m-Commerce: An analysis of South African scenarios from the perspective of the mobile operators – 1999 – 2004

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We certify that the report is our own work and that all references used are accurately reported.

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ABSTRACT

The attractiveness of the m-commerce industry, in general, and in the South African context, in particular, are assessed within the framework of Porter’s Five Forces, Grove’s Sixth Force and two additional forces: the role of government and pre-existing industry structure. The suggested positions along the industry value chain are reviewed and the actuality explored. Thereafter, issues facing emergent industries such as the need for co-operation in order to cross the chasm, are discussed. Finally, three scenarios facing the South African mobile operators are considered. The extent to which industry participants co-operate will influence whether widespread adoption is achieved or not.

KEYWORDS: Porter’s Five Forces, Grove’s Sixth Force, 10X force, value chain, inflection point, emerging industries, co-opetition, technology adoption lifecycle, technological uncertainty, Chasm, gorilla, widespread adoption, mobile operators, MTN, Vodacom
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1 Introduction

Mobile commerce (m-commerce) is the product of the convergence of the two fastest growing technologies of the modern era (Attwood and Duncan, 2000): mobile phones and the Internet. Mobile phone maker Nokia predicts that there will be more than 1 billion mobile phones in use, world-wide, by 2005 (Kelsey, 2000). Industry commentators expect that m-commerce will revolutionise the telecommunications industry and the way businesses reach and transact with consumers. As shown in Figure 1, the industry is expected to enjoy rapid growth over the next four years. World-wide, m-commerce revenues are expected to exceed $14 billion by 2004. Consequently, earlier in 2000, mobile operators in the United Kingdom (UK) and Germany, anxious to secure a slice of this potential income, paid $34 billion and $45.9 billion, respectively, for third-generation (3G) mobile licences: a pre-requisite for many advanced m-commerce applications (Financial Times, 2000c).

Figure 1: Forecast m-commerce revenues

![Figure 1: Forecast m-commerce revenues](image)

Source: Jupiter Communications, 2000

1.1 Aims of the research

Given the interest around m-commerce and the rapid pace at which the industry is evolving, it was considered worthwhile to investigate the underlying dynamics of the
industry. As a result of this industry’s potential it would be useful to analyse the factors that make it attractive to mobile operators and to assess their competitive strategies. This study will, therefore:

- define m-commerce;
- evaluate the attractiveness of the m-commerce industry, viewed from the perspective of the mobile phone operators;
- determine the potential positions along the value chain in which the mobile operators could compete;
- consider the necessary strategies which the mobile operators should pursue in order to ensure that the m-commerce industry achieves widespread adoption;
- conduct an analysis of the South African m-commerce industry; and
- develop scenarios of the South African m-commerce industry from the perspective of the mobile operators.

1.2 Focus of the theoretical literature review

The focus of the research will be to:

- establish the attractiveness of the m-commerce industry using an Eight Forces analysis;
- establish which positions the mobile operators are likely to take along the industry value chain;
- establish the strategies operators ought to pursue so as to overcome the uncertainty associated with an industry in its early stages of development, and to increase the likelihood of the underlying technology achieving widespread adoption.

1.3 Benefits of the study

As the m-commerce industry is an emergent high-tech industry, its ultimate success – that is, whether it achieves widespread adoption or not – is subject to the strategies industry participants pursue. The study identified the importance of co-operation amongst industry participants in order to overcome the uncertainty associated with such industries.
The study, in developing three scenarios of the South African m-commerce industry, identified critical factors which would influence the industry’s ultimate success and profitability. These factors are the role of government and the manner in which mobile operators promote the industry, meet customer needs and work together.
2 Theoretical Literature Review

Mobile commerce is the product of the convergence of two of the fastest growing technologies of the modern era: mobile phones and the Internet (Attwood and Duncan, 2000: p24). Much excitement has, therefore, been generated about the potential of the industry and mobile operators have paid substantial amounts to participate in the m-commerce industry: third-generation (3G) mobile licence auctions raised $34 billion in the UK and $45.9 billion in Germany (Financial Times, 2000c). The risk for the mobile operators is high: they will only recover their investments if they choose their position in the industry well and m-commerce is enthusiastically adopted by consumers.

