003).

The prevalence of clusters reveals important insights about the microeconomics of competition and the role of location in competitive advantage. Clusters' influences on competition have taken on growing importance in an increasingly complex, knowledge-based, and dynamic economy (Porter, 2003).

Clusters represent a new way of thinking about national, state and local economies and they necessitate new roles for companies, government and other institutions in enhancing competitiveness (Porter, 2003).

In the Danish Research Unit for Industrial Dynamics (DRUID) Report (2005) clusters are referred to as non-random, geographical concentrations of firms with similar or complementary capabilities (Richardson, 1972; Ellison and Glaeser, 1994 cited in Maskell and Kebir, 2005).

The basic unit of analysis for understanding national advantage is the industry. Nations do not succeed in isolated industries (Porter, 1998), but in “clusters” of industries connected through vertical and horizontal relationships. A nation's economy contains a mix of clusters, whose makeup and sources of competitive advantage (or disadvantage) reflect the state of the economy's development (Porter, 1998).

Porter's cluster argument includes the way in which proximity makes benefits flow forward, backward and horizontally. He says that aggressive rivalry in one industry tends to spread to others in the cluster and that the “exchange of R&D and joint problem solving” lead to faster and more efficient solutions. Suppliers also tend to be a conduit for transmitting information and innovation from firm to firm. The pace of innovation within the entire national industry is accelerated through this process. All these benefits are enhanced if suppliers are located in proximity to firms because they shorten the lines of communication. He spells out how “developing clusters also attract - and cluster participants seek out - people and ideas that reinforce the cluster”. Growing clusters attract skilled people through offering better opportunities. Entrepreneurs or individuals with ideas migrate to the cluster from other locations, as well, because growing clusters signal opportunity (Porter, 1990, p 151 and p 103 cited in Maskell and Kebir, 2005).

This Cluster Theory has been selected as the point of departure in this dissertation as it provides a way of defining the universe and, as Porter's Diamond Model has been selected as the mechanism for analysis, it also means that the universe is defined in a manner that is consistent with the constructs of Porter's theory. Cluster membership makes possible direct observation of other firms (Porter, 1998). This enables the researcher to view the individual firms in the context of the universe.

2.2.1.2. Defining mobile phone web utilisation in order to define the cluster

The author could not find a definition of the mobile phone web utilisation cluster in the literature and as this research requires the delineation of this cluster in South Africa, the definition of mobile commerce was used as a point of departure.

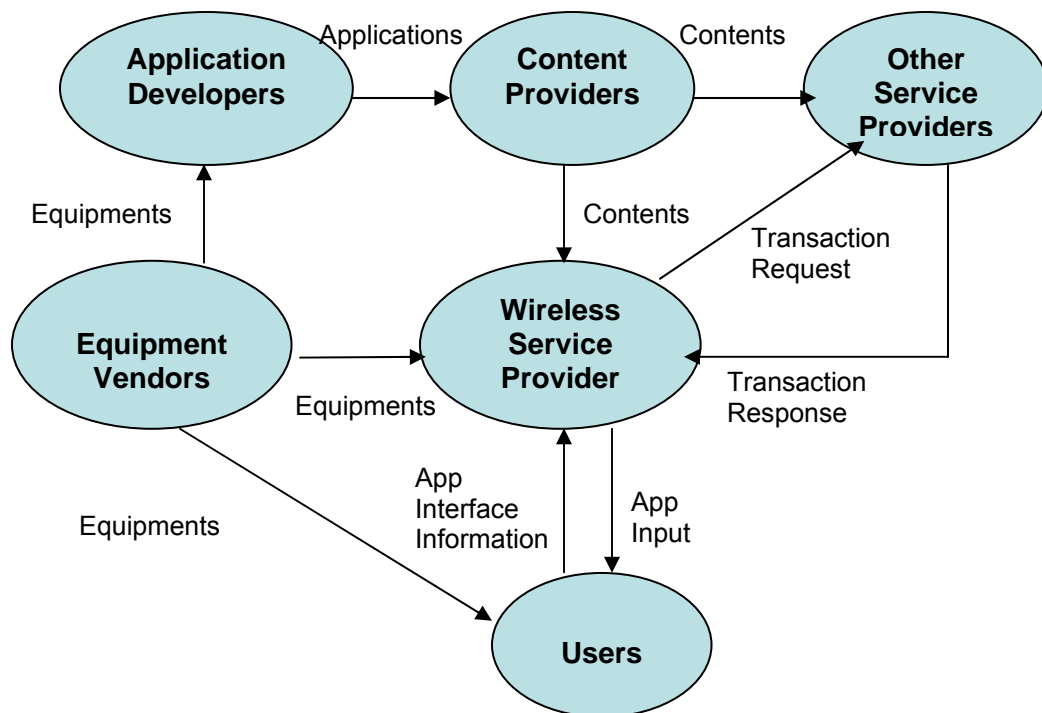
There are many definitions of mobile commerce. A commonly adopted definition of mobile commerce is "any transaction with a monetary value that is conducted via mobile telecommunication network" (Müller-Veerse, 1999 cited in Camponovo and Pigneur, 2002). Similar to e-commerce, the focus is on the exchange of products and services, but without the constraint of a stationary user using wired infrastructure. A broader definition of mobile business includes "all activities related to a commercial transaction through communication networks that interface with mobile devices" (Tarasewich *et al.*, 2002 cited in Camponovo and Pigneur, 2002).

Skiba *et al.* (2000) (cited in Lehner and Watson, 2001) describe mobile-commerce as "the use of mobile hand-held devices to communicate, inform, transact and using text and data via connection to public or private networks". This is any service that can be provided

through the use of a mobile device including commercial, communication and information services.

The mobile commerce life cycle was proposed by Varshney and Vetter in 2001. This life cycle depicts the flows and interactions between highly specialised firms in the mobile commerce industry (Varshney and Vetter, 2001 cited in Lehner. and Watson 2002).

Figure 1: The Mobile Commerce Life Cycle



2.2.2. Porter's Diamond Model

Porter's Diamond Model represents a tool with which to evaluate conditions within a country and how they interact to create a negative or positive environment for competitiveness for a particular cluster. This model systematically covers each of the elements that contribute towards the nation's ability to compete internationally. A fundamental premise of the model is that domestic competition is the precursor of global competitiveness.

The Diamond Model will be used as a framework for examining the conditions within which the mobile phone web utilisation cluster operates in order to assess this cluster's (potential) competitiveness.

In his paper "The economic performance of regions" Porter (2003) says that there are substantial differences in economic performance across regions within virtually every nation. This suggests that many of the essential determinants of economic performance are to be found at the regional level. A regional level analysis is beyond the scope of this research paper and may represent the opportunity for further research in this field.

The Porter Diamond framework encapsulates these conditions by identifying four key drivers which are explained here.

2.2.2.1. *Related and supporting industries*

The presence or absence of supplier and related industries in a nation that is internationally competitive determines competitive advantage. The availability, density and interconnectedness of vertically and horizontally related industries generates knowledge spill over, transactional efficiencies and cluster-level scale economies, which are enhanced when clusters are concentrated geographically.

This paper will seek to define the industries that play in this cluster, their revenue streams and relationships.

Porter (2003) suggests that there are two more goals that a company must have if it wishes to sustain its competitive advantage:

- Adopt a global strategy – localised companies' risks are too focused in one place. They are unable to compete with multinational companies which can bypass them by learning from other countries.
- Work towards making competitive advantage obsolete because it is only a matter of time before a competitor will find a way to get around this competitive advantage.

This paper will seek to understand the global strategies that are being adopted and how firms are innovating in order for the cluster to sustain its competitive advantage.

There are two types of competitive advantage:

- Lower cost – the ability to design, produce and market a comparable product more efficiently than its competitors – superior returns.
- Differentiation – the ability to provide unique and superior value to the buyer in terms of product quality, special features or after sales service.

Competitive advantage of either type translates into higher productivity than that of competitors (Porter, 2003).

2.2.2.2. Factor conditions

Competitive advantage stems from the nation's position on factors of production; the availability of high-quality and specialised innovation inputs. These factors include a skilled labour pool, raw materials, infrastructure and capital. In order to create competitive advantage, the factors must be highly specialised in relation to an industry's particular needs (Porter, 2003).

This research will show that the factor conditions that have been identified in this sector include “skills and capital” and these factor conditions will be examined with a view to understanding whether they may be added to or upgraded in order to increase South Africa's competitive advantage.

2.2.2.3. Firm strategy, structure and rivalry

Competitive advantage stems from the conditions in the nation governing how companies are created, organised and managed and the nature of domestic rivalry and the extent to which the local competitive context is both intense and rewards successful innovators.

General innovation incentives such as intellectual property protection, consistent pressure from intense local rivalry, and openness to international competition in the cluster are also influential (Porter, 2003).

Porter argues that among all the points on the diamond, domestic rivalry is the most important because of the stimulating effect it has on all the others.

To improve national competitive advantage, a nation and firms must be willing and able to invest aggressively. Porter suggests that this is the second stage of economic upgrade after factor conditions have been created and upgraded. Firms invest to construct modern efficient facilities with the best technology available on global markets.

This research will examine how the players in this cluster compete, their business models and how they are investing in growth and competitive advantage.

2.2.2.4. Demand Conditions

Competitive advantage is derived from the nature of home demand for the industries' offering. Porter (2003) postulates that nations gain competitive advantage in industries where local demand provides companies with a clear picture of emerging buyer needs, and where demanding, quality-sensitive buyers pressure companies to innovate faster and achieve more sophisticated competitive advantages than their foreign rivals.

Improved competitive advantage at this level of a country's economic development is innovation-driven – consumer demand becomes increasingly more sophisticated because of rising personal incomes, higher levels of education and an increasing desire for convenience. New mechanisms emerge to create advanced and specialised factors and to upgrade them continually. Firms not only appropriate and improve technology and methods from other nations, but create them. Firms compete with self-contained global strategies and possess their own internal marketing and service networks along with growing brand reputations abroad. This stage of a country's economic growth marks the onset of significant foreign direct investment.

Early in this stage, a vertical deepening of established industry clusters occurs, which increasingly begin to compete globally. Deep clusters are a sign that the economy has achieved a moderate level of innovative capacity. A more advanced and dynamic economy is capable of widening the range of successful industries and of spawning entirely new clusters

This study will review the demand conditions and innovations in South Africa.

2.2.3. Additional theory for analysing the points on the diamond

2.2.3.1. Firm strategy, structure and rivalry

There are various business models in the academic literature that can contribute to understanding the nature of rivalry in a sector and many of these have been examined in the context of the Internet, some even in the context of mobile Internet access. These models will form the basis of evaluating firm strategy, structure and rivalry in this cluster.

Business models in the mobile phone web utilisation cluster

Osterwalder and Pigneur (2003) define a business model as the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams.

Innovative business models are constantly emerging in electronic commerce and can become a major contribution to competitive advantage when it comes to eBusiness (Bloch *et al.*, 1996 and Robinson *et al.*, 2000 cited in Yuan and Zhang, 2003).

However, Porter talks about distorting market signals in the early stages of the rollout of any new technologies and says that market signals can be unreliable. New technologies trigger rampant experimentation, by both companies and customers, and the experimentation is often economically unsustainable. As a result, market behaviour is

distorted and must be interpreted with caution (Porter 2001). This therefore needs to be born in mind when analysing the sectors' strategies, structures and rivalries.

Porter's five forces

The strength of the five competitive forces is a function of industry structure, or the underlying economic and technical characteristics of an industry. Firms through their strategies can influence the five forces for better or for worse. This model is useful for determining the attractiveness of the industry (Porter, 1985).

Industry structure is significant because it creates differing requirements for success in different industries. Structurally attractive industries, with sustainable barriers in areas such as technology, specialised skills, channel access and brand reputation often involve high labour productivity and will earn more attractive returns to capital (Porter, 1985)

Structural change creates genuine opportunities for competitors from a nation to penetrate new industries, for example by stressing an underserved segment, employing a new approach to the buyer, altering processes and modifying pricing. A new strategy can reduce barriers to entry and nullify a previous leader's advantages. Companies that recognise the significance of the triggers of structural change and move aggressively to exploit them often gain competitive advantage through things like being the first to reap economies of scale, reducing costs through cumulative learning, establishing brand names and customer relationships without direct competition, getting their pick of distribution channels, etc. (Porter, 1985).

The five forces are

- the threat of substitute products or services;
- the bargaining power of buyers;
- the bargaining power of suppliers;
- the threat of new entrants; and
- rivalry amongst existing competitors

Balanced scorecard adapted for eBusiness

Alexander Osterwalder and Yves Pigneur (2003) propose an e-business model framework that highlights the relevant e-business issues and elements that firms have to think of in order to operate successfully in the Internet era.

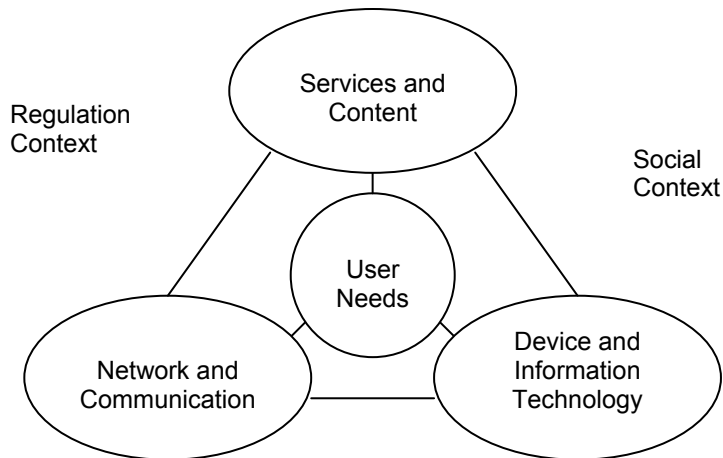
They adapted Kaplan and Norton's balanced scorecard (1992) and suggest that there are four main business model blocks: product Innovation, which describes the value proposition of a firm; customer relationships, which describes how a firm gets in touch with its customers and what kind of relationships it wants to establish with them; infrastructure management, which describes what activities, resources and partners are necessary to provide the first two blocks and the financial block, which describes the revenue flows and the pricing mechanisms of a firm and the ways that firms and make money from the other three blocks.

2.2.3.2. Related and supporting Industries

In order to analyse the related and supporting industries, this study will review the value chain that links industries in the cluster with a view to understanding exactly where value is constructed and the chains it creates between industries.

In 2002 Camponovo and Pigneur created the mBusiness Application Framework illustrated in Figure 2 to understand the mobile arena. They assessed and compared the strategic approaches of the industry actors which they classified according to three general main classes: technology, application and network (Müller-Veerse, 2001, cited in Camponovo and Pigneur, 2002).

Figure 2. The mBusiness Framework



In this framework, they place the users at the centre of the mobile business. These users have mobility-related needs. In order to fulfil these needs, there are necessary and complementary supporting blocks: communication (including the different networks that provide transmission capabilities), technology (composed of all the required hardware, including network equipment, mobile devices and platforms) and the services (including applications, content and supporting services). These blocks are constrained by regulation and social context.

In this study this framework will be used in order to understand the value chain that links industries in the cluster with a view to understanding where that value is constructed and the links it creates between industries. This will give some insight into the related and supporting industries and the closeness of their relationships.

2.2.3.3. Demand conditions

2.2.3.3.1. Demographics

Thompson and Teo (2001) examined how demographic variables (gender, age, and educational level), intrinsic motivation variables (perceived ease of use, perceived enjoyment) and extrinsic motivation variables (perceived usefulness) are associated with the four Internet usage activities, viz. messaging, browsing, downloading and purchasing.

Results of this study suggested that

- males are more likely to engage more in downloading and purchasing activities;
- younger users tend to engage more in messaging and downloading activities;
- perceived usefulness is significantly associated with messaging, browsing, downloading and purchasing; and
- perceived ease of use and perceived enjoyment are associated with messaging, browsing and downloading.

One explanation is that users are unlikely to continue to use the Internet for certain activities if they do not find it to be useful.

The strong association between perceived enjoyment and browsing indicates that browsing the Internet is generally perceived to be an enjoyable experience. One plausible reason is the wide variety of information available coupled with the interesting design of Web pages that incorporate multimedia features. Internet users are therefore able to search for and obtain leisure and entertainment information quickly and easily for their enjoyment.

Marketers who are encouraging more people to use the Internet can highlight that browsing the Internet is not only a useful activity but that it is also enjoyable as users may find a wide variety of Web sites related to their interest. Mobile phone web utilisation role players could emphasise that the Internet is easy to use for communication with other people and for downloading leisure or work-related information (Thompson and Teo, 2001).

2.2.3.3.2. Access

The term “access” can have many connotations when referring to information and communication technologies. One of these is in reference to the presence and availability of the physical equipment needed to access electronic networks. A second use of the term refers to a person’s ability to access and retrieve information, content and services from electronic interactive networks or to place information, content and services on the Internet (Keenan and Trotter, 1999).

2.2.3.3.3. Adoption of WAP-enabled mobile phones among Internet users

Wireless Application Protocol (WAP) is one of the few technologies that emulate the success of the Internet. Its success is credited to the fact that WAP combines two of the most popular inventions in recent times: Mobile Phones and Internet (Teo and Pok, 2003).

Other reasons that WAP is successful are:

- WAP provides a standardised way to link the Internet to mobile phones, two of the biggest sectors in the telecommunication industry,
- WAP receives widespread support from the major players in the telecommunication industry. As a result in 2000 the number of WAP pages grew from zero to about one million pages in only eight months. This rate of growth is much faster than the rate of growth of web pages (Teo and Pok, 2003).

2.2.3.4. Considerations and challenges for Internet Access

This section examines the attitudinal, social and perceived behaviour control factors that are associated with the adoption of WAP enabled mobile phones among Internet users. It starts off with general technology adoption theory which is based on research prior to the advent of mobile phone web utilisation. In the last part of this section some relatively recent research by Teo and Pok in 2003 that looks specifically at the adoption of mobile phone internet access is reviewed.

2.2.3.4.1. Technology acceptance and diffusion models

Adoption and diffusion rates have been studied by many authors for a variety of different technologies. Bass (1994) came up with one of the first models, and many of the subsequent models have extended and modified Bass's model to evaluate and forecast new products and technologies. The basic premise of most of these models is that technologies and innovations are adopted and diffused through societies at different rates. These models help understand why some technologies flourish, while others are overtaken and never reach their full potential.

Diffusion is the process by which an innovation is communicated through channels over time among members of a social system (Rogers, 1985). The rate of adoption is the relative speed with which an innovation is adopted by members of a social system. New technologies diffuse through a population of potential buyers over time (Norton and Bass, 1987) and successive generations of a technology compete with earlier ones and

sometimes substitute earlier technologies. These build on Bass's original diffusion model developed in 1969 (Bass, 1994) by encompassing both diffusion and substitution.

Technology diffusion models need to take internal and external factors into account. New technology adoption is jointly determined by a person's attitude towards using the new technology and its perceived usefulness and ease of use (Davis, 1986).

2.2.3.4.2. Theory of reasoned action (TRA)

TRA is based on the proposition that that an individual's actual behaviour is determined by the person's intention to perform the behaviour, and this intention is informed jointly by the individual's attitudes and subjective norm. A person's attitude towards a behaviour is in turn determined by salient beliefs about the consequences of that behaviour and the evaluation of the desirability of the consequences (Fishbein and Ajzen, 1975). Beliefs are defined as the individual's subjective expectation that performance of a given behaviour will result in a given consequence. Subjective norm is the person's perception that people who are important to him think he should or should not behave in a certain way (Dillon and Morris, 1996).

2.2.3.4.3. Technology Acceptance Model (TAM)

TAM is an adaptation of TRA (Taylor and Todd, 1995). It specifies two beliefs, perceived ease of use and perceived usefulness as determinants of usage intention and IT usage (Davis, Bagozzi and Warshaw, 1989). Perceived usefulness is defined as the degree to which a person believes that use of the system will enhance his performance. Perceived

ease of use is the degree to which a person believes that using the system will be free of effort (Dillon and Morris, 1996). TAM theorises that a technology that is easy to use and useful will have a positive influence on the intended user's attitude and intention towards using the technology and increases the use of the technology.