After developing a definition of m-commerce, the study will assess the attractiveness of the industry using Porter’s Five Forces framework (1980), Grove’s Sixth Force (1988) as well as Hubbard, Pocknee and Taylor’s (1996) additional two forces: the role of government and the impact of pre-existing industry structure. However, the success of a firm within an industry is also dependent on the firm’s position along the industry value chain (Lewis, 1999). Barnett, Hodges and Wilshire (2000) of McKinsey have suggested a value chain for the m-commerce industry, which consists of seven links. The interplay between these two broad sections is shown in Figure 2.

In choosing to participate in the m-commerce industry, the mobile operators will face uncertainty as to whether the underlying technology will receive widespread adoption or not. In considering this issue, the technology adoption lifecycle (Moore, 1991; Moore, Johnson and Kippola, 1998) will be explored as well as strategies such as co-opetition (Brandenburger and Nalebuff, 1996), which operators may need to deploy so as to overcome these uncertainties. Mobile operators which achieve overwhelming market dominance within their chosen segments of the value chain stand to profit handsomely and become the industry’s gorilla company (Moore, 1991; Moore, Johnson and Kippola, 1998).
2.1 Definition of m-commerce

The Global Mobile Commerce Forum (GMCF) defines m-commerce as “the delivery of electronic commerce capabilities into the consumer’s hand via wireless technology” (Attwood and Duncan, 2000: p8).

This definition can be decomposed into two areas:

- Wireless technology enables communication to handheld electronic devices without the use of fixed networks. Thus, as indicated in Circle 1, Figure 3, such
devices include mobile telephones, notebook computers and other mobile devices such as personal digital assistants (PDAs) (Scientific American, 2000: p38). Transactions conducted using a dial-up connection over a fixed network are not regarded as being within the ambit of m-commerce even if a notebook or PDA, for example, were to be used. To date, though, the focus has been placed on mobile phones; hence, the emphasis in the literature. Companies are now beginning to place greater emphasis on the use of other wireless devices to access the Internet. For example, NTT DoCoMo, a Japanese mobile operator which has enjoyed substantial success with m-commerce, recently signed an alliance with Palm, manufacturer of handheld devices, to encourage the use of handheld devices for accessing the internet (Nakamato, M, 2000: p1)

- In terms of the GMCF’s definition and the fact that m-commerce is an alternative channel for conducting business (The Banker, 1999: p92), it can be regarded as a branch of e-commerce (www.mcommercetimes.com, 2000). E-Commerce is the use of electronic networks – including the Internet – for buying and selling goods and services (Laudon and Laudon, 1996: p25). Indeed, m-commerce is identified as a means to access the Internet from handheld devices (Convergence, 2000: p18; Financial Mail, 2000b). Thus, mobile commerce is any transaction with a monetary value that is conducted via a mobile telecommunications network (Muller-Veerse, 2000: p7). Therefore, as indicated in Circle 2, Figure 3, business-to-business and business-to-consumer transactions – and not consumer-to-consumer transactions – are regarded as being part of m-commerce (Muller-Veerse, 1999). M-Commerce transactions, though, can take place without networks (Attwood and Duncan, 2000: p10).

M-Commerce also extends to mobile devices used as payment mechanisms as shown in Circle 3, Figure 3 (Convergence, 2000: p18). Purchases would be charged to customers’ phone bills as opposed to charging them through their credit card company. This could be done:

- through the use of Bluetooth technology, which enables handheld devices to communicate with computers (Scientific American, 2000: p43-44); or
over a network whereby the customer would dial a number when wanting to execute basic transactions such as purchasing colddrink from vending machines (Barnett, Hodges and Wilshire, 2000: p5).

In this sense, m-commerce refers to the use of mobile devices as electronic wallets. Mobile phones would function either as:

- debit cards (Attwood and Duncan, 2000: p57). Customers’ bank information would be stored on the phones’ memory if the phones have smartcard capabilities. Customers’ transactions would be deducted immediately from their account as and when they make purchases (Barnett, Hodges and Wilshire, 2000: p5); or
- credit cards. Consumers would be billed for transactions on their monthly phone bills (Fox, 2000: p77).

Thus, for the purposes of this study, m-commerce is defined as:

- the use of wireless telecommunication
- to or from a handheld device
- for transactions for financial gain
- whether such communication be conducted over a network or not.

That is, m-commerce is that point at which either Circles 2 or 3 overlaps with Circle 1.

**Figure 3: Diagrammatic definition of m-commerce**

Source: Authors’ own
2.2 Eight Forces industry analysis

This study will consider the attractiveness of the industry using Porter’s Five Forces framework (1980), Grove’s Sixth Force (1988) as well as Hubbard, Pocknee and Taylor’s (1996) additional two forces: the role of government and the impact of pre-existing industry structure.

2.2.1 Porter’s Five Forces

Porter’s Five Forces Model is useful in assessing the attractiveness of an industry; that is, whether there are good prospects for above-average profits (Porter, 1980: p6). An industry would be considered attractive if it has:

- high barriers to entry;
- a large number of small suppliers;
- a large number of buyers;
- few substitutes; and
- few competitors, each of whom is content with its position along the industry’s value supply chain (Hubbard, Pocknee and Taylor, 1996: p105).

In assessing whether the right combination of factors prevails it is useful to consider:

- the likelihood of new entrants entering the market;
- the bargaining power of suppliers;
- the bargaining power of buyers;
- the availability of substitutes; and
- industry rivalry (Hubbard, Pocknee and Taylor, 1996: pp105-109).

2.2.2 Analysis of Porter’s Five Forces

Porter’s model, while useful in considering the attractiveness of an industry, is criticised for failing to consider the role of complementors, government as a separate force and the pre-existing state of the industry (Grove, 1988: p29; Hubbard, Pocknee, Taylor, 1996: pp110, 113). Moreover, Grove (1988: p30) argues that any one of Porter’s Five Forces and the role of complementors could become so large as to disrupt the ordinary functioning of the industry. He refers to such a force as a 10X
force: so called to suggest that the force has been magnified by a factor of 10. A 10X force may threaten the continued survival of a business within an industry as it experiences circumstances and dynamics previously unencountered.

Porter does, in fact, recognise that government impacts on the attractiveness of an industry through several of the forces. He believes, though, that it is useful to analyse government’s role through the five forces rather than as a separate force. Nevertheless, he recognises that in certain instances it may be more useful to treat government as a discrete force (Porter, 1980: p29). As government plays such an influential role in the mobile telephony industry and, therefore, the m-commerce industry, it is considered as a separate force in this instance.

2.2.3 Threat of new entrants

In assessing the threat of new entrants, it is useful to consider the barriers of entry and potential reaction of existing players. Barriers to entry are created by high capital requirements, proprietary technology, switching costs and product differentiation amongst others (Porter, 1980: pp7-10). The transport, basic enabling services, transaction support, personalisation support and content aggregator segments of the industry value chain have substantial barriers to entry so limiting the extent to which new participants could enter the market. Two of these areas are considered below.

High capital requirements raise barriers of entry to potential entrants wishing to provide transport services. It is expected that DoCoMo will have to spend $10 billion to establish a 3G network (Kunii, 2000: p25). Furthermore, ongoing network development costs are high: Vodacom has spent R11.4 billion to date on developing its network (Bennet, 2000).