2.2.3.4.4. Theory of Planned Behaviour (TPB)

The theory of planned behaviour is another variant of the theory of reasoned action, but perceived behavioural control is added as a determinant of attitude and behaviour. This overcomes the limitation of incomplete volitional control.

2.2.3.4.5. Decomposed theory of planned behaviour

The decomposed TPB explores attitude and subjective norms more completely by decomposing them into specific belief dimensions which have the advantage that they can be applied more universally, because they can point to specific factors that may influence adoption and use. This means that specific elements can be identified as more relevant than others in IT uptake (Ajzen, 1991).

2.2.3.4.6. WAP technology adoption

Teo and Pok (2003) researched relative advantage, social image, perceived risk, life style compatibility and perceived ease of use in the context of the adoption of WAP technologies.

The findings show that the intention to adopt a WAP enabled mobile phone is associated with attitudinal factors and normative factors, but not perceived behavioural control factors.

The attitudinal factors that are found to have a significant influence on behavioural intention are relative advantage, social image and perceived risk.

Life style compatibility was found to have significant influence only on email, whereas perceived ease of use is found to have significant influence in news forums.

Social image has significant influence on attitude. Mobile phones have evolved to become life style products and the possession of a particular model projects a certain image.

In early stages of new technologies, where information on the innovation may be incomplete, potential adopters have to rely on their referent groups for information.

2.3. Innovation

2.3.1. Disruptive Innovations

The concept of disruptive innovation is discussed in a book entitled *The Innovator's Dilemma* by Clayton Christensen (1997). Christensen suggests that innovation refers to all changes of processes by which an organisation transforms labour, capital, materials and information into products or services of greater value. In addition to creating new processes and products, innovation also includes new types of business models.

The Disruption Innovation Theory recognises two types of innovation. The first, sustaining innovation, generates growth by offering better performance in existing markets. Usually, these innovations are exploited successfully by the established players in an industry and do not lead to revolutionary changes in an industry's landscape. On the other hand, compared to existing products and business models, the second type, disruptive innovations, initially have a lower performance in the traditionally most important performance criteria such as functionality, speed, or size (Christensen, 1997).

The author maintains that mobile phone web utilisation is innovative at both levels. In the corporate environment, the benefits of mobile commerce are being realised, but it is viewed as a sustainable innovation, enhancing the operational running of a business. But the low end of the market is where the disruption will occur. Historically disadvantaged consumers will benefit from using the web for communication and possible job hunting as they gain access on WAP enabled phones that were launched into the markets some years ago and which will start to reach the second hand phone market. This will be a truly disruptive innovation as it will now be possible to create new markets with new products and possibly even new business models that overtake the existing markets.

2.4. Specific features of the Mobile phone web usage cluster

2.4.1 Mobile business characteristics

The mobile business industry presents a number of peculiar economic characteristics such as mobility, network effects and proprietary assets. Successful business models are likely to be those that best exploit these particularities (Camponovo & Pigneur, 2002)

2.4.1.1 Mobility

Mobility represents a distinct advantage upon which mobile services can build their value proposition. Mobility brings several unique benefits that can be related to freedom of movement (services can be used while on the move), ubiquity (using services anywhere, independent of the user's location), localisation (user's location information can be exploited to offer location-based services), reachability (users can be reached anywhere, anytime), convenience (always at hand), instant connectivity (always on) and personalisation (Müller-Veerse, 2000, cited in Camponovo and Pigneur, 2002).

However, mobility also involves some drawbacks; in particular, mobile applications suffer from limited and more expensive bandwidth and device limitations (Camponovo & Pigneur, 2002).

Bandwidth limitations are a consequence of radio spectrum being a fixed, scarce resource and its control being restricted to licence owners. Device limitations are due to the portability requirement of mobile handsets that have to be small and lightweight, leaving limited space to be used for screen, batteries and input/output interfaces (Camponovo and Pigneur, 2002).

2.4.1.2 Network externalities

Networks are composed of a set of components connected by links. These structures exhibit an economic phenomenon known as network externality. Externality occurs when a transaction between two actors affects, as a side-effect, a third party that is external to the transaction. A product presents a network externality if the utility that a user derives from

consumption of goods increases with the number of other agents consuming the product (Katz and Shapiro, 1985, cited in Camponovo and Pigneur, 2002).

Network externalities can be direct or indirect. When customers are identified with network components, which are typical of two-way networks such as telecommunication networks, the externality is direct and results from the fact that a user joining a network adds to the benefit of all other network members because the number of potential interactions increases.

Rohlfs (1974 cited in Camponovo & Pigneur, 2002). showed that network externalities play an important role in the telecommunication market, where the utility of joining a communication network is positively related to the number of its members. In this case, network effects take the form of being able to communicate (call and receive calls) with a larger number of other users.

On the other hand, the increase in the number of network members also produces negative externalities such as network congestion. Communication networks also show signs of indirect externalities, where users benefit indirectly from network size. As an example, an extra customer potentially increases the number of services available to other customers since, by increasing the demand for services, the provision of services becomes more profitable and more firms would be willing to offer them.

2.4.1.3 Exclusive control over important assets

The mobile business market is also characterised by the existence of important assets that are under the exclusive control of a firm. Exclusive control may arise for a number of reasons including scarcity, licensing or the existence of a patent, which gives its owner the exclusivity over an asset, and the presence of particular cost structures with increasing returns or very high initial investments that cause natural monopolies to arise.

One example is access to radio spectrum, a necessary but finite resource, required by mobile telecommunication, TV, radio, transport, navigation, etc (Camponovo and Pigneur, 2002).

Spectrum access has to be regulated to ensure an efficient and equitable use of this resource. Consequently, the portion of spectrum allocated to mobile communications is small and restricted to a few network operators who own the licence to operate on a particular frequency band.

Network operators have total control over a number of other important assets. By providing the SIM card to their customers, mobile operators have total control over them, since the communication from and to a user must pass through the operator network. In addition, the operator possess unique access to valuable user-related information such as a complete customer profile, call patterns, location information, etc (Camponovo and Pigneur, 2002).

2.4.1.4 Implications

Mobility adds a great deal of complexity to application and services development, which requires broader competencies that are only accessible through partnerships or acquisitions. Network effects necessitate that devices and applications must be inter-compatible, requiring partnerships to agree on common standards and platforms. An example is Symbian, a consortium bringing together a large number of device manufacturers to develop a common operating system (Camponovo and Pigneur, 2002).

Finally, the existence of indispensable assets exclusively controlled by network operators requires firms to collaborate with them, unless financial problems or regulation compel them to open up access to these assets to other firms.

From these characteristics, it follows that providing complete mobile services solutions requires the collaboration of a large number of market players, with a particular consideration towards network operators (Gordijn, 2002).

2.4.2 Understanding Internet marketing adaptation for mobile commerce

When we examine the propensity of marketers to adapt the way they use the Internet for mobile phones, the Change Propensity Matrix developed by Wang, Hwang and Fesenmaier (2003) (cited in Youcheng, Yeong-Hyeon, Fesenmaier, 2006) provides a useful model.

Figure 3: The Propensity Matrix

| | | | |
|------------|-----|-------------|-----|
| Importance | Yes | 1 | 2 |
| | No | 3 | 4 |
| | | No | Yes |
| | | Utilisation | |

Wang, Hwang, and Fesenmaier proposed that change propensity analysis can be used to estimate the general likelihood of future growth in the use of Internet marketing activities using a two-dimensional space defined by two related constructs: propensity and relative popularity. Propensity is measured as a function of the current level of use and the perceived importance/usefulness of existing and potential marketing activities including web site features/ applications (Youcheng *et. al.* 2006 p 158).

It is argued that the future use of an Internet marketing activity will stay the same if it belongs to either of the following two situations:

- the Internet marketing activity is currently widely used, and the users believe that it is important to achieving the marketing goal(s) (quadrant 2); or
- the activity is currently not being used, and it is believed not to be an important part of the overall marketing strategy (quadrant 4).

Change in the use of the marketing activity/application will likely take place in the following two scenarios:

- Organisations are currently using a marketing activity, but it is not widely believed to be important (quadrant III); and
- Organisations are not currently using the activity but believe it is important to use the activity as part of the overall marketing programme (quadrant I).

This model will be adapted to examine the propensity of businesses to include mobile phone web utilisation in their marketing strategies.

2.4.3 Changing business and marketing models and IT strategies

There are two basic user classes to consider: existing Internet users who are migrating from desk top access to mobile phone access and new markets that are starting to use the Internet and mobile commerce because they now have access on their mobile phones.

2.4.4 Adapting web strategies for mobile phone web utilisation

Cellphone applications for viewing the Internet are focused on a simplified display of web pages on a cellphone. Web pages are usually designed considering the restraints of a regular work station. Most cell phones have small screens; which means there is very limited space to present the content. Very few solutions have presented content in an adequate and appealing way on these screens. The difference in the graphical presentation of content between a cellphone and a normal workstation is very large for content (Sundelof, 2006).

This is an important challenge for future mobile phone solutions and in many ways this is a philosophical challenge rather than a technological challenge. For instance, the mouse or touchpad of a normal laptop makes the user interaction much simpler than on the cellphone with its small “keyboard”. The available mobile applications usually lack the corresponding web application that completes the content delivered to the cellphone. The user must be provided with the full version of the content. (Sundelof, 2006)

The cellular networks are also still lagging in bandwidth and the data plans in cellular networks are continuing to be fairly expensive. Both these factors are limiting the amount of data that is being sent to and from a cellphone. (Sundelof, 2006)

3. Research Questions

3.1. Restating the research questions

In order to understand the South African mobile phone web utilisation cluster, the specific points of departure by each of the elements that make up the cluster and how these elements interrelate needs to be understood and analysed. The main research question to be asked is “Does the Mobile phone web utilisation cluster represent a source of competitive advantage for South Africa? “ In order to do so, the following sub-questions are proposed to satisfy the needs of this research paper:

- What is the universe of the mobile phone web utilisation cluster?
- Are the related and supporting industries conducive to competition?
- Are firm strategies, structures and competitive rivalry conditions conducive to competitiveness in this cluster?
- Are demand conditions conducive to global and local competitive growth?
- Are factor conditions conducive to competitiveness?
- What is the role of Government?

4. Research methodology

Introduction

This chapter presents the research thinking, methodology used, and design used to address the research problem outlined in Chapter 1.

This research will analyse and explain the mobile phone web utilisation cluster through predominantly qualitative methods using deductive logic based on existing theories and the outcome will be applied research in this sector. It will also use quantitative methods to provide insight into how businesses, not directly involved in this cluster, are adapting their web strategies for this new technology.

There are three main sections to this chapter: research philosophy, research approaches and research design and strategy. Each will deal in turn with a brief explanation of the overall research paradigm being presented and the reason for the selection of the particular paradigm for this research project. The structure of this chapter has been derived from the doctoral thesis of Peter Tobin (2006).

Research Philosophy

Given the research problem as outlined in Chapter 1, the best fit was to follow the phenomenological paradigm. Giorgi, (cited in Groenewald, 2004) says that phenomenological research is concerned with description. The aim of the researcher is to

describe as accurately as possible the phenomenon. According to Welman and Kruger (cited in Groenewald, 2004) phenomenologists are concerned with understanding phenomena from the perspectives of the people involved.

The following parameters identified by Hussey and Hussey (1997, cited in Tobin, 2006) were recognised for this phenomenological paradigm:

- . It tends to produce qualitative data: this fits well with the case study approach.
- . Data is rich and subjective: the qualitative data would be rich by nature, and the gathering is subjective due to the level of involvement and the background knowledge of the researcher.
- Reliability could be low, but the possibility of lower reliability data is countered by the use of triangulation.
- Validity should be high as a result of the empirical nature of the exercise.

Research approaches

Research can have elements which are based upon a non-empirical approach, an empirical approach, or a combination of the two. These do not necessarily represent a simple either/or choice, but should rather be seen as the extent to which elements of the approach apply. In addition, the researcher must choose between adopting one or a combination of a qualitative and quantitative approach; and a subjective or objective approach.

This research project was designed to take into account both non-empirical and empirical research approaches. The non-empirical research informed the structure and execution of the empirical research activities.

4.3.1. Non-empirical / empirical research

4.3.1.1 Non-empirical research

The pre-existing body of knowledge that exists in this field was used as input to the body of theory which pertains to the selected subject area.

The literature review was used to address the research problem as identified by Saunders *et al.* (2000 cited in Tobin, 2006) in order to

- include the key academic theories within the chosen area: these are identified in Chapter 2;

- demonstrate that the knowledge of the chosen area of research is up-to-date: as demonstrated in Chapter 2;
- show how this research relates to previous published research: this will be shown in Chapter 6;
- enable those reading this research report to find the original work cited: per the references supplied in this document; and
- to avoid charges of plagiarism.

4.3.1.2 Empirical research

According to Hussey and Hussey (1997 cited in Tobin, 2006) there are four different types of research purpose: exploratory, descriptive, analytical or predictive. Whatever the purpose of the research, empirical evidence is required. They define empirical evidence as data based on observation or experience.

4.3.2 Qualitative / quantitative approach

As this research sought to understand the mobile phone web utilisation cluster, which is a relatively young industry characterised by a large number of uncertainties at different levels, in particular concerning technology, business strategy and consumer demand (Camponovo and Pigneur 2002), a mainly qualitative approach to data gathering was used. This fits in with the definition of qualitative research given by Hussey and Hussey (1997 cited in Tobin, 2006) definition of qualitative research as a subjective approach which includes the examination of perceptions in order to gain understanding.

Quantitative methods were used for part of the empirical study, to assist in the assessment of the state of web site optimisation for mobile access in big businesses.

4.3.3 Deductive / inductive

Deductive research is a study in which theory is tested by empirical observation. The deductive method moves from the general to the particular.

In this study a mainly deductive approach was used, with the emphasis on an exploratory approach to improve the understanding of the cluster being investigated in this case study

4.3.4 Subjective / objective

Another significant choice which exists in the research paradigm to be adopted is the extent to which the researcher is subjective (involved in or has an influence on the research outcome) or objective (distanced from or independent) in the execution of the fieldwork (empirical work).

The phenomenological research paradigm is, by its very nature, subjective because it requires involvement in both real world circumstances as well as the involvement of the researcher. A subjective approach requires the recognition of any influence or limitation such subjectivity may have on the conduct or findings of the research. It is important to recognise the subjective nature of phenomenological research in the analysis and interpretation of the data gathered.

Research design/strategy

Problem Discovery and Definition

The author has a business which is designed to provide web based services to historically disadvantaged individuals via their mobile phones in order encourage these individuals to see value in the Internet. In consequence, the author has a deep interest in the fundamentals of how this market relates to the Internet.

The problem defined was that the business cluster that provides mobile phone web utilisation services was a young cluster, in a state of flux because of various drivers which were shaping its future in terms of globalisation, new technologies and changing demographics in South Africa as the Government seeks to redress the atrocities committed in the name of apartheid.

The author therefore wanted to explore this changing landscape within the context of the South African economy. This was therefore the motivation for this research: to understand how the cluster was adapting to the macroeconomic changes around it, and how the players were creating competitive advantage.

4.4.2 How the research was structured

This research was predominantly qualitative, it was therefore appropriate to understand the fundamental characteristics of the phenomenon under consideration before theorising about it (Trucker and Powell, 1995). In order to do this the study comprised the following:

Phase 1: An extensive secondary data analysis in the form of a literature study into the role of the Internet in economic development, theories on competition and cluster, business models designed for eBusiness and mBusiness internationally.

Phase 2: Defining the cluster and ensuring that it met with the requirements to be classified as a cluster (Porter, 2003).

Phase 3: In-depth interviews with industry experts in order to understand the cluster better, this was complemented by the rigorous gathering of artefacts in order to supplement and contextualise what these experts were saying.

Phase 4: A small quantitative survey, designed to provide a snapshot of businesses' readiness for mobile phone web utilisation.

4.4.2.1 Defining the cluster

Qualitative research was conducted in order to “diagnose the situation” (Zikmund, 2003, p.111). This involved determining who the players in the cluster were and how they defined themselves as well as the terminology used, in order to ensure that the universe was consistent when selecting all players.

The research study aimed to create an understanding of the role of the mobile phone web utilisation cluster in creating economic growth in South Africa. The research paper is exploratory as it serves to clarify and define the nature of the problem (Zikmund, 2003). It provides qualitative data that assists in creating a greater understanding of mobile phone web utilisation, as opposed to a precise measurement.

4.4.2.2 Semi-structured Interviews

To achieve the research objective industry players were selected and interviewed in order to describe the universe. The primary unit of analysis was private sector companies trading in the South African mobile phone web utilisation cluster, selected using a convenience sample and snowball techniques.

As the author could find no definition of this cluster, a description of the mobile commerce cluster found in the 'Mobile Commerce Life Cycle' (Varshney and Vetter, 2001 cited in Lehner and Watson 2001) was used as the point of departure. According to this definition the cluster is made up of:

- wireless service providers, specifically the mobile network service providers;
- application providers (WASPS)
- content providers (for example, ring-tone and information services)
- equipment vendors (handsets and other mobile devices)
- other service providers (for example banks and retailers); and
- users.

The secondary unit of analysis was the Chief Marketing Officer who guides marketing and business development or the Chief Strategy Officer who guides the business strategy.

As mobile phone web utilisation is relatively new in South Africa, not all the players in the industry have a formally designated individual in this role. Where this was the case, a key informant, who had a strategic understanding of both the organisation and the cluster, was interviewed. The following informants were considered for the purpose of this study:

- A major contributor to the organisation's strategy development.
- The individual tasked with aligning business imperatives with mobile phone web utilisation.

4.4.2.3 In-depth Interviews

In-depth interviews were conducted with players who had had personal experience in the field (Zikmund, 2001). The purpose of these in-depth interviews was to understand the role of the elements cited by Porter (2000) in creating competitive advantage in this cluster.

The respondents were selected for interview purposes based on a convenience sample. The data was gathered through unstructured in-depth interviews with the respondents as well as by referring to documented third party data which provided insights into the mobile phone web utilisation cluster, formal documentation on websites and formal documentation supplied by industry experts who elected not to be interviewed, including annual reports.

4.4.2.4 Survey

The businesses surveyed were selected using convenience sampling. The purpose of the survey was to gauge the readiness of South African businesses for mobile phone web utilisation as demonstrated by their strategic intent or actions in this regard when it came to their websites. The survey was conducted using email, with no attached document, and the questionnaire in the body of the email.

4.4.3 Research Paradigm

Given the nature of the research problem as outlined in Chapter 1, it was decided to select the case study alternative as being the most appropriate for this research project.

This research paradigm will be explored in some detail in the following sections.

4.4.3.1 Case study research overview

Yin (1994 cited in Tobin, 2006), defines a case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context.” Yin maintains that because phenomena and context are not always distinguishable in real life situations, using a case study as a research strategy represents an all encompassing method which includes the logic of the design, the techniques for collecting data and specific approaches to analysing the data.

Case studies can be applied to explaining complex, presumed casual, links in real life interventions, describing interventions in a real life context and exploring situations in

which the intervention has no clear single set of outcomes. The case study will comprise a description of the South African mobile phone web utilisation cluster.

A research design is the logic that links the data to be collected (and the conclusions drawn) to the initial questions of the study. The development of an illustrative case study design needs to maximise three conditions related to design quality: (1) construct validity, (2) external validity and (3) reliability. Research design deals with what questions to study, what data is relevant, what data to collect and how to analyse the results (Philliber, Schwab and Samloss, 1980 cited in Tobin, 2006).

According to Stake (1995 cited in Tobin, 2006) a case study is the study of the particularity and complexity of a single case, understanding its activity within important circumstances.

The research project was conducted based on the guidelines supplied by Myers (1997) who suggests the case study method involves at least four stages of work:

- Determine the present situation through the semi-structured and unstructured interviews.
- Gather information about background to the present situation through interviews and by referring to documentation and other sources.
- Gather more specific data through the quantitative exploration of the optimisation of websites for mobile access, by further interviews, observation and collection of artefacts.
- Present an analysis of findings and recommendations for action in the final research report.

This case study was a Patchwork case study, it comprised a set of multiple case studies of the same research cluster which was intended to provide a more holistic view of the dynamics of the mobile phone web utilisation cluster (Jensen and Rodgers, 2001 cited in Tobin, 2006)

The next section will discuss the selection of the cluster.

4.4.3.2 Case research data methods

Zikmund (2003) says that exploratory research is classified as such because of the purpose of the research and not necessarily because of the actual technique used. This methodology was selected because the cluster was in a state of extreme flux and in order to develop a phenomenological view where the view of the players was under consideration.

There are four categories of exploratory research methods which include experience surveys, secondary data analysis, case studies and pilot studies (Zikmund, 2003).

Of these four, two research techniques were used to understand the mobile phone web utilisation cluster and its role in economic growth in South Africa:

- Secondary data analysis, in the form of Internet searches on content aggregator sites and content generation sites, such as IT Web, Marketing Web, Moneyweb and iAfrica, to provide an understanding of mobile phone web utilisation players, their activities in the market, business models and new technologies.

The initial purpose of this data was to select the key respondents to be interviewed. However, analysis of the activities also proved very useful in developing a classification of the functions found in the cluster.

- Experience surveys were conducted with the identified industry experts. This is a technique “where individuals who are knowledgeable about a particular research problem are surveyed” (Zikmund, 2003).

The interview was generally informal and unstructured to allow for conversation and to explore elements that may not have been on the questionnaire or to move beyond issues that were not relevant in the context (Zikmund, 2003).

4.4.3.3 Data sampling

Given the nature of the research problem outlined in Chapter 1 and the fact that, to a large extent, the players in the cluster competed against each other, non-probability data sampling methods were appropriate for this research study.

For the purpose of this research Powell’s classification was followed. Powell (1997 cited in Tobin, 2006) identified that non-probability sampling includes: the accidental sample, the quota sample, the purposive sample, the self-selected sample and the incomplete sample.

Considering the nature of the research, the purposive sampling method was selected as the most appropriate, and then considering the level of seniority of the respondent self-

selection played a role. This sample was based on the researcher's knowledge of the population, personal relationships and the objectives of the research (Powell, 1997 cited in Tobin, 2006).

4.4.3.4 Data collection methods

Data collection methods when using the case study approach include the use of the questionnaire; interviews; observation and gathering of documentation and artefacts.

A multi-method approach was taken to the data collection (Jankowicz, 2000 cited in Tobin 2006). Data was gathered using

- key informant interviews;
- a semi-structured questionnaire;
- electronic surveys; and
- historical artefacts including corporate materials such as annual reports, press releases and news media analysis

Each of the data collection methods could be considered part of an overall approach to improving the quality and validity of the research data through an approach known as 'triangulation' (Tobin, 2006). Triangulation is an approach intended to increase the quality and validity of the qualitative research methods.

During this study, triangulation was used as part of the empirical data gathering. Three types of triangulation (identified by Stake 1995, cited in Tobin, 2006) used in this research include:

- data triangulation where multiple sources were used, including published material, annual reports, press releases, white papers and media and industry commentary and analysis;
- theory triangulation which was achieved using a variety of eBusiness theories which were referred to in the construction of the quantitative and qualitative data-gathering; and
- methodological triangulation through the use a variety of data gathering tools and techniques: quantitative and qualitative methods; interviews, surveys and triangulation of data sources.

Each of the data collection methods used during this research study will now be explained in more detail.

4.4.3.4.1 Interviews

The interview was selected as the primary data gathering technique as being best suited to the case study method. The data was collected through face-to-face interviews and recorded by hand. Where the interviewee was not available within the timeframe an electronic questionnaire was used.

For the purposes of this research the following types of interviews were used:

- Semi-structured interview: this offered free responses from participants to specific questions. Eight such interviews were conducted.
- Unstructured interview: this allowed the key informants to express themselves without any restriction. Five unstructured interviews were conducted.

The following explains how the interviews were conducted:

- A brief explanation was given of the purpose and format of the interview to be conducted. This was done in the motivation for the interview in order to secure the interview by email and telephonically, and then again in the actual face-to-face interview itself.
- The unstructured interviews were planned to be of roughly one hour's duration (actual duration varied from 60 to 300 minutes).
- All interviews were conducted on a "one-on-one" basis.
- Some interviews were conducted at the normal work location of the interviewee. Other interviews were conducted at a location convenient to the respondent.
- All the interviews were transcribed by hand in front of the respondent, so that he could see what was being written down.

4.4.3.4.2 Survey

The sample survey was selected as a secondary data gathering technique.

In addition to the face-to-face, unstructured interviews, a small probabilistic sample of marketing directors and other key informants was also sent an electronic survey, based on the format of the semi-structured interviews, to complete the delineation of the cluster and the roles of the players.

A small survey was also conducted with a non-probabilistic sample of marketing directors in organisations that had websites as a channel for communication with their stakeholders. This was done in order to gauge the strategic intent in terms of whether their websites were optimised for mobile phone web usage.

4.4.3.4.3 Documents and artefacts

A number of artefacts and documentary sources were collected during the empirical data gathering activities. These included:

- case study organisations' corporate publications;
- case study organisations' public websites;
- press clippings about the case study organisations;
- press clippings about other cluster players not interviewed; and
- "best practice" articles from South African and global cluster players.

The next session addresses the data analysis approach used in this research project.

4.4.3.5 Data analysis and conclusions

The details and facts were arranged in a logical order. Specific documents, occurrences, and other data were examined for the specific content that they might have in relation to the case. First the higher level categories were determined and the answers coded (Chipp, 2007). The data and their interpretations were examined for underlying patterns (Leedy and Ormrod, 2001 cited in Tobin, 2006) The data was then synthesised and generalisations made.

4.4.3.5.1 Sampling errors

The following sample errors must be taken into consideration when reading this report Zikmund (2003):

Respondent Error: A non-response error as Vodacom did not participate in the research. It is Vodacom's company policy not to participate in research of this nature. They did however provide documentation that could be used.

Administrative errors: Different interview techniques (Zikmund, 2003) may have been a source of bias when questions were rephrased etc.

4.5 Limitations

4.5.1 In-depth interviews

Personal interviews were conducted to gain explorative insight into the mobile phone web utilisation cluster, but due to the nature of these face-to-face interviews there was “no anonymity” and individuals may have been reluctant to provide information regarding specific strategies of a confidential nature (Zikmund, 2003, p. 203).

The sample size was small and therefore the results are not generalisable across the cluster in South Africa. This small sample also means that some elements of the cluster, viz. mobile phone operators, were, to some extent, over-represented, when these respondents spoke to issues affecting other cluster participants, for example, cell phone device distributors. Therefore the results of this study cannot be inferred to the entire cluster (Zikmund, 2003, p. 402)

The two largest mobile phone operators, MTN and Vodacom, declined to participate in the research. However, they did provide annual reports from which to work.

The interviews were completely unstructured and, therefore, the interviewees spoke to what interested them most about the cluster. Each respondent may, therefore, have emphasised a different aspect of the cluster, making comparisons difficult. To some extent, this was overcome by referring to artefacts such as press releases, white papers and opinion pieces in order to correlate their answers.

4.5.2 Semi-structured questionnaires

The sample size was very small and not representative of the entire industry because a snowball sampling methodology was used. Not all the respondents answered all the questions and the answers may consequently not be generalisable to the industry (Zikmund, 2003).

4.5.3 The email survey

The sample size was small compared to the size of the industry and a snowball sampling methodology was used to select the sample. The responses therefore only provide an indication of the level of mobile phone readiness. There may be other variables which impact on mobile phone readiness, such as the sophistication of target audiences, etc.

4.6 Summary

This chapter has explained the various options available for the execution of the field research and the logic for the selection of the specific approach, strategy and methods applied in this research project.

In summary, the overall methodology was one based on a phenomenological philosophy. It combined non-empirical and empirical approaches; was subjective rather than objective; was deductive in terms of theory testing about how organisations in this cluster compete; it used mainly qualitative methods; it employed the case study as the primary research strategy; it took a patchwork approach to the case setting; it treated the case as one of an

exploratory nature, and it used a combination of data sampling, collection and analysis methods.

The following chapter will present the empirical case data gathered during the fieldwork phase of this research project.

5. Results

5.1. Introduction

This chapter describes the data gathered during the empirical work phase, facilitated by 5 in-depth interviews and 10 semi-structured interviews and 25 eMail survey respondents. These respondents and their comments are described in this chapter.

This research project used both qualitative and quantitative methods to assess the factors in the mobile web utilisation cluster that could contribute to competitive advantage.

The structure of the chapter will be as follows:

- respondents;
- data collected from semi structured questionnaires;
- data collected from unstructured in-depth interviews;
- data collected from the quantitative electronic survey; and
- summary.

The findings in this chapter are segmented into the following elements and presented without formal analysis:

- The universe and related and supporting industries in which key informants assessed the validity of the universe of the project and identified the related and supporting industries through semi structured interviews and electronic questionnaires

- Firm strategy, structure and rivalry, demand conditions, factor conditions and the role of the Government, in which key informants identified the competitive features of each of these elements through unstructured in depth interviews, a quantitative electronic survey and through reference to other artefacts. The data is sorted onto the prevailing themes within each element that emerged from these methodologies.

5.2. Respondents

5.2.1. Semi structured qualitative survey respondents

A qualitative survey was designed in the form of a series of open-ended questions in order to understand what the mobile phone web utilisation cluster looks like and to identify the related and supported industries. These questionnaires were semi-structured; some of them were conducted face-to-face and one by email when the respondent indicated that this is how they would prefer to participate.

Not all respondents answered all questions, and therefore only answers from the respondents who did answer the questions are captured here.

Table 1 shows the industry players who responded, their titles, companies they work for and their role according to the Mobile Commerce Life Cycle Model.

Table 1 Industry Players interviewed in order to define the Universe

| Expert | Company | Role in the model | Designation |
|--------------------|-----------------|--|--|
| Tobie van der Spuy | LUUK | WASP | CTO |
| Simon Camerer | Cell C | Wireless Service Provider and Content Provider | Marketing Director |
| Bernd Stachelhaus | Vodacom | Wireless Service Provider and Media Company | Senior Analyst – this interview was in his personal capacity |
| Alan Knott Craig | iBurst | Wireless Service Provider | MD |
| Paul Rubin | NXT Mobile | WASP Content Provider | Business Development Manager |
| Ryan Paikin | Net#work | Other Service Provider | Web Master |
| Benny Naude | 1 Stop Cellular | Equipment Vendor | MD |
| Ron Goldstein | Randworths | WASP | Developer |
| Dave Hillier | Deli Artists | Other Service Provider | MD |
| Tristao Abro | Virgin Mobile | Wireless Service Provider | Director of Strategy |

5.2.2. In depth Interviews

The in-depth interviews involved free discussion aimed at understanding the elements of firm strategy structure and rivalry, demand side and factor conditions. When time allowed, the semi-structured questions were introduced into the free discussion in order to complement the data collected about what the cluster looks like and the related and supporting industries.

The in-depth interview results will be reported in terms of the emerging themes that came out of the unstructured interviews.

Table 2 shows the respondents who were interviewed and the time given for the interviews, and the individual who agreed to complete a single semi structured electronic questionnaire containing many of the same issues covered in the in-depth interviews (not to be confused with the semi structured questionnaires mentioned above).

Table 2 Respondents interviewed in depth.

| Expert | Company | Data Gathering | Role in the market | Designation |
|--------------------|---------------|-------------------------------|---|----------------------|
| Tobie van der Spuy | LUUK | 5 Hour interview Documents | Mobile Virtual Network Enabler | CTO |
| Simon Camerer | Cell C | 1.5 Hour interview | Mobile Network Operator and Content Provider | Marketing Director |
| Alan Knott Craig | iBurst | Questionnaire | Wireless Broadband Provider | MD |
| Dave Hillier | Deli Artists | 1 Hour interview | Broadcast designer | MD |
| Tristao Abro | Virgin Mobile | 3 Hour interview Documents | Mobile Virtual Network Operator | Director of Strategy |

Biographical Information on key informants

➤ **Tobie van der Spuy**

Tobie van der Spuy is a director and CTO of Luuk, a software company based at the Innovation Hub in Pretoria. As web-based application specialists, focusing on web, mobile and GIS applications, LUUK develops technologies that range from Internet and Intranet-based mobile software applications and an operating platform, to hardware devices.

➤ **Simon Camerer**

Simon Camerer joined Cell C (Pty) Ltd in March 2004 as the Executive Head of Marketing. Prior to joining Cell C, he served as Marketing Director for the Walt Disney Company in Europe, as well as having held other Senior International Marketing and Strategy positions at Anderson Consulting (now Accenture) and Saatchi and Saatchi Advertising. Simon obtained a BA at Stellenbosch and an MBA at Thunderbird – The American Graduate School of International Management. He is a Fellow of the Chartered Institute of Marketing (UK) and a member of the American Marketing Association.

➤ **Alan Knott Craig**

Alan is a chartered accountant and was formerly the MD of Cellfind, a Wireless Application Service Provider that was the first company in the Southern Hemisphere to launch passive location-based services on GSM (Global System for Mobile Communications) cellular networks. He has been the MD of iBurst since early 2006.

➤ **Dave Hiller**

Dave Hiller is MD of Deli United Artists, a web development company that specialises in Broadcast Animation, and based at Network BBDO.

➤ **Tristao Abro**

Tristao Abro is a Chartered Marketer, who has spent most of his career in the mobile cluster. He headed marketing for Virgin Mobile, but has recently been promoted to Director of Strategy.

5.2.3. Quantitative survey

Table 3 shows the businesses that use websites to communicate with their stakeholders, and who were surveyed in order to understand their adoption of mobile phone web utilisation as part of their marketing strategy and the designation of the person who was contacted.

This survey was conducted in order to gauge whether businesses are taking mobile phone web utilisation into consideration in their marketing strategies. These businesses are on the demand side of the mobile phone web utilisation cluster, and their level of strategic intent in this regard could form part of the analysis of the role of demand factors in creating competitive advantage for this cluster.

Table 3 – Respondent Businesses

| | Responding Business | Designation |
|-----|-------------------------------|----------------------|
| 1. | AASA | Marketing director |
| 2. | African Encounters | Owner |
| 3. | Airport Media | Owner |
| 4. | AMH | Marketing Director |
| 5. | Avon | Marketing Director |
| 6. | CNBC Africa | Marketing Director |
| 7. | Digital Bridging Technologies | Owner |
| 8. | Discovery Health | Marketing Director |
| 9. | GIBS | Senior Lecturer |
| 10. | Investec | Marketing Director |
| 11. | LUUK | CTO |
| 12. | Mastercard | Senior Manager |
| 13. | Microsoft | Marketing Director |
| 14. | Nedbank | Senior Manager |
| 15. | Nestle | Marketing Director |
| 16. | Net#work BBDO | Web Master |
| 17. | OutSurance | CEO |
| 18. | Primedia | Marketing Director |
| 19. | Puruma | MD |
| 20. | Renault | Marketing Director |
| 21. | Santam | Marketing Director |
| 22. | Standard Bank | Marketing Director |
| 23. | TopPro | Managing Director |
| 24. | Toyota Finance | Senior Manager |
| 25. | VeZA | CEO |
| 26. | Virgin Mobile | Director of Strategy |

5.3. Data collected from the semi structured questionnaires

5.3.1. Defining the Universe

The mobile phone web utilisation cluster is a new cluster in South Africa. It does not have clearly defined boundaries. In order to ensure that the cluster was correctly delineated and analysed, the initial part of the research was about understanding exactly what fell within the boundaries of the universe and, importantly, what should be left out of the research.

The first two questions on the electronic semi-structured questionnaire were about defining the universe.

Question 1

The purpose of this question was to understand how closely the term *mobile commerce* corresponded with the term that was eventually chosen for the purposes of this paper viz. “mobile phone web utilisation”.

Therefore the first question read:

For the purposes of this study, mobile commerce will be limited to mobile phone web utilisation. Do you agree that the following definition of mobile commerce includes the full spectrum of mobile phone web utilisation?

Mobile commerce is described as “the use of mobile hand-held devices to communicate, inform, transact and using text and data via connection to public or private networks”. This is any service that can be provided by the mobile device, thus including commercial, communication and information services (Skiba et al. 2000).

Results of question 1

- Most respondents agreed with the statement, four out of seven who answered this question agreeing outright and two with the following qualifiers
 - Qualifier 1 - It should be not limited to handheld devices
 - Qualifier 2 - This can be divided into 2 distinct groups, “Mobile Phones” and “Internet Access”.
- The seventh respondent disagreed saying the use of the word “commerce” means there has specifically been a transaction. He said “I can’t think of any examples when you would engage in mobile commerce without transacting”.

It is a key requirement of this study that the respondents agree with the definition of the Universe.

Question 2

This question was used to confirm that we were dealing with a cluster, therefore question 2 read:

Please see the definition of cluster below; does the mobile phone web utilisation industry qualify as a cluster?

Clusters include the existence of benefits flowing between the players – horizontally and/or vertically, the exchange of R&D, joint problem solving, competition in one part of the industry spilling over into another, suppliers serving multiple organisations in the sector (Porter, 2002).

Results of question 2

- Six out of the seven respondents who answered this question answered in the affirmative
- The seventh respondent answered “clusters are associated with statistical methods or proximity so I would leave them out of the terminology if the method does not warrant it”.

5.3.2. Related and supporting industries

Question 3

The purpose of this question was to understand which players needed to be considered when understanding and researching the cluster, therefore the third question read:

Please look at the mobile commerce cluster as it has been defined within the context of mobile phone web utilisation

- Wireless Service Providers, specifically the mobile network service providers
- Application Providers (WASPS)
- Content Providers (for example ring-tones and information services)
- Equipment Vendors (handsets and other mobile devices)
- Other Service Providers (for example Banks and Retailers)
- Users

a. Is there anyone else in this cluster that has not been included, but who should participate in the study?

b. Please expand and comment on it and validate it

Results of question 3

a. Expansion commentary and validation

There was a high level of agreement on the definition and the players, from all respondents, however, the following additional complementary and contradictory comments were noted.

Wireless Service Providers

Regarding wireless Service Providers the following statements were noted:

- Wireless Service Providers provide connectivity whether through a cellphone or a PC
- Mobile network service providers include Cell C, MTN, Vodacom
- Mobile Virtual Network Operators include Virgin Mobile
- Mobile Resellers include Nashua, Alcatel and Smart Call etc.
- WIMAX providers include Sentech, iBurst and Internet Solutions
- WIFI, ISP's, ADSL. ISP's and ASDL have a fixed line infrastructure but they have wireless routers
- Some municipalities are putting up meshed networks; a combination of cable and wireless. These could be a threat to the mobile service providers
- Digital video broadband hand held DBVH devices could be included. They are being tested by DSTV and MultiChoice and they use their own network
- Mobile data network providers include Cell C, MTN, Vodacom, iBurst, Sentech

As many of these comments fall outside of the scope of this study they will be disregarded

WASPS

Regarding Wireless Service Application Providers, the following comments were noted:

- A WASP provides mobile services like bulk SMS, USSD, IVR, PRSMS and MMS
- Killer Apps Providers include MXit, Exact Mobile e.g. ringtones & information services
- Killer apps relate to content – news, information, music, Cointel (sex IVR's), Worldplay (LoveSMS)
- Payment gateways and platforms need to be considered
- Luuk provides payment gateways
- Technical Service Providers represent a consolidation of the Utility Service Provider's services (Clickatel, iTouch)
- There are currently 147 registered WASPs (see WASPA's web site).
- Subscription services are long-term mobile content services where a consumer is billed at regular intervals on an ongoing basis.
- Players include Peach Mobile, Glocell
- They include cartoons, pop culture gossip, weather updates, religious messages, motivational messages, adult content, horoscopes, and rugby or cricket scores.
- The uptake of mobile content subscription services in the market has occurred because of the success of premium rate SMSs.
- Consumers confuse subscription services with once-off premium rate SMS billing for mobile content. Both once-off premium rate SMS and subscription services involve sending a keyword (e.g. AB123) to a shortcode (e.g. 35500).
- These businesses are looking for opportunities to convert once time down-loaders to subscribers as the transaction costs related to once off down loads are not as profitable as subscription services

Other service providers

Regarding other service providers the following comments were noted:

- These include organisations who have markets e.g. banks and retailers and content providers - Primedia, Sony, Ster Kinekor, SARS eFiling via cell phones.
- Web Developers, Mobi – developers are funded by organisations that have markets.
- Autopage, Nashua, Orion, iTalk, MTN, Vodacom, Cell C all offer other services.