Barriers to entry are high in the area of basic enabling services as a result of proprietary product technology and high switching costs. In order for the various parts of a system to work together and for the industry to achieve scale, it is better to have only one architecture at the level of enabling technology. Consequently, companies on their own or as part of alliances are attempting to establish their architecture as industry standard and so establish themselves as the ‘gorilla’ within each of the operating platform areas. Gorillas are companies which have control over proprietary
knowledge used across the industry and are, therefore, the value chain leaders (Moore, Johnson and Kippola, 1998: pp44, 48). Qualcomm, for example, is seeking to become a gorilla in the provision of the underlying standard for high-speed mobile access to the Internet (The Economist, 2000b). Once standards have been set it is unlikely that newcomers would be able to introduce alternative standards, as switching costs would be too high for users of those platforms or enabling technologies (Moore, Johnson, Kippola, 1998: pp51-52).

Barriers to entry, by contrast, are relatively low for providers of presentation services and user applications. Much in the same way that content providers on the internet are easily able to develop web-sites using HTML (HyperText Markup Language), so it will be possible for content providers to establish their presence on the wireless internet through the use of WML (Wireless Markup Language) (Barnett, Hodges and Wilshire, 2000: p2). It is here that newcomers are likely to seek to establish themselves. While DoCoMo has 600 official content providers, there are thousands of unofficial ones, enabling subscribers to access up to 16 000 sites on their phones (Rohwer, 2000: p65). The number of phone-friendly web-sites worldwide, the majority of which are European and Japanese, ballooned from 15 000 in April 2000 to 2.5m in June 2000 (Wilson, 2000: p50). As a consequence of the low barriers to entry, competition is likely to be toughest in these areas.

2.2.4 Suppliers
Mobile operators’ suppliers tend to be larger companies, such as Siemens, Alcatel, Nortel and Lucent, which provide the underlying technology and infrastructure such as mobile switching units, base station controllers and intelligent network platforms. Companies such as Computer Configuration Holdings and Dimension Data provide mobile operators with services such as systems integration. As the suppliers are few and provide highly specialised services, they have strong bargaining power.

2.2.5 Customers
According to Nokia, there were 340 million mobile users world-wide in the first quarter of 1999. This figure is expected to rise to 529 million users world-wide in 2002 (Attwood and Duncan, 2000: pp15-16). Furthermore, as mobile phones are purchased by individuals, operators face a diffused market.
However, content providers will face a demanding customer base. The volume of information available to customers and the ease with which they can switch between content providers, confer power to customers. Those content providers who focus on time-sensitive information or provide important services such as ticket reservations will lose customers immediately should they fail to deliver efficiently and effectively. Operators will, therefore, have to work closely with content providers to ensure that the content providers are indeed able to deliver their promised services (Attwood and Duncan, 2000: pp96-97).

2.2.6 Substitutes
Mobile communications currently have the following attributes:

- **Ubiquity**: Communication can take place anywhere independent of the user’s location.
- **Reachability**: Users can be contacted at any time.
- **Security**: the SIM (Subscriber Identification Module) card provides authentication of the owner (Muller-Veerse, 2000: pp8-9).

In the future, following the development of GPRS and other enabling technologies, mobile communications will have additional attributes:

- **Localisation**: The mobile operator will know where the user is physically located and will be able to customise content dependent on the user’s location.
- **Instant connectivity**: It will be possible to access the Internet without having to connect a call. GPRS will enable mobiles to remain connected all the time.
- **Personalisation**: The phone will be as specific to an individual as their wallet (Muller-Veerse, 2000: pp8-9).

As a result of this unique combination of attributes, users will be able to access the Internet in slices of available time as opposed to having to use chunks of time as is currently the case when accessing the Internet from computers. As DoCoMo’s i-mode founder, Enoki, observed: m-commerce is “optimal for killing time or making use of it” (Rohwer, 2000: p65). The level of convenience and personalisation of mobile phones for both voice and Internet access has no peer. Thus, there are no substitutes
for m-commerce. This, though, should not give rise to complacency as the threat of substitution in high-tech industries does not necessarily come from another existing product: it comes from further innovations (Moore, Johnson and Kippola, 1998: p41).

2.2.7 Adding to Porter’s Five Forces - Complementors
Grove (1988: p29) defines complementors as those companies who sell products which work better or work only with other companies’ products. Handset manufacturers are complementors to mobile operators: mobile telephony would not be possible without both participants. Complementors have similar interests but could diverge with the introduction of new technologies. In the case of the development of m-commerce, though, the two parties continue to work together.