Equipment vendors

Regarding Equipment vendors the following additional comments were noted:

- They also include Motorola, Ericson, Siemens and Alcatel who have their own towers.
- Mobile devices are not manufactured in South Africa, but assembled predominantly in the East; China is the largest manufacturer of mobile phones.
- Technical equipment vendors such as base stations, towers, equipment, hubs and routers e.g. Siemens, Cisco and ACE telecoms, fall into this cluster. They offer network infrastructure design, evolution planning, integration, optimisation and operation.
- Equipment vendors provide the physical network infrastructure (base stations, routers and switches) and the logical infrastructure to operate and manage the network (billing systems, network management systems, application and service platforms).
- There is a thriving market for new and second-hand handset repairs.

Users

Regarding Users the following additional comments were noted:

- Market segments, trends, distribution, behaviour and uptake are important.
- Users include B2B and B2C.

b. Other participants who should be included in this cluster

Regarding other participants who should be included in this cluster the following additional participants and comments were noted:

- Media, TV, radio and print because we use it to drive awareness, and for education around where and how to connect.
- Television broadcasters and handset rental agencies.
- Businesses who want to use the web to manage their customer relationships.
- The Media who are driving the interest in web.
- Mobile phone web utilisation companies use media to promote their services

As the research was specifically limited to mobile phones as the device, the researcher was not too concerned that the Mobile Commerce Cluster could be used as a point of departure, and is confident that all the roles in the cluster in terms of understanding Related and Supporting industries have been covered.

Questions 4 to 6

In order to understand how the industries are related or support each other, the respondents were asked questions 4, 5 and 6 which related to where the organisation that they represent plays in the market, what influences relational dynamics are found in the cluster, and how they quantify business success.

Questions 4 and 5

These two questions were aimed at understanding the various value propositions, relationships and dynamics of the industry.

Question 4

Where does your organisation play in this Cluster?

The following responses were noted with regard to question 4

Six out of seven respondents who answered this question indicated that they played in more than one role, both in this cluster as well as other related clusters.

For example Cell C said “We are in all the clusters, we provide Wireless Services, we generate content, we supply the handsets, although I suppose that we are, strictly speaking a channel for the equipment vendors in that instance. We advertise using radio and TV... “

iBurst answered that it is “one of 7 companies licensed to provide telecoms infrastructure for the provision of data services. Our primary product comprises best effort broadband services targeted at households and SOHO’s. On top of the data layer, iBurst offers content and soon VoIP for mobile phones”.

LUUK answered “We are a sophisticated WASP, but we are rapidly becoming a Mobile Virtual Network Enabler, which means that we will be enabling all the players in the cluster through our modular enablement platform.” We also provide payment platforms.

Question 5

What are the spheres of influence and dynamics that the different players have on each other?

The following responses were noted

- One respondent answered “I don’t understand this question”
- Convergence
 - They are beginning to converge. For example Vodacom is a Service Provider, WASP, retailer, has developers, etc....
 - There is a Tug-of-war between A grade content suppliers and WASPs.
 - Network operators are beginning to dominate the content space
- Operators purchase from infrastructure vendors in order to build their networks.
- Operators set traffic agreements with other network operators and ISPs in order to let their customers to access other networks.
- Mobile operators subsidise and distribute handsets in order to build their customer base.
- The Mobile operators’ central role means that they need to partner with a number of other players including content providers, application providers, service providers, virtual operators and portals. These players are essential to developing the market for 3G services, and increasing operators' revenues, the operator helps them with revenue sharing agreements and access to network-related services.
- Content providers partner with content aggregators and portals to extend the distribution of their offerings

Partnerships and outsourcing

Regarding Partnerships and Outsourcing the following Responses were noted:

- We have relationships with service providers such as the content providers. We don't regard content as a core competency; we are a "pipe" or delivery mechanism.
- In terms of content providers we are looking at relationships with the music studios, Sony etc. As well as with SABC, Ster Kinekor.
- We cannot do everything, therefore we are partnering with companies to offer specialised services such as video-on-demand and managed IP PABX.
- We are outsourcing back room administration to best in that space, focusing on our core competencies.
- Content providers need to ensure that they have partnerships with content owners, press agencies and other media companies in order to get access to raw information.
- Sometimes content providers need to partner with payment agents for micro-payment services.

Question 6

This question was designed to understand the business drivers and gain insight into their revenue models. Question 6 read:

How are you measuring or quantifying business success?

With regard to question 6 the following responses were noted:

- We measure our success through WAP and mobile transaction numbers which increase continuously. This is a massive growth industry at the moment.
- We measure using all the usual financial indicators EBIDA, ARPU, Daily, Monthly Connection rates.
- We quantify business success via 2 metrics:
 - Market share
 - Profitability
- The number of connections is an internal measure; we can't really use it to compare ourselves with other mobile operators because we use different parameters. MTN and Cell C use "Active Subscribers" over a 3 month base. At least one revenue generating activity must have been performed in the last 3 months. Vodacom uses an "Active seven" measure.

5.4. Data collected from the unstructured in-depth interviews

The themes of firm strategy, structure and rivalry together with demand and factor conditions were explored during the in-depth interviews.

5.4.1. Firm strategy, structure and rivalry

Porter (2003) argues that among all the points on the diamond, domestic rivalry is the most important because of the powerfully stimulating effect it has on all the others.

Emerging competitive themes

The respondent's comments have been grouped together in themes that emerged.

As information on the way an organisation competes may be regarded as sensitive, the researcher was aware that not all the competitive information might have been provided by the respondents.

Where the researcher felt that the full picture may not be emerging, player's websites and news portals were consulted for additional information.

The following competitive themes were identified:

- competition through organic growth;
- competition through the reduction of churn;
- competition through changing business models;
- competition through product and service innovation;
- competition from external competitors entering the market; and
- competing globally.

a. Competition through organic growth

Organic growth occurs through greater penetration of existing markets and greater penetration of existing services into new markets. The following responses were noted, and some additional information was sourced from the artefacts supplied by the organisations that declined to be interviewed:

Greater penetration of existing services into existing markets

Acquisition of subscribers and increase in market share can be described in terms of voice subscriptions, secondary SIM card usage and data subscriptions.

Voice

- Voice is a lead indicator for data consumption. Data consumption is a function of mobility.
- MTN uses low-denomination vouchers to stimulate usage (www.mtn.co.za).

- In South Africa, 96% of revenue comes from voice. Data is only 5% of revenue and 80% of that is SMS. Only 1% is from the new technologies that connect to the Internet, and yet a great deal of CAPEX is being invested here.
- The latest AMPS figures for August 2007 show that mobile penetration has reached only 50% in the LSMs 6 and 7. This is the prime opportunity for growth. There is a lot of churn (switching between providers) in this market.
- Cell C Hola is an example of how existing services have been reconfigured to reach low end markets.

Increase in secondary SIM usage

- When users have one SIM card for voice, and one for data, mobile network operators try to get other Networks' voice users to switch between operators to use their SIM cards for data and vice versa.
- Increase the number of users who carry two or more SIM cards to reduce the cost of their cellphone calls by using different cards to call provider to provider.

Data

- The MTN data proposition is gaining momentum with competitive pricing and an increased 3G rollout (www.mtn.co.za).

Greater penetration of existing services into new markets

In terms of Greater penetration into new markets the following comment was noted:

- MTN competes in Africa and the Middle East, looking for countries with large numbers of users. it has an operational footprint of 21 companies (*Business Report*, June 20, 2007).

b. Reducing Churn

Churn refers to the tendency of cell-phone subscribers to switch providers. The most common reasons for churn are dissatisfaction with an existing provider, the lure of a lower price for equivalent service from a different provider, and the lure of better service for the same price from a different provider. Churn can also result from a change in the subscriber's geographic location, the desire for increased connection speed, or a need for different or enhanced cell-phone coverage (Microsoft 2005).

- There is a high level of churn, particularly in the prepaid market. This is being counteracted through branding and service.
- Mobile Number Portability does not seem to have changed the competitive environment materially.

c. Competition through changing business models

The following examples of changing business models were found in press releases regarding cluster participants:

- MTN acquired Investcom in order to create a leader in the emerging market telecom arena (www.mtn.co.za).
- Telkom is looking into buying into MTN in order to grow into Africa (*Business Report*, June 20, 2007).
- Telkom is building a fixed-mobile offering (*Engineering News*, June 13, 2007).
- Mobile, data and geographical diversity are key strategic thrusts for Telkom (*Engineering News*, June 13, 2007).
- Telkom is looking to integrate the mobile elements of its Wi-Max roll-out (*Engineering News*, June 13, 2007).
- Telkom is investing in bolstering its fixed-mobile offering, and integrating value-added services such as broadcast, Internet service provision, and information technology (*Engineering News*, June 13, 2007).
- Vodacom operates in four countries outside South Africa: Mozambique, Lesotho, the Democratic Republic of Congo and Tanzania and is in talks with MTel in order to operate in Nigeria.
- Vodaphone has an appetite for emerging markets. In the past 18 months, the cellular giant had increased its position in Vodacom from around 35% to the 50% level, following a multibillion Rand deal with Venfin (*Engineering News*, June 13, 2007).
- Vodacom is promoting products from high speed internet provider iBurst, in which it owns 10% (*Business Report*, June 20, 2007).

- Vodacom announced a R7 billion investment into a fibre optic cable to help it venture into the fixed-line market to reduce its dependency on Telkom, meet high Internet demand and seek new growth opportunities as the local cellular market was reaching saturation (*Business Report*, June 20, 2007).
- Vodacom is competing by changing its business model to become a media and advertising company.
- Cell C is competing for deeper penetration into the low end of the market.
- Cell C has positioned itself as a value-offering network operator, focusing on value for money and operational efficiency to improve margins while driving demand for product offerings
- Virgin Mobile competes by its positioning as a rebel and structuring its offerings around this.
- Secondary businesses (such as banks) are creating competitive advantage through using the Internet to manage customer relationships (for example mobile banking and newsletters).
- Vodacom planned to adopt the international trend of entering the fixed-line market to support growth in South Africa's data traffic which cannot be sustained by the country's current transmission capacity.
- Vodacom has an exclusive agreement with pay television provider MultiChoice to sell its DStv products.
- By entering the fixed-cellular space, Vodacom will compete with Telkom, Neotel and other value-added network service providers.
- LUUK is competing by becoming a Mobile Virtual Network Enabler. It provides enablement services to players in the Cluster
- Revenue streams for content providers and WASPs used to be either transaction or subscription based, WASPs are finding that it is too expensive to manage large

numbers of small transactions and are looking for more revenue per user, i.e. there is a drive towards subscription-based revenue models.

- iBurst is commercialising content and generating voice revenue.

Competing through product and service innovation

The following comments were noted, and although they relate to competition through product and service innovation, they also attest to the sophistication of demand

- In the TV broadcast space, TV programmes can be downloaded onto a hard drive and served up when required.
- In the future mobile device hard drives will be so big that they have the ability to have every song in the world loaded and consumers can buy “digital keys” to unlock them.
- Eventually more of what people want when they want it will be provided, for example Joost, online video streaming onto mobile devices and people simultaneously chatting to each other while watching it.

d. External competitors

The following example of an external competitor entering the South African market was identified:

- Google is entering this space in leaps and bounds with email and interactive content. Five years ago no one knew who Google were, and now they are “The space”.
- Google is entering the mobile space to link into communities to share content delivered over a mobile phone.

- Google has launched a WAP application, which when downloaded can give the handset the functionality of 3G, in terms of serving up websites as though they are enabled for mobile phones (.Mobi).
- Google's talk application competes with Skype.

e. Competing globally

The following examples of South African companies extending their competitive landscapes into global markets were identified in press releases:

- mXit is poised for growth in India and the UK.
- MTN competes in Africa and the Middle East.
- LUUK has partnered with Minnick to take mobile applications and mobile enablement solutions into Africa.
- Vodafone may acquire Vodacom and then the license agreement prohibiting Vodacom from competing in countries where Vodafone currently competes will not be relevant. Vodacom could try and compete in Africa.

5.4.2. Demand conditions

The following themes pertaining to demand conditions emerged from the in-depth interviews:

- User perception of the web
- Technology drivers
- Technology cycles in South Africa
- The role of wireless technology
- Web utilisation patterns
- Web utilisation drivers
- Products and services to meet demand
- Optimisation amongst corporates

a. User perception of the web

The following comments were noted regarding user perceptions of the web:

- Between voice and data, is SMS which is an interim technology and it is the forerunner to communication using the web. Older users see SMS as a limited form of email; however the younger generation who have not grown up with email see SMS as a texting platform.
- Younger users are driven by the need to communicate; they are pushing for data access rather than SMS, in order to be able to chat. The chat and mail environment are currently functionally driven.

- Texting is no longer immediate and it is expensive over mobile networks
- Texting is being overtaken by “chat”. Chat is immediate and cheap, users sign up in Chatrooms and chat across the web using their mobile phones
- Younger people don’t send email as chat, they see email as a letter.
- Chat is a different form of communication to talking. Chat has a social element- 10 people can chat at a time in a chatroom.
- Devices are becoming cheaper and services such as chat rooms are also coming down in price, therefore chat is increasing.

b. Technology drivers

The following comments around technology drivers were noted:

- Consumer demand for communication (chat, made possible by WAP) is driving innovation in handsets. The demand is for increasing the technological sophistication at reduced costs. Low end phones are starting to become more sophisticated.
- The mobile device is driven by two functions, namely:
 - voice - which is available to everybody;
 - data which is reliant on the bearer platform
 - the simplest data access is the cheapest in terms of devices – this can be very slow
 - quicker complex data access is more expensive in terms of the device.
- There is a cost pressure downwards and upwards pressure to increase speed and quality.
- As technology develops, access to the web increases as costs decrease and now users can access richer information such as video streaming, etc.

- A number of gmail applications for communication are available for download over the web using cellphones. The latest one is Google Talk, a beta VOIP product which will compete with Skype to reduce communication costs even more.
- In the past when a web page was opened on a mobile phone, a user would not see the whole page and it was difficult to navigate. Now many phones have browsers on them, these browsers share the same shortcomings as early PC Internet browsers, which would “crash” regularly.
- Google has created search engines for phones that serve up all websites in what ever format is best for the specific phone, it is no longer necessary to optimise the website for a mobile phone access in terms of how it is served up on the device However it remains important to evaluate the content and functionality in terms of what the mobile device user may need vs. a PC user.
- As long as a phone is GPRS enabled; a Google application can be downloaded to serve up all websites in a .mobi format. The price point for a GPRS phone is about R800. Because of the availability of prepaid cellphone offerings in many credit retailers, many more prepaid users are buying their phones on credit. This means that GPRS enabled phones are becoming more available in prepaid markets.
- Every contract phone has a .mobi download format now. The handset is automatically configured by the handset manufacturer.

c. Technology cycles in South Africa

Regarding technology cycles in South Africa, the following comments were noted:

- WAP enables a text interface into the web and is therefore good for chat because speed is not that important. Anyone with WAP can download Google applications. Google has developed a WAP browser application, a Google search interface that recognises the handset.
- The technology cycle for mobile phones is five years. All phones have been WAP enabled since 2001, therefore it is to be expected that most phones in South Africa are likely at least to be WAP enabled.
- Cellphone banking is currently on the J curve, which means it is continually increasing without any sign of slowing down.
- Nowadays rich media, such as social networks are highly device dependent; this is the next “big thing”. Facebook is driven by the speed of data access and sophistication on phones.

d. The role of wireless technology in mobile phone web utilisation

The following comment about the role of wireless technology in mobile phone utilisation was noted:

Most new phones come with 3G which gives users access to any data network, be it iBurst, WIMAX WIFI etc. Phones are starting to overtake the function of computers with Google's new web applications which allow the creation and storage of documents on the web through the mobile phone.

e. Web utilisation patterns

The following comments were noted about web utilisation patterns:

- Traditional markets utilise the web for email and web surfing, including content and information.
- Now it is being used as an interface for communication including chat and social networks such as "My Space"
- This environment is understood by the youth, Techies, Business People, and defined consumer groups with common interests such as schools, families and immigrants with relations overseas.

f. Mobile phone web utilisation drivers

There are two distinctive patterns around web utilisation drivers, they centre around the top and bottom ends of the market:

At the bottom of the market

The following comments were noted around the bottom end of the market:

- At the low end of the market, the youth are driving uptake through instant messaging and chat. As mobile penetration increases the number of young users increases.
- Ubiquity of web access through WAP enabled phones.
- The youth are driving demand for chat.
- The instant messaging service MXit has more than three million subscribers in South Africa and half a million international subscribers.
- Vodacom has launched The Grid to compete with MXit. The launch has used viral marketing. Each subscriber to the service invites an average of 20 friends. Each of them will invite another 20.
- MXit is more than just instant text messaging. When subscribers logon they see an advertising screen.
- Mobile content providers are now producing audio and video content for viewing on cellphones. This is funded by advertising and sponsorship.

The majority of the users are in their teens or early 20s. As they grow up they are likely to stick to the habits of their youth.

Other comments included:

- The rate of technology is wooing businesses into a stalemate (it is almost like a Trojan Horse to operators). We need to look for segments in the customer base and understand what they will take up.
- “Consumers will not be interested in the Internet per se, because they don’t understand what it can do - it is like having a hook to hang a picture on. It doesn’t matter how big the hook, it is not the hook that provides value. Only when you hang a picture on the hook does the size and position of the hook becomes important” – Simon Camerer
- “We have to create the pictures that make the hook, which is the Internet, relevant to these people. Cell C’s picture is education. We are developing educational products that can be accessed on the Internet to make the Internet useful.” Simon Camerer.

At the top end of the market

The following comment was noted around the top end of the market:

- At the top end of the market, users understand the value of the Internet and this is driving the market
- Time constraints prevent the uptake of mobile phone Internet access.

g. Products and services to meet demand

The following products were mentioned by one of the respondents.

- Cell C's Hola 7 prepaid starter pack, a joint effort with personality Zola, achieved 60 000 new connections on only two distribution channels during its first two months on the market
- the Woza Weekend initiative, offering South Africans free on-net calls during weekends has proved to be a runaway success.

5.4.3. Factor conditions

Factors include a skilled labour pool, raw materials and capital (amongst others). In order to create competitive advantage, the factors must be highly specialised in relation to an industry's particular needs. The following factor conditions were identified by the respondents:

- skilled labour; and
- capital

a. Skilled Labour

The following comments were noted about skills

- Technology is changing so quickly that it is difficult to formalise the training and in consequence most technical skills are learned on the job by building on basic skills acquired at tertiary institutions.
- Many of the more general skills such as web and some applications development, however, are learned through tutorials in the software packages off the Internet. There are also many software user groups who run Question and Answer forums which are accessed through portals on the web.
- The entrance of Google into the mobile phone web utilisation space has meant that they have developed a number of applications which convert general web applications into mobile phone compliant applications. This software is downloadable onto mobile phones by the phone user, making the necessity for specialised skills in the mobile phone web space, less critical than it may have been.
- It is difficult to find employees with the right skills in the specialised “applications space”. A lot of in-house training is required in order to bring them up to the required level. These skills tend to be expensive because they are scarce and developers expect to be paid while they are learning.
- The skills are available in the web design sector, they are predominantly learned on the job, and there isn't much formal training. Web developers tend to teach themselves and often look for tutorials on Google when they have difficulty.
- Many of the software applications for Web design have help manuals which developers refer to when they need them.
- Multimedia training is available in tertiary institutions such as universities and colleges.

All the comments were about how the skills are developed, rather than about the shortage of skills in this cluster.

b. Capital

The following comments were noted about capital

- There is a lack of venture capital companies in South Africa and the processes for accessing capital are arduous and inefficient.
- Organisations have to prove themselves before they can successfully obtain venture capital.
- Most entrepreneurs in this sector either bootstrap themselves or rely on “angel investors” from friends and family for seed capital.
- The high regulation of the industry makes it possible for the larger players to erect high barriers to entry in the form of capital requirements.

All these comments reflect negatively on the availability of capital.

The role of Government

The following comments were provided by the respondents on the role of Government:

- Government needs to continue with deregulation and liberalisation. They have already opened the gateway by licensing VANS, VOIP and WIMAX. This will make the sector more competitive for the smaller players.
- The government is too highly involved in the cluster. For example they are involved in Telkom, and as Eskom is providing the backbone for Neotel, the Government is involved there too. Telkom owns a large chunk of Vodacom and so the government is very involved there. The PIC owns a big slice of MTN and so the Government is involved there. Cell C is the only independent service provider in South Africa.
- The regulatory framework is very uncertain at the moment. Without certainty as to the future regulatory environment, it is very difficult to justify investing billions in infrastructure. The market remains characterised by an imprecise regulatory environment.
- RICA, the Regulation for Interception and Connection Act could shake up the industry. The Department of Justice has become very security conscious. This is going to kill the secondary SIM market. Of course the post paid market is automatically RICA'd, but it will be an issue in the prepaid market.

5.5. Data collected from the quantitative electronic survey

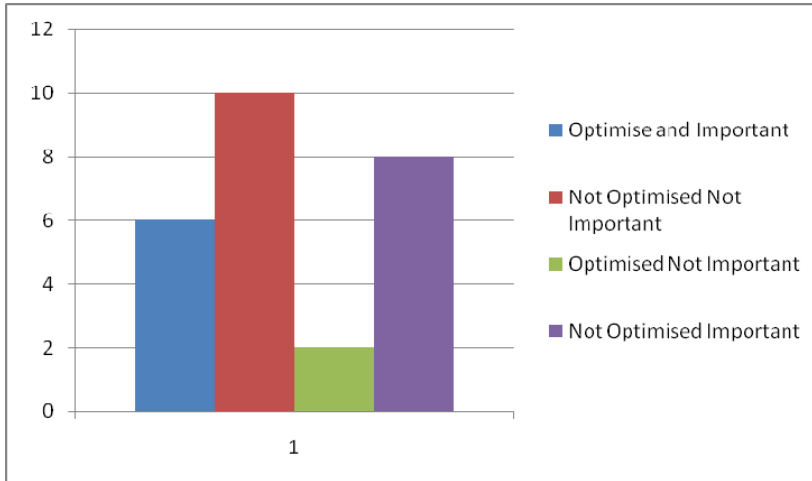
Web optimisation amongst corporates

A simple electronic survey was responded to by 26 corporates or firms who had websites that they use to communicate with their customers. They were asked to indicate which of the following statements was most true for them:

1. Your company website is optimised for access to it using a cellphone, as a core part of achieving your marketing goal(s).
2. Your company website is not optimised for access to it using a cell phone because it is not core to achieving your marketing goal(s).
3. Your company website is optimised for access to it using a cell phone, but it is not really important to achieving your marketing goals.
4. Your company's website has not been optimised for access to it using a cell phone, but you believe it is important to use the activity as part of the overall marketing programme and attain your marketing objectives.

The aim of the survey was to gauge corporate South Africa's awareness and strategic intent with regard to their web strategy, of mobile phone web utilisation.

Figure 4: The responses from firms who use websites to manage customer relationships



It was argued that the future use of an Internet marketing activity will stay the same if it belongs to either of the following two situations:

- the Internet marketing activity is currently widely used, and the users believe that it is important in achieving the marketing goal(s) 6 respondents or
- the activity is currently not being used, and it is believed not to be an important part of the overall marketing strategy – 10 respondents.

Sixteen users out of twenty six were unlikely to change their behaviour, however out of the sixteen, ten did not regard that website optimisation was important to their web strategy and would be unlikely to optimise their web site for mobile phone web utilisation.

Change in the use of the marketing activity/application, will likely take place in the following two scenarios:

- Organisations are currently using a marketing activity, but it is not widely believed to be important; - 2 respondents and
- Organisations are not currently using the activity but believe it is important to use the activity as part of the overall marketing programme – 8 respondents.

Ten respondents were likely to change their marketing behaviour. Eight of these respondents indicate that they intend to change their strategy, have strategic intent to adapt their website for mobile phone web utilisation.

5.6. Summary

This concludes chapter 5, in which data collected from the empirical phase of this research project is presented. The data gathered during this phase, relates to the following:

The universe and related and supporting industries; key informants assessed the validity of the universe of the project and identified the related and supporting Industries through semi-structured interviews and electronic questionnaires

Firm strategy, structure and rivalry, demand, factor conditions and the role of Government; key informants identified the competitive features of each of these elements through unstructured in-depth interviews, a quantitative electronic survey and through reference to other artifacts. The data was sorted onto the prevailing themes within each element that emerged from these methodologies.

An analysis will be done into the findings in the next chapter against the background of the non-empirical work conducted in chapter 2.

6. Discussion of Results

6.1. Introduction

This chapter describes the findings from the data collected during the empirical phase of the research project. The data collected in Chapter 5, related to the universe and definition of the cluster, related and supporting industries, factor conditions, demand factors and conditions for rivalry and competition. In this chapter the data is analysed and explored to address the purpose of this research project which sought to answer the question:

Is the Mobile phone web utilisation cluster likely to create competitive advantage for South Africa?

And the following sub-questions:

- What is the universe of the mobile phone web utilisation cluster?
- Are the related and supporting industries conducive to creating competitive advantage and economic growth in South Africa?
- Are factor conditions conducive to competitive advantage and creating economic growth for South Africa?
- Are firm strategies, structures and competitive rivalry conditions conducive to competitiveness in this cluster?
- Are demand conditions conducive to global and local competitive growth?
- What is the role of Government?

6.2. What is the universe of the mobile phone web utilisation cluster?

The answers to this question have been divided into two parts, viz:

- The universe of the mobile phone web utilisation cluster; and
- Ensuring that the mobile phone web utilisation “cluster” is actually a cluster, by Michael Porter’s (2003) definition

The definition of “mobile phone web utilisation” that has been used for the purpose of defining the universe is: “The use of mobile phones to communicate, inform, transact, using text or data via a public network. This is any service that can be provided by the mobile device, thus including commercial, communication and information services” (Skiba *et al*, 2000)

The cluster that has been focused on for the purposes of this case study is based on the “Mobile Commerce LifeCycle” as proposed by Varshney/Vetter (cited in Lehner and Watson, 2002), viz.:

- wireless service providers, specifically the mobile network service providers;
- application providers (WASPs);
- content providers (for example ring-tones and information services);
- equipment vendors (handsets and other mobile devices);
- other service providers (for example banks and retailers); and
- users.

The analysis of this cluster in terms of its contribution to economic growth in South Africa has been limited to this universe, and six out of the seven respondents were in agreement that the universe had been defined correctly.

Two of the respondents qualified their agreement with the definition of the universe by saying that the definition should not be limited to handheld devices and that the universe should be divided into two distinct groups, namely “mobile phones” and “Internet access”. As the scope of this study is limited to mobile phone web utilisation, the author is comfortable that these comments are not material to this study.

The single respondent who disagreed with the definition said that the use of the word “commerce” meant there had specifically been a transaction. He said “I can’t think of any examples when you would engage in mobile commerce without transacting”. Internet advertising is a commercial activity that comes about by virtue of the access of websites, therefore author is comfortable with the use of the word “commerce” in the definition that was used in order to define this universe. The author has, however, noted that this may mean that the universe is not entirely correctly defined, and that all cluster players might not be in agreement.

The definition of a mobile phone web utilisation cluster which strictly meets with the need for a transaction may be the subject of a future research topic.

It was a key requirement of this study that the respondents agree with the definition of the universe, and the author feels confident that the definition of the universe is robust enough for the purposes of this study.

6.2.1. Ensuring that the mobile phone web utilisation “cluster” is really a cluster by Michael Porter’s definition

In terms of ensuring that the mobile phone web utilisation industry indeed forms a cluster, by Michael Porter’s definition, the respondents were provided with the following definition and asked to confirm that they believed that a cluster was indeed being dealt with..

Clusters include the existence of benefits flowing between the players – horizontally and or vertically, the exchange of R&D, joint problem solving, competition in one part of the industry spilling over into another, suppliers serving multiple organisations in the sector (Porter, 2002).

Six out of the seven respondents agreed that a cluster is specifically being dealt with in terms of Michael Porter’s definition.

A seventh respondent answered “clusters are associated with statistical methods or proximity so I would leave them out of the terminology if the method does not warrant it”.

The author has a long-standing business relationship with this respondent and understands that his background is in statistics, in which he has been extensively trained, and believes that his answer is related to this background, rather than the fact that a cluster in terms of Michael Porter’s definition is being dealt with. The author is therefore comfortable with the fact that a cluster is being dealt with.

It was a key requirement of this study that the respondents agree that a cluster by Porter’s definition is being dealt with, as this is central to the academic work of Porter and his

theories of competitiveness which will be used as the framework for analysis. The author feels confident that it can be accepted as a cluster for the purposes of this study.

6.3. Are the related and supporting industries conducive to creating competitive advantage and economic growth for South Africa?

The presence or absence in a nation of related and supporting industries that are internationally competitive determines competitive advantage. The availability, density and interconnectedness of vertically and horizontally related industries generates positive externalities, which are enhanced when clusters are concentrated geographically (Porter, 2003). In order to analyse the related and supporting industries it was necessary to identify the players and their roles using their value chains.

Using the “Mobile Commerce LifeCycle” (Varshney and Vetter 2002), the value chain for delivering mobile phone web utilisation was extracted; this was used to identify players and the roles they play in the cluster.

Next the mBusiness Application Framework developed by Camponovo and Pigneur (2002) was used to analyse the players, their interactions and interdependencies.

The mBusiness Application Framework (see figure 2 on p. 26 of this research paper) is useful because it provides a comprehensive, general architecture which covers users, their needs, social context, services and content, the devices and IT, the communication networks and the regulatory environment.

The positioning of the “users” in the centre of this model is important because it highlights the role of the demand side as it drives competition in the cluster. Another reason for using this model is that it also takes into consideration the regulatory environment and the social context, which enhances the researcher’s ability to relate this cluster to South African economic growth and bring in the role of the Government.

At the centre of this cluster are the users who have mobile phone and web utilisation related needs. In order to fulfil these needs, three complementary and supporting blocks are required: the network and communication backbone, the device and IT and the services and content. These blocks are constrained by the South African regulation and social context.

In this research paper each block has been expanded, using data from the interviews and surveys, supplemented by the artefacts gathered off the players’ websites or IT and business news portals such as ITWeb and Moneyweb as well as collateral collected from the players themselves. The interdependence of the role players in order to demonstrate their contribution to the competitiveness of the cluster was then analysed.

6.3.1. Competitive advantage and economic growth in the related and supporting industries

The author will consider the supplier and related industries conducive to creating competitive advantage and economic growth if the following five points, which are congruent with Porter's theory, are true:

- There is a high level of representation across the value chain of the mobile phone web utilisation cluster, therefore the availability, density and interconnectedness of vertically and horizontally related industries could generate positive externalities in terms of competitive advantage and macro economic growth.
- Many South African cluster players compete in Africa and all over the world; in other words they compete globally.
- There is a high level of convergence in this market and industry players who have traditionally been active in one block are broadening their service offerings into other blocks as this will indicate that they are highly interconnected.
- Many players play more than one role in the value chain; they are therefore highly interconnected and related industries
- There are a high number of business partnerships in the value chain which will also serve as evidence of the interconnectiveness of the industries.

6.3.1.1. The players, their roles in the South African mobile phone web utilisation cluster and levels of interconnectiveness

There was a high level of agreement on who the cluster players were their roles from all respondents. However, some additional complementary and contradictory comments were noted and these will be dealt with during the analysis.

6.3.1.1.1. Technology players

The technology players provide the hardware and software infrastructure needed to offer mobile phone web access to the end user. The primary participants in this area are mobile phone manufacturers and network equipment vendors. Secondary players include mobile phone retailers, second hand device retailers and device repair firms, component makers and platform vendors that provide software platforms such as operating systems, micro-browsers and development platforms.

a. Mobile phone manufacturers

Regarding mobile phone vendors the following additional responses were noted:

- Mobile devices are not manufactured in South Africa, but assembled predominantly in the East; China is the largest manufacturer of mobile phones.
- There is a thriving market for new and second-hand handset repairs.

These comments were incorporated into the mBusiness Framework.

Mobile phones are not manufactured in South Africa; they are imported from international manufacturers. These mobile phones are designed in laboratories in the country where the Mobile phone holding companies (brands) are located, but assembled predominantly in the East. China is the largest manufacturer of mobile phones.

As mobile phone manufacturers are not located in South Africa, they are not part of the South African mobile phone web utilisation access cluster, but part of the global cluster. However, the mobile phone brands are represented in South Africa by local marketing offices and these local offices are part of the South African cluster. Therefore the respondents analysed the device manufacturers from the perspective of their marketing activities in South Africa.

mBusiness application framework for mobile phone vendors

Value proposition - Mobile phone manufacturers provide the physical mobile phones to end users through a variety of channels that enable users to access a mobile network and to run mobile applications. These channels include second hand phone retailers.

Target customers - Mobile phone retailers and network operators' distribution channels and users.

Core activities – Marketing, communication and distribution.

Business partners – Mobile phone marketers receive the devices from manufacturers and distribute them through device retailers and network operators' distribution channels. Network operators are important partners, because they often subsidise the devices to customers that sign a contract with them. They are very active in the push for the adoption of 3G handsets to capitalise on their 3G network investments. Mobile phone software

developer communities sometimes provide an important source of inspiration into the design of the phones because they are closely associated with content and application developer communities.

Revenue flows - Revenues come from sale of mobile phones to distributors. Additional revenues may come from providing services.

Examples - There is a variety of device manufacturers. A distinction can be made between mobile phone manufacturers integrated with equipment vendors (Nokia, Eriksson, Siemens and Motorola) and other phone manufacturers (Sony, Samsung).

b. Equipment vendors

With regards to equipment vendors, the following responses were noted:

- They also include Motorola, Ericsson, Siemens and Alcatel who have their own towers.
- Technical equipment vendors such as base stations, towers, equipment, hubs and routers e.g. Siemens, Cisco and ACE telecoms, fall into this cluster. They offer network infrastructure design, evolution planning, integration, optimisation and operation.
- Equipment vendors provide the physical network infrastructure (base stations, routers and switches) and the logical infrastructure to operate and manage the network (billing systems, network management systems, application and service platforms).

These responses were incorporated into the mBusiness framework.

mBusiness application framework for equipment vendors

Value proposition – Equipment vendors provide the physical core mobile network infrastructure (base stations, routers and switches) and the logical infrastructure required to operate and manage the network (including billing systems, network management systems, application and service platforms, etc). They also offer network infrastructure design, evolution planning, integration, implementation, optimisation and operation.

Target customers - Network operators such as cellular network operators, WLAN operators and ISPs.

Core activities - R&D, production, system development, infrastructure, related services.

Business partners - Equipment vendors purchase from component vendors and application developers, assemble a variety of network equipment and systems and sell them to network operators, with whom they often partner and tightly collaborate. They must also collaborate with other equipment vendors to ensure interoperability and offer multi-vendor solutions. They are usually influential members of standardisation groups.

Revenue flows - They earn revenue from sale or leasing of equipment and providing services.

Examples - Companies operating this role include ACE technologies, Ericsson, Nokia, Motorola, Siemens and Lucent.

International competitiveness – ACE Technologies competes in Africa.

6.3.1.1.2. Services

Mobile services are value-added services, content and applications that the user can access using a mobile phone. They allow access to information (news, weather), communication (SMS, email, chat, alerts, tracking) and transactions (banking, payments). They also allow entertainment (games, ring tones photographs, MP3 and video clips).

The primary actors are content providers and application providers, viz. wireless application service providers (WASPs). This category includes supporting service providers such as payment agents, security solution providers (e.g. encryption), advertising companies and professional service providers (e.g. consultancies).

a. Content providers

Regarding Wireless Service Application Providers, the following additional comments were noted regarding content:

- Killer apps relate to content – news, information, music, Cointel (sex IVR's), Worldplay (LoveSMS).
- Subscription services are long-term mobile content services where a consumer is billed at regular intervals on an ongoing basis.
- They include cartoons, pop culture gossip, weather updates, religious messages, motivational messages, adult content, horoscopes and the latest rugby or cricket scores.
- Players include Peach Mobile, Glocell.

- Autopage, Nashua, Orion, iTalk, MTN, Vodacom and Cell C all offer these services.
- The uptake of mobile content subscription services in the market has occurred because of the success of premium rate SMSs.
- Consumers confuse subscription services with once-off premium rate SMS billing for mobile content. Both once-off premium rate SMS and subscription services involve sending a keyword (e.g. AB123) to a shortcode (e.g. 35500).
- These businesses are looking for opportunities to convert one time down-loaders to subscribers as the transaction costs related to once-off downloads are not as profitable as subscription services.

The comments about who the players are and their content services, were incorporated into the mBusiness model. The additional comments about the uptake of mobile content subscription services and the confusion experienced by consumers were noted, but are outside of the scope of the research project.

The further comment regarding the WASPs looking for opportunities to convert users from single downloads to subscription services has been noted and will be incorporated in strategies for competition under the heading “Firm strategy, structure and rivalry”.

mBusiness application framework for Content

Value proposition – Content providers provide data and information products (such as news, music, cartoons, gossip, weather updates, religious messages, motivational messages, adult content, horoscopes and sports scores video and location-based information) and distribute them using the mobile channel. The value proposition often integrates many channels' distribution to broaden the reach and exploit the complementary characteristics of different channels.

Target customers - Content aggregators, syndicators and portals (which bundle content from different sources together and re-distribute it to customers) and the end user through direct distribution.

Business partners - Content providers often partner with content aggregators and portals in order to broaden the reach of their products and with content owners, press agencies and other media companies in order to get preferred access to raw information. Other useful partners include network operators to agree on a profitable revenue sharing business model and payment agents for payment services. There might also be partnership agreements with application providers for content management platforms.

Core activities - Content collection, processing and formatting, publishing and distribution.

Revenue flows - Revenues come from subscriptions fees, usage fees (transaction), syndication agreements, airtime revenue sharing and advertising.

Examples - This role is performed by press agencies (IT Web, Marketing Web), media companies (Media 24) end user distributors (Peach Mobile and Glocel) and content aggregators (i.e. Marketingweb, Moneyweb, Bizcommunity, Ananzi) and specialist content providers (Knowledge Factory), Autopage, Nashua, Orion, iTalk, MTN, Vodacom, Cell C all offer these services.

Global Competitiveness - Bizcommunity competes in Africa.

b. Application providers

Regarding wireless service application providers, the following additional comments were noted regarding applications:

- Killer Apps providers include mXit, Exact Mobile e.g. ringtones & information services
- Technical service providers represent a consolidation of the Utility Service Provider's services (Clickatel, iTouch).
- A WASP provides mobile services like Bulk SMS, USSD, IVR, PRSMS and MMS.
- There are currently 147 registered WASPs (see WASPA's web site).

These comments were consolidated and included into the mBusiness Application Framework developed by Camponovo and Pigneur (2002).

mBusiness application framework for application providers

Value proposition – They provide mobile applications and platforms. The value proposition may include application-related services such as remote access to a variety of applications that are managed in a central location, with hosting, implementation, integration, support and maintenance services.

Target customers - Target customers include network operators, portals, businesses, device manufacturers and consumers.