Handset manufacturers, motivated by concerns as to slowing demand for handsets (The Economist, 2000g: p98), have facilitated the development of m-commerce by developing enabling technologies. Bluetooth for example was developed as a result of over 1000 companies, including the handset manufacturers, co-operating (Kahney, 2000: p55; The Economist, 1999: p13). Similarly, WAP (wireless application protocol – enables non-voice data to be downloaded on mobile phones) was developed by a consortium of companies, including Motorola, Nokia and Ericsson, all handset manufacturers, in conjunction with Phone.com, a software company (Bannan, 2000: p46). Finally, it is believed that after 2001, mobile phone manufacturers will only produce internet-enabled mobile phones (Muller-Veerse, 2000; p60). As a consequence of their efforts to stimulate the development of m-commerce, replacements of mobile phones have overtaken first-time purchases. Moreover, by 2003 it is expected that 80% of mobile purchases will be replacements (The Economist, 2000g: p98).

2.2.8 Adding to Porter’s Five Forces - Pre-existing industry structure
Part of the m-commerce industry’s attractiveness derives from the attractiveness of the two key components of the industry: mobile phones and the Internet.

- Mobile phones are currently the fastest growing area within the telecommunications industry. As far back as 1995, annual mobile-phone connections world-wide exceeded that of fixed lines. Consequently, the International Telecommunications Union, a United Nations agency, expects the
number of mobiles to exceed fixed lines by 2001 (The Economist, 1999: p6). It is estimated that there were 480m mobile users in 1999 (ITU, 2000: p3). By 2004, it is expected that there will be over a billion mobile phones in use world-wide (The Economist, 1999: p1).

- The Internet, too has been an enormous success with consumers world-wide. In 1999, there were between 196m (IDC, 2000) and 260m (ITU, 2000: p3) Internet users world-wide.

It is the rapid success of these two technologies and the manner in which they have tapped into consumer needs that has led to the high expectations for m-commerce.

Prior to the late 1990s price competition was not an issue faced by mobile operators. Mobile tariffs were high in the 1980s as supply was limited and in the early 1990s as demand was such that mobile operators did not need to lower tariffs to attract new customers (ITU, 1999: p17). Price competition has developed in the late 1990s as a result of governments permitting additional participants into the industry (Muller-Veerse, 2000: p9). The Yankee Group estimates that world-wide, the cost of mobile calls fell by an average of 38% between 1996 and 1999, despite an increase in the quality of calls over the same period: battery life, radio technology, network capacity, reception and security all improved (The Economist, 1999: p8). It is believed that within the next three years, tariffs for mobile telephony will equal that of fixed lines (Muller-Veerse, 2000: p9).

European mobile operators have seen the average revenue per user (ARPU) fall as a result of increased competition. In South Africa, by contrast, ARPU has been under pressure as a result of the changing profile of subscribers – increasing numbers of pre-paid customers with lower average usage (Szczesniak, 1999: p21). Consequently, mobile operators have needed to develop new value-added services. This search for new revenue streams has resulted in pre-existing industry players becoming a 10X force in the development of the m-commerce industry.

The success of m-commerce will be influenced by the pricing model adopted by mobile operators for access to m-commerce related services. The pricing model used by the mobile operators for m-commerce will be influenced either by that currently used for mobile telephony, access to the Internet or a combination thereof.
Traditionally, mobile telephone subscribers have paid for calls based on the duration and destination of calls (Attwood and Duncan, 2000: p94). The pricing model for access to the Internet, by contrast, is currently one of a flat monthly charge for unlimited use (Fox, 2000: p80).