Business partners - Application providers often partner with network operators, in order to ensure a sufficient quality of services and gain access to essential network services (i.e. location information) and have a privileged contact with their customer base. They also partner with device manufacturers, in order to ensure compatibility with the different existing and future devices and as a sales partner in order to exploit their brand. If they do not develop their own applications, application providers purchase from other application developers or establish a partnership with them. Other application providers and system integrators are also useful partners to provide broader solutions and offer a single point of contact to customers.

Core activities - Application development, integration, application management, infrastructure operation, support and consulting services

Revenue flows - They earn revenue streams from sale of license fees, installation fees, hosting agreements, operation and maintenance services and consulting services.

Examples - Mobile application providers include eXact Mobile, MXit, Clickatell and Glocell but many of them are small, unknown start-ups.

International competitiveness - Clickatell developed the world's first web-to-mobile messaging products and competes globally, mXit competes all over the world.

c. Mobile virtual network enablers

It is interesting to note the appearance of mobile virtual network enablers, absent from the original mBusiness Application Framework. When the respondent was questioned as to the reason for this, it was speculated that this is in response to the changing competitive landscape due to global payers, who are too big to compete against, entering the market.

mBusiness application framework for Mobile Virtual Network Enablers

Value proposition – A highly specialised form of application developer, they provide mobile platforms for mobile network operators, application providers and content providers to enable their offerings on mobile phones. The value proposition may include application-related services such as remote access to a variety of applications that are managed in a central location, with hosting, implementation, integration, support and maintenance services.

Target customers - Target customers include players in the mobile value chain such as network operators, portals, application developers, businesses, device manufacturers and consumers.

Business partners - Mobile virtual network enablers often partner with network operators, application and content providers to provide mobile phone enablement solutions.

Core activities - Platform development, integration, application management, infrastructure operation, support and consulting services

Revenue flows - They earn revenue streams from licence fees, installation fees, rental agreements for hosting, operation and maintenance services and consulting services.

Examples - Mobile virtual network enablers include LUUK, TC3 mobile and Lumunik.

International competitiveness LUUK has partnered with Munnik and Vodacom to compete in Africa.

d. Payment agents

The following responses were received regarding payment agents:

- Payment gateways and platforms need to be considered.
- LUUK provides payment gateways.

These comments were incorporated into the mBusiness Framework.

The mBusiness application framework for payment agents

Value proposition - Provide a method of payment to end-users for cash-free purchases of goods and services via the mobile phone.

Target customers - End users and different service providers.

Business partners - Payment agents usually partner with financial institutions (banks, credit card companies) for payment processing and gain access to their customers' accounts. Other partners can be network operators (billing and collection services), device manufacturers (device interoperability and special payment features), hardware providers and application developers (security solutions) and other service providers.

Activities - Billing and collection, payment platform development and management.

Revenue flows - Subscription and transaction fees.

Examples - Payment agents comprise network operators, banks, credit card companies, smartcard companies and start-ups. An example in South Africa is LUUK.

6.3.1.1.3. Communication

Communication players provide communication services that enable mobile devices to access mobile services. The primary actors are mobile network operators and internet service providers. Other players include mobile virtual network operators and infrastructure management service providers.

a. Mobile network operators

Regarding wireless service providers the following contradictory statements were noted:

- Wireless Service Providers provide connectivity whether through a cellphone or a PC.
- WIMAX providers include Sentech, iBurst and Internet Solutions.
- WIFI, ISP's, ADSL. ISP's and ASDL have a fixed line infrastructure but they have wireless routers.
- Some municipalities are putting up Meshed Networks; a combination of Cable and wireless. These could be a threat to the Mobile Service Providers.
- Digital video broadband hand held DBVH devices could be included. They are being tested by DSTV and MultiChoice. They use their own network.

As mentioned in the definition of the universe, two respondents indicated that the cluster should not be limited to handheld devices and that the universe should be divided into two distinct groups, namely "mobile phones" and "Internet access", these comments fell outside of the scope of this study they were disregarded.

The following responses were incorporated into the mBusiness Application Framework.

- Mobile network service providers include Cell C, MTN and Vodacom
- Mobile Virtual Network Operators include Virgin Mobile.
- Mobile Resellers include Nashua, Alcatel and Smart Call.
- Mobile data network providers include Cell C, MTN, Vodacom, iBurst and Sentech.

mBusiness application framework for Mobile Network Operators

Value proposition - Provide communication services to end users, giving them access to their network and other network operators' networks and the Internet. Provide various network-related services such as location information, user identification and billing services to third parties.

Target customers - End customers, businesses, application providers, virtual operators and ISPs.

Business partners - Operators purchase from infrastructure vendors in order to build their networks. They set traffic agreements with other network operators and ISPs in order to let their customers access other networks. They also subsidise and distribute handsets in order to build their customer base. Their central role in mobile phone web utilisation means that they are required to partner with other players including content providers, application providers, service providers, virtual operators and portals. These players are essential to develop the market for 3G services, thus increasing operators' revenues, and the operator can help them with revenue sharing agreements and access to network-related services.

Core activities - Their main activities are network promotion and contract management (customer care, sales, problem handling and invoicing), providing services (service

development and operations and quality management) and infrastructure operation (network planning, deployment, maintenance and systems management).

Revenue flows - Network operators earn revenues from their subscribers, charging a combination of subscription, airtime fees and volume-based fees. They also earn revenues from network services provided to other parties, transaction fees (for billing services) and may earn revenues from portal activities.

Examples - This category includes traditional network operators (e.g. Cell C Vodacom and MTN), virtual operators who provide services through networks of other operators (e.g. Virgin Mobile and Nashua).

International competition - MTN and Vodacom compete internationally in Africa and the Middle East.

The mBusiness model also incorporates users, social context and regulatory environment, these have been analysed separately under the research questions pertaining to demand side factors and the role of the Government for completeness in these sections.

Conclusion

Porter says that the presence or absence in a nation of related and supporting industries that are internationally competitive determines competitive advantage. The availability, density and interconnectedness of vertically and horizontally related industries generate positive externalities. The supplier and related industries are highly conducive to creating competitive advantage and economic growth because of the following four points which are congruent with Porter's theory:

- There is a high level of representation across the value chain of the mobile phone web utilisation cluster, therefore the availability, density and interconnectedness of vertically and horizontally related industries which should generate positive externalities.
- Many South African players compete in Africa and all over the world; examples include mXit, Clickatell, MTN and Vodacom.
- There is a high level of convergence in this market and industry players who have traditionally been active in one block are broadening their service offerings into other blocks in order to realise greater revenues from their consumers.
- Many players play more than one role in the value chain, they are therefore highly interconnected and related industries.
- There are a high number of business partnerships in the value chain.

The related and supporting industries are therefore conducive to creating competitive advantage in this cluster.

6.4. Are factor conditions conducive to competitive advantage and creating economic growth for South Africa?

Competitive advantage stems from the nation's position on factors of production: the availability of high-quality and specialised innovation inputs. In order to create competitive advantage, the factors must be highly specialised in relation to an industry's particular needs (Porter, 2002).

The two factor conditions that were reported in this cluster were skilled labour and capital.

6.4.1. Skills

The following evidence was found regarding skills in South Africa:

South Africa is in the grips of a severe skills shortage which will inhibit its competitiveness in this industry cluster. The telecommunications industry's major requirement is for highly skilled individuals. In a survey of the South African Information, Communication and Technology (ICT) Industry, one of the major constraints towards developing world class ICT companies was the lack of appropriate skills. As more competitors enter the market they compete for the same skills. This results in a high attrition of IT professionals as they move between companies. (SAITIS, 2000).

South Africa has a shortfall in advanced networking technology skills (internet protocol telephony, security and wireless). The Telco sector's shortfall alone represents 69 700 people. (Mokopanele, 2006).

The respondents were not entirely in agreement with this. They said that top end technology skills are scarce and expensive. The following responses were noted regarding skills in South Africa:

- Technology is changing so quickly that it is difficult to formalise the training and in consequence most technical skills are learned on the job by building on basic skills acquired at tertiary institutions.
- Many of the more general skills such as web and some applications development, however, are learned through tutorials in the software packages off the Internet. There are also many software user groups which run question and answer forums which are accessed through portals on the web.
- The entrance of Google into the mobile phone web utilisation space has meant that they have developed a number of applications which convert general web applications into mobile phone compliant applications. This software is downloadable onto mobile phones by the phone user, making the necessity for specialised skills in the mobile phone web space less critical than it may have been.
- It is difficult to find employees with the right skills in the specialised applications space. A lot of in-house training is required in order to bring them up to the specific level. These skills tend to be expensive because they are scarce and developers expect to be paid while they are learning.
- The skills are available in the web design sector. They are predominantly learned on the job, and there isn't much formal training. Web developers tend to teach themselves and often look for tutorials on Google when they have difficulty.

- Many of the software applications for Web design have help manuals which developers refer to when they need them.
- Multimedia training is available in tertiary institutions such as universities and colleges.

Overall the respondents commented on how the skills are developed. Four of the five responses indicated that any skills shortage is mitigated to some extent by the very nature of the cluster as a cluster within a higher order internet Industry, where help is easily available on line, or built into the applications developed by other cluster players.

Although it is evident that there is a severe skills shortage in this cluster, there may be advantages in being a latecomer to this market. Latecomers often grow faster than pioneers, whose innovations they can implement without having to develop them on their own. This view, however, assumes that the world's stock of state-of-the-art technology is relatively unchanging, so that latecomers avoid the costs incurred by pioneers, and then by growing faster than the pioneers, eliminate the income gaps between them (Lucas *et. al.* 2003). By simply learning how Google designs its applications, or by building on them, there may be an opportunity for South African WASPs to compete effectively in developing countries, where there are even fewer related skills.

6.4.2. Capital

The following comments were noted about capital

- There is a lack of venture capital companies in South Africa and the processes for accessing capital are arduous and inefficient.
- Organisations have to prove themselves before they can successfully obtain venture capital.
- Most entrepreneurs in this sector either bootstrap themselves or rely on “angel investors” from friends and family for seed capital.
- The high regulation of the industry makes it possible for the larger players to erect high barriers to entry in the form of capital requirements.

All these comments reflect negatively on the availability of capital.

Venture capital is not generally freely available for new entrants into the software and applications development segments of the cCluster, and many of the smaller players bootstrap their businesses or rely on “angel investors” for seed capital.

As the businesses grow and they prove their success, venture capital is more available. Sources in the private sector include Mark Shuttleworth’s *Here be Dragons* (HBD) and Vodacom Ventures. Public Sector sources of capital include the IDC which provides capital to organisations in alignment with the Government’s mandate and the process is slow and onerous.

Conclusion to factor conditions

This research shows that the skills may need to be added in order to increase South Africa's competitive advantage, especially in the application and software development space to create sophisticated sources of competitive advantage and towards positions in higher productivity segments and industries.

The lack of skills probably will not constrain the mobile network operators too much. The author has drawn this conclusion from the fact that the only times the skills shortage was mentioned, it was by the applications and services providers.

Capital is not freely available, especially to the smaller players who tend to be the applications developers. This severely constrains South Africa's competitive advantage.

Factor conditions in the South African mobile phone utilisation cluster are unlikely to contribute to economic growth and competitive advantage.

6.5. Firm strategy, structure and rivalry

6.5.1. Introduction

Competitive advantage stems from the conditions in the nation governing how companies are created, organised and managed and the nature of domestic rivalry and the extent to which the local competitive context is both intense and rewards successful innovators.

Porter argues that among all the points on the diamond, domestic rivalry is the most important because of the stimulating effect it has on all the others.

Improved national competitive advantage is based on the willingness and ability of a nation and its firms to invest aggressively. Intense domestic rivalry propels firms to invest continuously in order to push down costs, improve product quality, introduce new models and modernise processes.

Competitive advantages are drawn from firm strategy, structure and rivalry.

This research examined how the players in this cluster compete, their business models and their investment in growth, and pushing down costs.

Porter (2001) talks about distorting market signals in the early stages of the rollout of any new technology and says that market signals can be unreliable. New technologies trigger rampant experimentation, by both companies and customers, and the experimentation is often economically unsustainable.

As a result, market behaviour is distorted and must be interpreted with caution. This therefore needs to be born in mind when analysing the sectors' strategies, structures and rivalries.

6.5.2. Analysis

It was found that cluster players compete for organic growth, by reducing churn, changing or innovating their business models, through product and service innovation, through creating partnerships and by acquisition.

a. Competition through organic growth

Organic growth occurs through greater penetration of existing markets and greater penetration of existing services into new markets. The mobile network operators compete in terms of the acquisition of new subscribers and deliberately increasing market share.

The following responses were noted, and some additional information was sourced from the artefacts supplied by the organisations that declined to be interviewed:

Greater penetration of existing services into existing markets

Acquisition of subscribers and increase in market share can be described in terms of voice subscriptions, secondary SIM card usage and data subscriptions. The following comments were noted:

Voice

- Voice is a lead indicator for data consumption. Data consumption is a function of mobility.
- In South Africa, 96% of revenue comes from voice. Data is only 5% of revenue and 80% of that is SMS. Only 1% is from the new technologies that connect to the Internet, and yet CAPEX is being invested here.
- The latest AMPS figures for August 2007 show that mobile penetration has only reached 50% in the LSMs 6 and 7. This is the prime opportunity for growth. There is a lot of churn in this market.
- MTN uses low-denomination vouchers to stimulate usage (www.mtn.co.za).
- Cell C Hola is an example of how existing services have been reconfigured to reach low end markets.

Voice is therefore still considered to be a source of revenue and an opportunity for growth. Voice is outside of the scope of this study, which focuses on mobile phone web utilisation, however it is still relevant for two reasons. Firstly, it is the offering that most impacts current revenues of mobile network operators and consequently a primary focus of these businesses. Secondly, the broadband enabling equipment piggy-backs on the existing voice network, being installed on the network towers. Therefore where voice is expanded into under serviced areas, it is likely that Internet access will follow. As Simon Camerer says, "voice is a lead indicator for data consumption".

Increase in secondary SIM usage

Secondary SIM card usage represents an opportunity for growth for mobile data network operators. As one of their measures for success is numbers of subscribers, they are actively pursuing secondary SIM card use:

- When users have one SIM card for voice, and one for data, mobile network operators try to get other networks' voice users to switch between operators to using SIM cards for data and vice versa.
- Increasing the number of users who carry two or more SIM cards to reduce the cost of their cellphone calls by using different cards to call provider to provider.

It is not clear from the responses whether organic growth in this regard will create competitive advantage for the mobile phone web utilisation cluster, however the author surmises that the additional marketing activities around this may lead to growth in web access using mobile phones, and this in turn will provide opportunities for other players in this cluster, particularly the WASPs.

Data

The so called "network effect" of mobile phone web access is likely to lead to an exponential uptake in mobile phone web utilisation which provides opportunities for other cluster players to take advantage of the economies of scale that new users create.

This is evident by the following comment on the MTN website

- "The MTN data proposition is gaining momentum with competitive pricing and an increased 3G rollout" (www.mtn.co.za).

Greater penetration of existing services into new markets

In terms of greater penetration into new markets the following comment was noted:

- “MTN competes in Africa and the Middle East, looking for countries with large numbers of users, it has an operational footprint of 21 companies” (Business Report June 20, 2007)

It is interesting to note that although all three of the mobile network operators have targets and segment their markets to compete for profitable clients, market share is more important. This is also witnessed by declining average revenues per users (ARPU) as they increase their market share into less profitable segments; this is evident in their annual results documentation.

There are many reasons for this:

- The network effect: effectively every additional subscriber creates more advantage to the network operators, for example, this increases the sales of secondary SIM cards, where subscribers have a card for each network because a same-network calls are less expensive, therefore even users with low ARPU can increase the sales of secondary SIM cards to a competitor's subscriber base. By taking advantage of network effects organisations can move rapidly ahead of others (Wills and Tranter cited in Lucas *et. al.* 2003).
- Network externality: this is when subscribing results in the addition of benefit to all other network subscribers because the number of potential interactions increases. This

may include an additional base station which provides a better signal in a sparsely populated area, or an additional incentive for a WASP to develop a new application for the users (Camponovo and Pigneur, 2002).

- Bottom line growth: although lower ARPU subscribers are less profitable, there is still enough margin to serve them. This point must be countered to some extent by the peculiarities of a dichotomous economy, where very poor people do not use their phones at all, except to send “please call me’s”. Some of the operators have terminated this because it cost more to serve them than they make in direct calls, however WASPs have found a way to make revenue for themselves and the Mobile Network Operators by advertising on the “please call me’s”
- Spreading fixed costs: the cost of providing the infrastructure is fixed and therefore the more users, the less expensive the cost of service provision per user (Camponovo and Pigneur, 2002).
- Voice is a lead indicator for data consumption. Data consumption is a function of mobility and therefore the greater the market share, the more likely that future growth will come from the more profitable data.

Many of the larger firms have invested in their infrastructure, this is evident in their annual results documentation, Cell C, Vodacom and MTN have all indicated that they will continue to invest in the best technology available on global markets.

Conclusion

Improved national competitive advantage is based on the willingness and ability of a nation and its firms to invest aggressively. Intense domestic rivalry propels firms to invest continuously as the larger firms in this cluster have to compete in new and existing markets.

Although revenues decline in these markets on a per user basis, the network effect ensures that the overall revenues for the firm increases, as do the opportunities for other cluster players in the value chain such as WASPs who benefit from the economies of scale.

The additional investments in infrastructure and technology also enable the cluster players to compete globally, creating national competitive advantage.

c. Reducing churn

Churn is a term for subscriber turn-over to other networks. The most common reasons for churn are dissatisfaction with an existing provider, the lure of a lower price for equivalent service from a different provider, and the lure of better service for the same price from a different provider. Churn can also result from a change in the subscriber's geographic location, the desire for increased connection speed, or a need for different or enhanced cell-phone coverage (Microsoft, 2005).

Players compete by monitoring and managing their churn rates, there are two very distinctive patterns in churn in South Africa: high rates of churn in the pre-paid market and

lower rates of number porting (moving from one operator to another while retaining the mobile number).

The following responses were received regarding churn:

- There is a high level of churn in the pre-paid market. This is being counteracted through branding and service.
- Mobile number portability does not seem to have materially changed the competitive environment.

These respondents refer to churn in the market for voice, however, these factors may conceivably apply to mobile phone web utilisation.

Churn is very high in the pre-paid market, because it is easy to switch from one network to another when there is no contract. In order to combat this churn, competitive advantage is created through pricing, branding (witness Cell C's Hola offering which is endorsed by a popular Kwaito Star, Zola) and service, many of the call centres are being improved to service this market.

The contract market is not witnessing such high levels of churn, as can be witnessed from the lack of material impact of mobile number portability.

The relative ease with which customers can churn means that the bargaining power of buyers is high as is the level of rivalry amongst competitors. These are two of the five forces that Porter (1985) mentions when he talks about the strength of competitive forces in an industry in determining the attractiveness of an industry. This indicates that this

cluster may not be structurally attractive and that competition here is rigorous. It is also indicative of the nature of domestic rivalry and the extent to which the local competitive context is both intense and rewards successful innovators. The firms' strategies to manage churn may lead to national competitive advantage because strong competition necessitates higher levels of productivity (Porter, 2003) and this makes industry players stronger and enhances their ability to compete if they are to survive.

Conclusion

High levels of competition in this cluster lead to stronger competitors who can create competitive advantage for the entire cluster.

d. Competition through changing business models

Innovative business models are constantly emerging in electronic commerce and can become a major contribution to competitive advantage when it comes to eBusiness (Bloch *et. al.*, 1986 cited in Yuan and Zhang, 2003).

Porter (1985) talks about structural change creating genuine opportunities for competitors to penetrate new markets and industries, for example by stressing an underserved segment, employing a new approach to buyers, altering processes and modifying pricing.

The following examples of changing business models were found in press releases regarding cluster participants, and have been grouped together under the headings of:

- penetrating new markets;
- penetrating new industries; and
- employing new approaches to buyers.