2.2.9 Adding to Porter’s Five Forces - Government

Governments have created barriers to entry to the industry by retaining the power to award radio-wave licences. It is necessary to limit the number of operators so as to overcome frequency constraints: too many operators would result in frequency interference (ITU, 1999: p9). However, by limiting the number of participants in an industry, government prevents new entrants from challenging incumbents. Moreover, the efficiency with which government has managed radio-waves determines the ability of the industry to prosper. As European governments have managed their radio-waves more efficiently than in America, which practically gave them away in the earlier years of the last century, the industry has established itself more successfully in Europe (The Economist, 2000c).

An additional way that governments shape the nature of the industry is through the method by which radio spectrum licences are allocated. The two main methods of allocating licences are auctions and beauty contests. In the UK and Germany for example, licences were allocated through auctions where the highest bidder won. In Finland and Spain, governments chose to award licences through beauty contests, where licences were awarded to companies that best met the prescribed criteria set by government. Hong Kong, where radio spectrum is due to be allocated early in 2001, will use a hybrid of these two methods (Financial Times, 2000e).

Countries which have used auctions as a means by which to allocate radio spectrum licences have raised substantially more money than those countries which have used beauty contests. Britain and Germany, for example, have raised $34 billion and $45.9 billion, respectively, whereas Spain raised only $480 million (Financial Times, 2000d). Some commentators argue, though, that auctions are a damaging tax on mobile operators and consumers and that the high cost of licences will slow the deployment of third-generation networks and raise mobile-telephony prices (The Economist, 2000e). Others believe that auctions have a big advantage over beauty
contests because they are efficient and allocate licences to those operators who value them most, rather than to those whom the regulators favour.

2.2.10 Conclusion to Eight Forces industry analysis

Porter’s Five Forces

- Threat of new entrants - low as barriers to entry are high: the result of proprietary technology, government control over radio spectrums and capital investment requirements.
- Customers – weak bargaining power as they are diffused.
- Suppliers – strong bargaining power as they are large companies providing highly specialised services.
- Substitutes – none as a result of the unique combination of attributes offered by m-commerce.

Adding to Porter’s Five Forces

- Complementors – a 10X force as handset manufacturers are furthering the growth of the industry through the development of enabling technology.
- Pre-existing industry structure – a 10X force facilitating the industry’s evolution as mobile operators, having enjoyed strong growth, seek opportunities to boost ARPU.
- Government – influence varies from region to region based on the manner in which they manage radio-waves and the method used to sell radio-spectrum licences.

In terms of Porter’s Five Forces, the mobile operators are in a relatively strong position to the other industry participants, with the exception of suppliers. Complementors and pre-existing industry structure have played a leading role in facilitating the development of the industry. Furthermore, on the whole, government has had a favourable impact on the industry. It can, therefore, be concluded that the m-commerce industry is attractive. Industry attractiveness, though, is in itself not sufficient for potential players. The success of a firm within an industry is dependent on the industry’s overall attractiveness as well as the firm’s position along the
industry value chain (Lewis, 1999: p10). Therefore, industry participants will want to identify and then position themselves on the most lucrative segments of the industry’s value chain.

2.3 Value chain

Each firm within an industry addresses a broad function, which complements the functions of other industry participants. The industry’s value chain constitutes the combined set of those functions undertaken by industry participants to create and deliver value to the ultimate consumer (Lewis, 1999: p7; Porter, 1985: p34). Some functions performed by industry participants, though, are more lucrative than others. As economic power has accumulated in the hands of consumers subsequent to the advent of the Internet, those functions which are closest to the customer are deemed to be the most valuable (Attwood and Duncan, 2000: p25).

2.3.1 Mobile industry value chain

As players seek to secure the most lucrative segment of the value chain, they are more likely to compete for positions on the segment closest to the end-users. To date, in the mobile phone industry the most desirable position along the value chain has been the handset provider – the position closest to the customer as shown in Figure 4. Network operators have sought to improve their position on the value chain relative to that of handset providers – that is, to position themselves closest to customers – by offering an array of services, such as voicemail, messaging and various billing options (Attwood and Duncan, 2000: p26).