Penetrating new markets

Evidence of firms penetrating emerging markets, which until recently have been underserved, can be seen.

- MTN acquired Investcom in order to create a leader in the emerging market telecom arena (www.mtn.co.za).
- Telkom is looking at buying into MTN in order to grow into Africa (Business Report, June 20, 2007).
- Vodacom operates in Mozambique, Lesotho, the Democratic Republic of Congo and Tanzania and is in talks with MTel in order to operate in Nigeria.
- Vodaphone has an appetite for emerging markets. In the past 18 months, the cellular giant had increased its position in Vodacom from around 35% to the 50% level, following a multibillion Rand deal with Venfin (Engineering News, June 13, 2007).

Some mobile network operators are aggressively seeking markets in developing countries which are not traditionally as profitable as first world countries and more high risk in terms of unstable political environments etc. MTN, for example, actively built on its experience in South Africa to enter Africa, and now it is building on the lessons learned in Africa to enter

the Iran in the Middle East. Other Multinationals are recognising that there is a profit to be made in Africa, but that it is a low margin, high numbers game and they are starting to look to this continent with interest, however, MTN already has the competitive advantage in Africa.

Penetrating new industries

There is much vertical and horizontal integration in this cluster: as fixed line operators look at buying into mobile phone web utilisation, mobile network operators look at competing using fixed line infrastructures.

- Telkom is building a fixed-mobile offering (Engineering News, June 13, 2007).
- Mobile, data and geographical diversity are key strategic thrusts for Telkom (Engineering News June 13, 2007).
- Telkom is looking to integrate the mobile elements of its Wi-Max roll-out (Engineering News, June 13, 2007).
- Telkom is investing in bolstering its fixed-mobile offering, and integrating value-added services such as broadcast, Internet service provision and information technology (Engineering News, June 13, 2007).
- Vodacom is promoting products from high speed internet provider iBurst, in which it owns 10% (Business Report, June 20, 2007).
- Vodacom announced a R7 billion investment into a fibre optic cable to help it venture into the fixed-line market to reduce its dependency on Telkom, meet high Internet demand and seek new growth opportunities as the local cellular market was reaching saturation (Business Report, June 20, 2007).

- By entering the fixed-cellular space, Vodacom will compete with Telkom, Neotel and other value-added network service providers.
- Vodacom planned to adopt the international trend of entering the fixed-line market to support growth in South Africa's data traffic which cannot be sustained by the country's current transmission capacity

There is also a consolidation between related clusters: Mobile Network operators are starting to seek competitive advantage in the media cluster.

- Vodacom is competing by changing its business model to become a media and advertising company.
- Vodacom has an exclusive agreement with pay television provider MultiChoice to sell its DStv products.

Entirely new business models are emerging, for example the mobile virtual network enabler, which provides enablement services to players in the cluster.

- LUUK is competing by becoming a mobile virtual network enabler. They provide enablement services to players in the cluster

Employing new approaches to buyers

The competitive advantage for the mobile phone web utilisation cluster is also being driven by businesses which are employing new approaches to buyers. The following examples were cited by respondents:

- Secondary businesses (such as banks) are creating competitive advantage through using the Internet to manage customer relationships (for example mobile banking and newsletters).
- Virgin Mobile competes by its positioning as a rebel and structuring its offerings around this.
- Revenue streams for content providers and WASPs used to be either Transaction or Subscription based, WASPs are finding that it is too expensive to manage large numbers of small transactions and are looking for more revenue per user, i.e. there is a drive towards subscription-based revenue models. They are therefore changing their products and services and creating new approaches to buyers.
- iBurst is commercialising content and generating voice revenue.

Conclusion

There is much evidence of changing business models in this sector, which is indicative of the intensity of the local competitive context, which is conducive to creating competitive advantage and macro-economic growth.

d. Competing through product and service innovation

We see firms in the cluster innovating their service offerings for competitive advantage.

The following products were mentioned by one of the respondents:

- Cell C's Hola 7 pre-paid starter pack, a joint effort with personality Zola, achieved 60 000 new connections on only two distribution channels during its first two months in the market
- The Woza Weekend initiative, offering South Africans free on-net calls during weekends is a runaway success.

There are two types of competitive advantage (Porter, 2003):

- Lower cost – the ability to design, produce and market a comparable product more efficiently than its competitors in order to provide superior returns.
- Differentiation – the ability to provide unique and superior value to the buyer in terms of product quality, special features or after-sales service.

The products mentioned above represent examples of lower cost and differentiation. Both of these innovations were designed for the low end of the market. Their success is based on clever branding.

The real competitive advantage comes from the Zola product because the free calls on weekends are internet-based, providing that the subscriber makes a certain number of regularly priced calls during the week. This means that the cost to cell C is miniscule, but

they have had a huge response from their competitors' subscribers to take up a second Cell C SIM card in order to take advantage of this offer. These callers are now making some of the calls they would have made using competitor's SIM cards on Cell C's SIM cards. Cell C has effectively taken a portion of its competitors' ARPU, even if it doesn't have the subscriber base, at relatively little cost to them.

Conclusion

There is a plethora of new products in this cluster. This is as a result of the players competing rigorously and an indication of the robust levels of rivalry in this sector, which Porter believes strengthens national competitive advantage. The examples cited by the respondents represent lower cost innovation and differentiation.

External competition and global competitiveness

Porter suggests that there are two goals that a company must have if it wishes to sustain its competitive advantage:

- Adopt a global strategy – localised companies' risks are too focused in one place. They are unable to compete with multinational companies which can bypass them by learning from other countries.
- Work towards making competitive advantage obsolete because it is only a matter of time before a competitor will find a way to get around this competitive advantage.

Competitive advantage of either type translates into higher productivity than that of competitors (Porter, 2005).

e. External competitors

External, global competitors entering the South African market bring the competitive advantages of economies of scale and experience into the market.

The following responses were received regarding external competitors entering the market:

- Google is entering the mobile phone web utilisation space cluster with email and interactive content.
- Five years ago no one knew what Google was, and now it is “The space”.

Conclusion

Google’s innovations are expected to have a structural impact on this cluster and more innovation is expected as cluster players reinvent themselves to compete more effectively in order to create competitive advantage.

f. Competing globally

The following examples of South African companies extending their competitive landscapes into global markets were identified in press releases:

- mXit is poised for growth in India and the UK.
- MTN competes in Africa and the Middle East.

- LUUK has partnered with Minnick to take mobile applications and mobile enablement solutions into Africa.
- Vodafone may acquire Vodacom and then the licence agreement prohibiting Vodacom from competing in countries where Vodafone currently competes will not be relevant. Vodacom could try to compete in Africa.

Many Cluster players are already globally competitive and this enhances the local economy as they compete effectively against other players in the global mobile phone web utilisation sector. The players are strongly positioned to compete in the developing world.

Conclusion

Many local cluster players have adopted a global strategy. They compete with multinational companies by learning from South Africa

6.5.3. Conclusion to firm strategy, structure and rivalry

Firm strategy, structure and rivalry are intense in South Africa and highly conducive to global competitiveness. Their threat to global competitiveness comes from the entrance into the market of companies like Google and they need constantly to reinvent their business models, products and services as well as competitive activity in entering new markets to grow their competitive advantage, especially in developing countries.

6.6. Are demand conditions conducive to global and local competitive growth?

Competitive advantage is derived from the nature of home demand for the industries' offering. Porter (1985) postulates that nations will gain competitive advantage in industries where local demand provides companies with a clear picture of emerging buyer needs, and where demanding, quality-sensitive buyers pressure companies to innovate faster and achieve more sophisticated competitive advantages than their foreign rivals.

The number of South Africans with access to the Internet was expected to grow by little more than 3% in 2007, despite massive growth in broadband connectivity (Internet Access in SA 2007). The demand for mobile commerce in South Africa is relatively low with data revenue contributing less than 10% to the Mobile Network Operator's Revenue, although it is poised for boom, expected to match growth in web-based eCommerce (SA Mobile Market Report 2007). The low demand can be attributed to low levels of Internet Literacy (Conrad, P 2003).

6.6.1. The mBusiness applications framework for users

Regarding business users on the demand side, the following comments were noted:

- These include organisations who have markets, e.g. banks and retailers and content providers - Primedia, Sony, Ster Kinekor, SARS eFiling via cell phones.
- Web Developers, .Mobi developers are funded by organisations that have markets.
- Market segments, trends, distribution, behaviour and uptake are important.

- Users include B2B and B2C.
- Media, TV, radio and print because it is used to drive awareness, and for education around where and how to connect.
- Television broadcasters and handset rental agencies.
- Businesses who want to use the web to manage their customer relationships.
- The media who are driving the interest in web.
- Mobile phone web utilisation companies use media to promote their services

Many of the business users in this cluster are looking at mobile phone web utilisation to enhance their own businesses and to create competitive advantage in their clusters.

Some convergence between clusters is also noted, for example between the media and mobile phone web utilisation clusters

Using the mBusiness framework (Camponovo and Pigneur, 2002) the following can be seen on the business side of demand, within the mobile phone web utilisation context:

The mBusiness Application framework for users

Value Proposition - Provide products and services to consumers. For the purposes of this paper business to business mobile phone web utilisation was excluded, but this would have included demand for applications to manage employees remotely or their supply chain through RFID, etc.

Target customers - End users

Business Partners - Mobile network operators, application designers, content generators and payment agents.

Activities - Design and creation of products and services which could be disseminated to mobile phones using the web. Management of customer relationships across the web.

Revenue flows - Charging consumers for products and services.

Examples - First National Bank, OUTsurance, Woolworths, Discovery and the AA.

Consumer groups

None of the respondents mentioned consumer groups. However they are included in the mBusiness model and have therefore been included in this study in the interests of completeness.

The mBusiness application framework for users

Value proposition - Defend the interests of consumers.

Target customers - End customers.

Business partners - Consumer groups influence different players in the mobile phone web utilisation landscape, in particular to regulation authorities.

Activities - Consulting and information services, legal assistance and lobbying

Revenue flow - Subscription fees and donations

Examples - Different consumer associations and property owner associations.

6.6.2. The effects of user demand

End-users, both businesses and consumers, are important players in this cluster because they ultimately determine the success or failure of mobile businesses.

Some respondents commented on future technologies that will enter this market in the near future:

- In the future mobile device hard drives will be so big that they have the ability to have every song in the world loaded and consumers can buy “digital keys” to unlock them.
- In the TV broadcast space, TV programmes can be downloaded onto a hard drive and served up when required.
- Eventually more of what people want when they want it will be provided, for example Joost, online video streaming onto mobile devices and people simultaneously chatting to each other while watching it.

It is interesting to note that all of these technologies are offered by global players. This is an indication of the strength of the demand side of the global mobile phone web utilisation cluster. Demanding, quality-sensitive buyers’ pressure companies to innovate faster and achieve more sophisticated competitive advantages than their foreign rivals, and global companies are innovating faster in this space than South African companies. This may in part be to the small numbers of web users in this country, and consequently this may not be an opportunity for competitive advantage for South African cluster players.

This assumption must be tempered by the fact that although all the respondents are senior experts in the cluster, the sample size is not large enough to be generalised across the cluster.

Web consumers

The users were not interviewed for this study, instead the key respondents were asked to give their thoughts on user behaviour, and therefore their comments cannot be analysed accurately using earlier theories such as the diffusion theory or WAP technology adoption study. However, it can serve as a guideline to the analysis of the role of the user on the demand side for creating competitive advantage.

The following factors are characteristic of the conditions for competitive advantage on the demand side of Porter's Diamond Model:

a. User perception of the web

The following responses were noted regarding user perception of the web:

- SMS is the forerunner to communication using the web. Older users see SMS as a limited form of email, however, the younger generation who have not grown up with email see SMS as a texting platform. "Chat" is a text conversation, rather than a messaging function.
- Younger users are driven by the need to communicate. They are demanding data access rather than SMS, in order to be able to chat. The chat and mail environments are currently functionally driven. This is causing device manufacturers to innovate so

that as the cost of devices goes down, services such as chat rooms are also coming down in price. This is increasing chat.

Chat is a way of communicating using text over the web. (This is a type of text-over IP, much the same as voice-over IP).

Diffusion is the process by which an innovation is communicated through channels over time among members of a social system (Rogers, 1985). The rate of adoption is the relative speed with which an innovation is adopted by members of a social system.

New technologies diffuse through a population of potential buyers over time (Norton and Bass, 1987) and successive generations of a technology compete with earlier ones and sometimes substitute earlier technologies.

Chat has replaced the earlier technologies of eMail and SMS and this would therefore appear to be consistent with the findings of Norton and Bass (1987).

In their WAP technology adoption study, Teo and Pok (2003) researched relative advantage, social image, perceived risk, life style compatibility and perceived ease of use in the context of the adoption of WAP technologies. Their findings showed that the intention to adopt a WAP-enabled mobile phone is associated with attitudinal factors and normative factors, but not perceived behavioural control factors.

The attitudinal factors that were found to have a significant influence on behavioural intention are relative advantage, social image and perceived risk.

Social image has significant influence on attitude. Mobile phones have evolved to become life style products and the possession of a particular model projects a certain image. This would seem consistent with the fact that younger users would maintain their social status and image through communication, and therefore, as part of their interaction with their peers, would create demand for chat which uses mobile phone web utilisation.

Conclusion to user perception of the web

It would seem that user perceptions of the web are particularly relevant to younger users, particularly in driving their demand for mobile phone web utilisation. As the youth probably regard the web and chat as important to social image, a growth in demand that will drive the competitiveness of this cluster is likely to be seen. Evidence of this can be seen in the way that mXit has taken off and is competing very successfully globally.

b. Technology cycles in South Africa

The Technology Acceptance Model (TAM) is an adaptation of TRA (Taylor and Todd, 1995). It specifies two beliefs: perceived ease of use and perceived usefulness as determinants of usage intention and IT usage (Davis, Bagozzi and Warshaw, 1989). Perceived ease of use is the degree to which a person believes that using the system will be free from effort (Dillon and Morris, 1996).

The following responses were noted regarding technology cycles in South Africa:

- WAP enables a text interface into the web and is therefore good for chat because speed is not that important.
- Anyone with WAP can download Google applications.
- Google has developed a WAP browser application, a Google search interface that recognises the handset.
- The technology cycle for mobile phones is five years and all phones have been WAP-enabled since 2001. Therefore it is to be expected that most phones in South Africa are likely to at least be WAP-enabled.

The fact that the technology cycles for WAP is five years probably means that most South African's who have mobile phones have WAP and therefore some Internet access and the fact that the demand amongst chat users is not for speed, means that ease of use is not going to inhibit demand for mobile phone web usage because of the perceived ease of use of mobile phone web utilisation for chat.

Conclusion to technology cycles in South Africa

From the above it can be seen that demand conditions are therefore likely to be conducive for competitive advantage in this cluster, because of perceived ease of use.

c. Technology drivers

WAP has made chat possible, because users are communicating using text over the web and this has brought the price of communication down for a financially constrained user group, with a high need to communicate.

Consumer demand for communication is driving innovation in handsets and mobile applications. This may be seen in the creation of “chatrooms” and mXit. This instant messaging service MXit has more than three million subscribers in South Africa and half a million international subscribers. The demand for this service has been responded to by Vodacom which has launched an application called “The Grid” to compete with mXit. mXit is also more than just instant text messaging. When subscribers logon they see advertising, which represents another revenue stream that could create competitive advantage to cluster players seeking competitive advantage in this cluster.

Mobile content providers are now producing audio and video content for viewing on cellphones. This is funded by advertising and sponsorship.

The demand is for increasing the technological sophistication at reduced costs. Low end phones are starting to become more sophisticated. There is a cost pressure downwards and upwards pressure to increase speed and quality

As technology develops, access to the web increases as costs decrease and users will be able to access richer information such as video streaming, etc.

A number of gMail applications for communication are now available (in beta version) for download over the web using cellphones. The latest one is Google Talk, a beta VOIP product which will compete with Skype to reduce communication costs even more.

Initially, when a web page was opened on a mobile phone, the whole page would not be visible and navigation was difficult. Today many phones have browsers on them. These browsers share the same shortcomings as early PC internet browsers, which would “crash” regularly.

Google has created search engines for phones that serve up all websites in whichever format is best for the specific phone. It is thus no longer necessary to optimise the website for mobile phone access in terms of how it is served up on the device. However, it remains important to evaluate the content and functionality in terms of what the mobile device user demands as opposed to the requirements of a PC user.

The price point for a GPRS phone is about R800. Because of the availability of pre-paid cellphone offerings at many credit retailers, many more pre-paid users are buying their phones on credit. Mobile phones have evolved to become lifestyle products and the possession of a particular model projects a certain image. This means that there is a demand for GPRS-enabled phones in the pre-paid market, which creates the opportunity to create mobile phone applications for this market. This corresponds with the findings of Tao and Pok (2003) that social image has significant influence on attitude and behaviour.

Every new contract phone has a .mobi download format now (a website optimised for mobile phone utilisation). The handset is automatically configured by the handset manufacturer.

If the phone is GPRS enabled, a Google application can be downloaded to serve up all websites in a .mobi format. “The boundaries of the mobile space are collapsing!” Tristao Abro

An example of an application that has taken off and created competitive advantage because of the availability of GPRS is cellphone banking which is currently on what Tristao Abro terms the “J curve”, in other words on a steady increase with no plateau (as in contrast to an S curve).

Rich media, such as social networks are highly device-dependent; this is the next “big thing”. Facebook is driven by the speed of data access and sophistication on phones. This in turn drives the demand for more social network applications as well as the need for speed.

Most new phones come with 3G which provides access to any data network, be it iBurst, WIMAX, WIFI, etc. This is expected to take away from voice revenues, and represents another jump to the next S curve (Foster, 1986).

This represents a potential threat to the demand for the communication services of mobile network operators and is part of the reason why they are changing their business models to compete differently.

Mobile phones are also starting to overtake the function of computers with Google’s new web applications which allow the creation and storage of documents on the web through

the mobile phone. The demand for this functionality will drive the demand for more sophisticated phones, higher speed and superior applications.

It has been seen from this research that the demand conditions are very robust in South Africa. Traditionally, the demand for web utilisation has been very low, because access to the Internet was difficult and this is why we have seen statistics of Internet Access of 5 to 10 % in South Africa has been seen. However with WAP-enabled or 3G phones, the youth has recognised the value of web utilisation for “chat”. This corresponds with the findings of Thompson and Teo (2001) around the demographics of Internet uptake.

Improved competitive advantage at this level of a country’s economic development is innovation-driven. (Porter, 2003) New mechanisms emerge to create advanced and specialised factors and to upgrade them continually.

The extreme financial constraints on the demand side in South Africa is driving innovations into mobile phone web utilisation delivery, aimed at reducing cost, increasing value and growing the market. It has been mentioned before that mobile phone web utilisation represents a network technology and the more people who use it, the better the benefits for the other users in the network.

The youth, technical people, business people and defined consumer groups with common interests such as schools and immigrants with relations overseas understand this space.

This would seem to support the social determinists’ strategic restructuring perspective to explain how the information revolution has produced different outcomes in different places (Wilson, 2004, cited in Lucas *et. al* 2003), where they contend that the changing web

utilisation is driven institutionally as well as technologically. They believe that it is fundamentally a social process, whereby electronic technologies are acquired, adapted, and diffused with varying outcomes in different social settings.

Conclusion to technology drivers

It would seem that from the point of view of technology drivers that they are conducive to driving robust demand, particularly amongst the youth and special interest groups and that this is conducive to creating competitive advantage in the mobile phone web utilisation cluster.

d. Financial drivers

The bottom of the pyramid

Structural change creates genuine opportunities for competitors to penetrate new industries, for example by stressing an underserved segment, employing a new approach to the buyer, altering processes and modifying pricing.

Companies that recognise the significance of the triggers of structural change and move aggressively to exploit them often gain competitive advantage through establishing brand names and customer relationships without direct competition (Porter, 1985).