Figure 4: Mobile value chain

Source: Attwood and Duncan, 2000
2.3.2 m-Commerce value supply chain

With the development of m-commerce, the operators now have an opportunity to position themselves closest to customers. Barnett, Hodges and Wilshire (2000: pp1-2) of McKinsey, Incorporated suggest that the m-commerce industry will face a value chain consisting of seven links (shown in Figure 5). They are (from the position furthest from the consumer to the position nearest):

- Transport – facilitating data communication between mobile users and application providers;
- Basic enabling services - server hosting, data backup, and systems integration;
- Transaction support – billing services and associated security;
- Presentation services – converting content to a suitable format;
- Personalisation – customisation of the content and presentation;
- User application; and
- Content aggregators; that is, portals (Barnett, Hodges and Wilshire, 2000: pp1-2).

**Figure 5: m-Commerce value chain**

Source: Barnett, Hodges, Wilshire, 2000

Mobile operators could compete in any segment along the value chain as:

- competition is currently limited;
- they have the technical capabilities;
- they have sufficient financial resources – as seen by the vast sums paid for 3G licences;
- they have control of wireless infrastructure; and
- they have strong brand images.

Barnett, Hodges and Wilshire (2000: p3), nevertheless, argue that rather than spread their resources too thinly, the operators should compete along those points of the value chain in which they have a strong competitive advantage as well as those segments where there is value to be captured. With these criteria in mind, Barnett,
Hodges and Wilshire (2000: p3) have recommended that operators seek to compete in transport, transaction support, personalisation and content aggregation.

**Transport**
Mobile operators already have a presence and substantial expertise in transport provision. Through the expected increase in traffic as a result of the additional data services, average revenues per user could rise. Japan’s DoCoMo believes that its revenues are 20% higher with i-mode than they would have been had they just relied on voice traffic (Rohwer, 2000: p65).

**Transaction support**
The systems that are currently employed by mobile operators to bill their subscribers can be leveraged to generate additional revenues by levying a per-transaction charge to subscribers for goods and services sold by third-party vendors. DoCoMo charges 9% commission on transactions such as ticket ordering (Economist, 2000 11 March). Similarly, Finnish operator, Sonera, charges its subscribers a commission for colddrinks purchased from vending machines and charged to their mobile accounts (Barnett, Hodges and Wilshire, 2000: p5).

**Personalisation support**
Churn in the cellular industry is as high as 30% in some countries as a result of marketing and incentives offered by rivals to lure customers (Szczesniak, 1999: p18). Churn is problematic for operators because of the high set-up costs which are incurred in connecting subscribers as well as subsidising handsets (in the case of contract subscribers). Personalisation support will enable mobile operators to raise the cost to customers of switching. It is the knowledge of personal information about customers and the dimensions of their phones that makes it possible for operators to dominate the personalisation segment of the value chain (Barnett, Hodges and Wilshire, 2000: p4). Once mobile operators tailor the features and content of their offerings, subscribers will be less willing to switch over to competitors as they will be reluctant to have their personal details in the possession of several different operators (Daugherty, Eugster, Roche and Stovall, 1999: p5).
Content aggregators
Portals are closest to the customer and are believed to be the most lucrative segment along the value chain. The e-commerce experience has reflected the power that portals exert. Consequently, the race to establish portals will be the most heavily contested in the m-commerce industry. Potential portal operators range from mobile handset manufacturers to mobile operators, from existing Internet portals to new and unconsidered entities (Attwood and Duncan, 2000: pp63-64; Muller-Veerse, 2000: pp63-65). A massive opportunity exists here for companies that are able to combine the content of different web-sites and store these in an easy-to-access format.

Unattractive segments
Mobile operators would be ill-advised to compete in basic enabling service provision and presentation services - the preserve of hardware and software providers - because they lack the technical expertise demanded in this area. Further, as operating in either of these two areas does not enable participating companies to ‘own’ the customer, they are unlikely to prove to be highly profitable niches (Daugherty, Eugster, Roche and Stovall, 1999: p6). It is argued that the provision of user applications is an unattractive option for mobile operators as it is possible for content providers to establish their presence on the wireless Internet in the same way that they have done so on the Internet and as user applications tend to be developed by dedicated companies (Barnett, Hodges and Wilshire, 2000: p2).