Structural change began in South Africa with the election of the ANC in 1994. This government has been working on redressing the societal ills imposed by apartheid. This has resulted in the continued increase in the rate of social and economic inclusion of more

and more of South Africa's population. The distribution of mobile phones in many instances has by-passed socio-economic inequities and made mobile communication accessible to 72% of South Africa's population, with a national average of 33.1% of households having cell phones (as calculated by the HSRC in 2007 based on 2003 data (HSRC, 2007)).

The following comments were noted around the bottom end of the market:

At the low end of the market, the youth are driving uptake through instant messaging and chat. As mobile penetration increases the number of youths utilising the web increases.

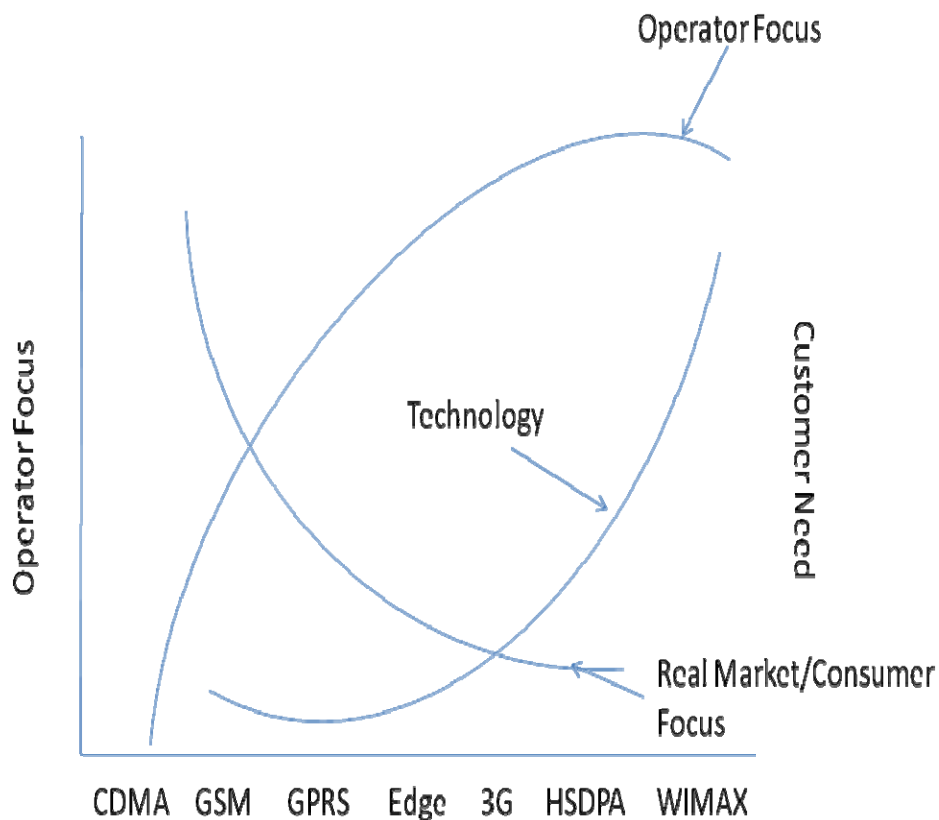
The following may be considered:

- Ubiquity of web access through WAP enabled phones.
- The youth are driving demand for chat.
- The instant messaging service mXit has more than three million subscribers in South Africa and half a million international subscribers.
- Vodacom has launched The Grid to compete with mXit. The launch has used viral marketing. Each subscriber to the service invites an average of 20 friends. Each of these will invite another 20.
- mXit is more than just instant text messaging. When subscribers logon they see an advertising screen.
- Mobile content providers are now producing audio and video content for viewing on cellphone. This is funded by advertising and sponsorship.
- The majority of the users are in their teens or early 20s. As they grow up they are likely to stick to the habits of their youth.
- Cell C is competing for deeper penetration into the low end of the market.

- Cell C has positioned itself as a value-offering network operator, focusing on value for money and operational efficiency to improve margins while driving demand for product offerings

At the bottom of the pyramid (Prahalad, 2005), the rate of technology development is seen to be wooing businesses into a stalemate (Simon Camerer referred to it being almost like a Trojan Horse to operators). While the technology that is becoming available is becoming more sophisticated, there is a large portion of the population who are Internet illiterate, and so financially constrained that innovation is required to reinvent the product offering by creating micro-value offerings.

Figure 5: The Trojan Horse Model (Simon Camerer 2007)



Due to increasing commercial application, the new digital technologies can often function as commodities, and their distribution tends to follow existing divisions of class, race and gender. Therefore they could reinforce social inequality, and lead to the formation of socially and technologically disadvantaged and excluded individuals (Golding, 1996; Zappala, 2000, cited in Lucas *et. al.*, 2003). By using Bottom of the Pyramid thinking, Cell C are countermanding this and making social inclusion possible.

Conclusion to financial drivers

The structural changes caused by the demise of apartheid and government policies to include the entire population in a growing South African economy have created genuine opportunities for competitors to penetrate new markets.

Firms in this cluster have recognised the significance of the triggers of structural change and moved aggressively to exploit them to gain competitive advantage through establishing brand names and customer relationships without direct competition. This means that it can be expected that the firms in the cluster are in a position to compete in other developing economies where similar economic substrata prevail.

e. Social drivers

One of the legacies of apartheid is a functional illiteracy when it comes to the Internet (Conrad, 2003).

The following response was noted with regard to social drivers:

- Consumers will not be interested in the Internet per se, because they do not understand what it can do; it is like having a hook to hang a picture on. “It doesn’t matter how big the hook, it is not the hook that provides value. Only when you hang a picture on the hook that the size and position of the hook becomes important” – Simon Camerer.
- At the low end of the market, demand will be driven by people seeing value in the Internet. We have to create the pictures that make the hook which is the Internet relevant to these people.

This is in line with the Technology Acceptance Model, (Taylor and Todd, 1995) which specifies two beliefs, perceived ease of use and perceived usefulness as determinants of usage intention and IT usage (Davis *et al*, 1989). Perceived usefulness is defined as the degree to which a person believes that use of the system will enhance performance.

This is also in line with Taylor and Todd (1995) who maintain that the constraint is likely to be recognition of value.

Conclusion to social drivers

Some firms in this cluster have recognised the significance of the perceived usefulness in web utilisation and move aggressively to exploit them to gain competitive advantage through establishing brand names and customer relationships without direct competition.

It is not clear whether firms are recognising this in their mobile web utilisation strategies, beyond the level of mXit. Therefore it is not clear whether this recognition will contribute to demand side competitive advantage in this cluster.

Demand for web utilisation at the top end of the market

The users at this end of the market were not interviewed in order to understand demand at this end of the market; instead key respondents who represent the players in this market were interviewed regarding their opinions on whether there is a robust demand at the top of the market.

The following responses were received regarding demand at the top end of the market.

- At the top end of the market consumers understand the value of the Internet and this is driving the market.
- Time constraints prevent the uptake of mobile phone Internet access

Only two respondents commented on the top of the market, and it is therefore not possible to draw significant conclusions about this end of the market, nor to generalise these results to the population, other than to say there is some sophistication at this end of the market.

Conclusion to web utilisation at the top end of the market

There were not enough responses to draw any conclusions apart from that some users recognise the value of mobile phone web utilisation.

f. Web optimisation amongst corporates

Corporates are on the demand side of the cluster for WASPs. They acquire mobile web utilisation applications, services and tools from players in this cluster. When the propensity of marketers to adapt the way they use the Internet for mobile phones was examined, the Change Propensity Matrix developed by Wang, Hwang and Fesenmaier (2003) provided a useful model.

Wang, Hwang, and Fesenmaier (2003) proposed that change propensity analysis can be used to estimate the general likelihood of future growth in the use of Internet marketing activities using a two-dimensional space defined by two related constructs: propensity and relative popularity.

This model was adapted to examine the propensity of businesses to include mobile phone web utilisation in their marketing strategies.

The survey was answered by only 26 respondents which is in no way a representative sample of the corporate world and only provides us with an indication of the levels of demand that they will place on the mobile phone web utilisation cluster. This result is not generalisable to the corporate sector. There may also be many other variables in

determining whether they see strategic advantage in optimising their websites for mobile phone utilisation. For example if they are in a Business to Business environment, they may feel that their viewers are more likely to access their websites from a PC.

Figure 5 The Change Propensity Matrix for website optimisation for mobile phone utilisation

| | | | |
|------------|-----|---------------|----------------|
| Importance | Yes | 8 Respondents | 6 Respondents |
| | No | 2 Respondents | 10 Respondents |
| | | No | Yes |
| | | Utilisation | |

It was argued that the future website optimisation for mobile phone access was likely to remain the same because the responses belonged in either of the following situations:

- Websites were enabled for mobile phone utilisation, and the marketers believed that it is important to achieving the marketing goal(s) (quadrant 2); or
- Websites were not enabled for mobile phone utilisation, and it is not believed not to be an important part of the overall marketing strategy (quadrant 4).

Websites are likely to be either optimised for mobile phone utilisation, or the .Mobi enablement will be discontinued in the following two scenarios:

- Organisation's websites are currently optimised for mobile phone utilisation, but it is not widely believed to be important (quadrant III); and
- Organisations' websites are not currently optimised for mobile phone utilisation but it is believed to be important to do so as part of the overall marketing programme (quadrant I).

Over all, it is likely that there will be seen some adoption of website optimisation for mobile phone access. It is a priority for about half of the corporates in South Africa. This suggests that the WASPs will be able to create competitive advantage for the Corporates by creating mobile phone applications with which corporates can manage their relationships with their customers (Osterwalder and Pigneur, 2003).

Conclusion to web optimisation amongst corporates

It is likely that there will be some demand on behalf of the corporate world for the offerings from the mobile phone web utilisation and this will lead to some competitive advantage in this sector.

Conclusion to demand conditions

Demand from corporates for the offerings by the mobile phone web utilisation cluster is likely to drive competitive advantage to some extent.

There is unlikely to be a huge demand for sophisticated world beating mobile phone web utilisation solutions that will drive South Africa's competitive advantage in the first world.

The greatest demand lies at the bottom of the pyramid and is likely to be the most significant source of demand. Less sophisticated solutions may be developed that will be scalable into emerging economies and appeal to global youth markets. It may well be this that drives this cluster's competitive advantage.

6.7. What is the role of the Government?

The mobile phone web utilisation is constrained by and impacted on by the Government.

The following comments were provided by the respondents on the role of Government:

- Government needs to continue with deregulation and liberalisation. They have already opened the gateway by licensing VANS, VOIP and WIMAX. This will make the sector more competitive for the smaller players.
- The government is too highly involved in the cluster. For example they are involved in Telkom, and as Eskom is providing the backbone for Neotel, the Government is involved there too. Telkom owns a large chunk of Vodacom and so the government is very involved there. The PIC owns a big slice of MTN and so the Government is involved there. Cell C is the only independent service provider in South Africa.
- The regulatory framework is very uncertain at the moment. Without certainty as to the future regulatory environment, it is very difficult to justify investing billions in infrastructure. The market remains characterised by an imprecise regulatory environment.

- RICA, the Regulation for Interception and Connection Act could shake up the industry. The Department of Justice has become very security conscious. This is going to kill the secondary SIM market. Of course the post paid market is automatically RICA'd, but it will be an issue in the prepaid market.

Most of the respondents felt that the government is too involved in this cluster and that its role should be to deregulate and liberalise the sector.

Regulation

Regulation-related players set the legal framework in which the mobile phone web utilisation cluster will evolve and that constrains all the other players in the mobile industry. They do not participate directly in providing services, but have a huge influence on the other players. Players in this area include Government, regulation authorities and standardisation groups.

mBusiness Framework for Regulation authorities

Value proposition - Set a legal framework which balances the interest of the different stakeholders, aiming to provide a favourable economic environment that enables businesses to provide a wide range of competitive telecommunications services which satisfy the needs of the population.

Target customers - All the players in the mobile landscape, including the end users.

Business partners - Regulation authorities interact and consult all the implied parties in order to develop an adequate legislation that best satisfies and balances their diverging needs. They are supervised by the Government and are influenced by different lobby groups which represent the different enterprises categories and consumer association.

Activities - Legislation development, frequency allocation management, service licences management and market monitoring to ensure compliance with legislation.

Revenue flows - Licence fees and taxes.

Examples - ICASA

Conclusion

The role of the Government is to exercise regulation with a light touch. Heavy-handed state involvement has resulted in unsatisfactory results for the consumer (Telkom and Sentech are very good examples). In certain areas state intervention is the only solution, i.e. the regulation of international bandwidth pricing by Telkom. But in general the state should step aside and let the market find its own balance.

6.8. Summary of chapter 6

The data collected during the empirical phase of this research project and recorded in chapter 5, was analysed in this chapter.

It revealed that on the whole, the elements that are conducive to competitive advantage and economic growth in the mobile phone web utilisation cluster are positive, with the exception of the factor conditions around capital and specialised cluster related skills which are lacking in the South African macro-economic context.

The prevalent stand-alone themes or combination of related themes, highlights the key factors challenging the competitive advantage in the cluster were examined one by one

In chapter 7, final conclusions, recommendations and areas of possible future research will be discussed.

7. Conclusion

This exploratory research study focused on understanding the role of mobile phone web utilisation cluster in creating economic growth in South Africa.

The research started off by defining the universe and testing to see whether the participants felt that this is a cluster. It was a key requirement of this study that the respondents agree with the definition of the universe, and that the group formed a cluster by Porter's definition. The author is confident that the definition of the universe is robust enough for the purposes of this study and that the mobile phone web utilisation industry can be regarded as a cluster in terms of Porter's definition.

Next Porter's diamond model was used to analyse the sector and to understand whether conditions in this sector were conducive to creating competitive advantage.

Porter says that the presence or absence in a nation of related and supporting industries that are internationally competitive determines competitive advantage. The related and supporting industries are highly conducive to creating competitive advantage and economic growth because there is a high level of representation across the value chain of the mobile phone web utilisation cluster and therefore the availability, density and interconnectedness of vertically and horizontally related industries which should generate positive externalities.

Other reasons why related and supporting industries are conducive to competitive advantage include that many South African players compete successfully in Africa and all over the world. There is also high level of convergence in this market and industry players who have traditionally been active in one block are broadening their service offerings into other blocks in order to realise greater revenues from their consumers and many players play more than one role in the value chain. These firms are therefore highly interconnected and related. There are also a high number of business partnerships in the value chain.

The related and supporting Industries are therefore conducive to creating competitive advantage in this cluster.

When we consider factor conditions, we find that the picture is not as good. This research shows that skills may need to be added in order to increase South Africa's competitive advantage, especially in the application and software development space to create sophisticated sources of competitive advantage and towards positions in higher productivity segments and industries. The lack of skills probably won't constrain the mobile network operators as in the data gathering, the only times the skills shortages were mentioned, it was by the applications and services providers.

Capital is not freely available in South Africa, especially to the smaller players who tend to be the applications developers. This severely constrains South Africa's competitive advantage.

Partnerships are likely to be an important part of the business models of most cluster players in South Africa, given that the complexity of providing a complete end-to-end

solution requires many complementary competencies, which in the short term can only be acquired through partnerships or acquisitions, especially with the skills constraints.

Therefore factor conditions in the South African mobile phone utilisation cluster are unlikely to contribute to economic growth and competitive advantage.

When we consider the context for firm strategy and rivalry we see that improved national competitive advantage is based on the willingness and ability of a nation and its firms to invest aggressively.

In South Africa, Intense domestic rivalry propels firms in the mobile web utilisation cluster to invest continuously. Additional investments in infrastructure and technology enable the cluster players to compete globally; this creates national competitive advantage. The larger firms in this cluster, such as MTN and Vodacom have made enormous investments in order to compete in new and existing markets.

Although revenues decline in these new markets on a per user basis, the network effect ensures that the overall revenues for the firm increases, as do the opportunities for other cluster players in the value chain who benefit from the economies of scale, which is also conducive to economic growth for South Africa.

High levels of competition in this cluster lead to stronger competitors who can create competitive advantage for the entire cluster.

There is much evidence of changing business models in this sector, which is indicative of the intensity of the local competitive context, which is conducive to creating competitive advantage and macro economic growth.

There is a plethora of new products in this cluster. This is as a result of the players competing rigorously and an indication of the robust levels of rivalry in this sector, which Porter believes strengthens national competitive advantage. The examples cited by the respondents represent lower cost innovation and differentiation

Google's innovations are expected to have a structural impact on this cluster and more innovation is expected as cluster players reinvent themselves to compete more effectively in order to create competitive advantage.

Many local cluster players have adopted a global strategy. They are competing with multinational companies by learning from South Africa

Therefore firm strategy, structure and rivalry are intense in South Africa and highly conducive to global competitiveness. Their threat to global competitiveness comes from the entrance into the market by companies like Google and they need to constantly reinvent their business models, products and services as well as competitive activity in entering new markets to grow their competitive advantage, especially in developing countries.

When we look at demand conditions, there are three sources of demand, organisations that use mobile phone web utilisation tools to manage their stakeholder relationships, high end sophisticated users and bottom of the pyramid users.

It is likely that there will be some demand on behalf of the corporate world for the offerings from the mobile phone web utilisation and this will lead to some competitive advantage in this sector.

At the bottom of the pyramid, the structural changes caused by the demise of apartheid and government policies to include the entire population in a growing South African economy have created genuine opportunities for competitors to penetrate new markets.

Firms in this cluster have recognised the significance of the triggers of structural change and moved aggressively to exploit them to gain competitive advantage through establishing brand names and customer relationships without direct competition. This means that it can be expected that the firms in the cluster are in a position to compete in other developing economies where similar economic substrata prevail. Less sophisticated solutions may be developed that will appeal to emerging economies and to global youth markets, and it may well be here that this Cluster finds its competitive advantage.

There is unlikely to be a huge demand for sophisticated world beating mobile phone web utilisation solutions that will drive South Africa's competitive advantage in the first world.

When looking at the conduciveness to creating competitive advantage on the demand side the propensity to adopt mobile phone web utilisation is based on user perceptions of the web. This is particularly relevant to younger users. The youth probably regard the web and chat as important to social image, and there is likely to be a growth in demand that will drive the competitiveness of this cluster. There is evidence of this in the way that mXit has taken off and is competing very successfully globally.

Perceived ease of use, due to the fact that technology cycles mean that it is possible for all mobile phone users to access and utilise the web through their existing handsets is likely to be conducive for competitive advantage in this cluster. In South Africa, technology drivers are conducive to driving robust demand, particularly amongst the youth and special interest groups and that this is favourable for creating competitive advantage in the mobile phone web utilisation cluster

The participants in the research felt that the role of the Government is to exercise regulation with a light touch. Heavy-handed state involvement has resulted in unsatisfactory results for the consumer. In certain areas state intervention is the only solution, i.e.: the regulation of international bandwidth pricing by Telkom. But in general the state should step aside and let the market find its own balance.

On the whole it would seem that this cluster is in a position to create national competitive advantage for South Africa and provide macro economic growth however the primary competitive advantage will be found in the developing world.

Recommendations for the mobile phone web utilisation cluster

The players in this cluster need to work towards making competitive advantage obsolete because it is only a matter of time before a competitor will find a way to get around this competitive advantage. The entrance of Google into this market provides opportunities to reach the bottom end of the market where there is a maximum growth potential.

These players also need to develop global strategies, especially with reference to competing in the developing world where they will have the advantage because of the demand in South Africa for services and products designed for the developing economy

Future Research Topics

Several future topics presented themselves during this research.

High levels of uncertainty about the future of the mobile industry hinder the use of traditional forecasting tools. A scenario based forecasting approach should be employed to identify a set of scenarios describing alternative future outcomes and the events indicating that the market is moving toward one or another scenario.

Encouraging the majority of the population, who are Internet illiterate and at the bottom of the economic pyramid, to participate in mobile phone web utilisation in the future.

In his paper “The economic performance of regions” (Porter, 2003) says that there are substantial differences in economic performance across regions within virtually every nation. This suggests that many of the essential determinants of economic performance are to be found at the regional level. A regional level analysis is beyond the scope of this research paper and may represent the opportunity for further research in this field.

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