2.3.3 Conclusion to value chain
As carrying voice and data traffic is becoming increasingly commoditised, the mobile operators must avoid becoming merely a conduit between the user and the Internet (Attwood and Duncan, 2000: pp31, 53). They need to migrate to more lucrative segments of the value chain. The mobile operators face a choice: either to continue in their current role as voice transporters or to develop new roles which enable them to launch themselves on a new growth curve. That is, the mobile operators face an inflection point (The Economist, 2000g: p98). An inflection point is that point on the organisational lifecycle where the organisation faces the opportunity of growing or declining (Stockport, 2000: p46). This is shown as point A in Figure 6. The m-commerce industry offers the mobile operators an opportunity to enjoy further growth. Beyond point A, the mobile operators will lose the chance to proactively take
control over their destiny. If they fail to pursue the new opportunities, they may well experience a decline (shown as point B in Figure 6).

Figure 6: Organisational lifecycle

Source: Stockport, 2000

2.4 Strategic manoeuvring

Should the mobile operators be proactive and choose to pursue the new opportunities offered by m-commerce, they will need to undertake various strategies to secure their position along the most lucrative segments of the industry value chain and to overcome the uncertainty associated with emerging industries.

2.4.1 Emerging industries

An emerging industry is one that has been created as a result of technological innovations, changes in cost relationships, changing socio-economic factors or the development of new needs (Porter, 1980: p215). New industries may be categorised as low- or high-tech, with high-tech industries characterised by considerable technological barriers to entry. These barriers are the result of:

- a high level of research and development to gain critical mass;
- high technological uncertainty; and
- a shortage of personnel with the requisite level of technological knowledge (Calori, 1990; pp22-23).
Most new industries cannot be defined purely as low- or high-tech as technological barriers vary along a continuum. Nevertheless, the use of the distinction is useful as the issues facing low- and high-tech emerging industries differ (Calori, 1990; pp23-24). As the m-commerce industry is considered to be high-tech – the underlying technology is sophisticated and there is a high level of technological uncertainty associated with it – it is worthwhile to consider the industry’s development in the context of a model appropriate for high-tech emerging industries. Such a model is the technology adoption life cycle.

2.4.2 The technology adoption lifecycle

The technology adoption lifecycle, shown in Figure 7, is a model for understanding the acceptance of new products, particularly when the products require a significant change to modes of behaviour or modifications to other products or services (Moore, 1991: p11).

Figure 7: The technology adoption lifecycle

As shown in Figure 7, the market consists of innovators, early adopters, early majority, late majority and laggards. Innovators and early adopters, who are enthusiastic adopters of new technology, account for 16% of the market: not sufficient a number to ensure a new product or service will achieve lasting success. Early adopters seek to implement new technology before others so as to gain a competitive advantage. They are willing to accept the discontinuity between the old ways and the
new caused by the introduction of the new technology as they are seeking a breakthrough, not continuous improvements (Moore, 1991: pp21, 34). The early majority, which accounts for 34% of the market, consists of pragmatic people who are comfortable with technology. They wish to gain productivity improvements for their existing operations with a minimum amount of disruption. “They want evolution, not revolution” (Moore, 1991: p21). The early majority is concerned as to which standard will prevail as the industry standard or whether the new product or service will gain widespread adoption or not; that is, they face technological uncertainty (Porter, 1980: pp216; 222).

Technological uncertainty raises the buyer’s perception of the risks associated with purchasing the product or service (Porter, 1980: pp216, 222). To overcome the technological uncertainty, the early majority relies on recommendations from other members of this group in making purchases. However, as the new technology has not received widespread acceptance, the early majority does not receive any such recommendations. Moreover, as the early adopters and early majority have different profiles, the early majority does not accept recommendations from early adopters. The discontinuity in product acceptance between the early adopters and the early majority is known as the ‘chasm’ (Moore, 1991: pp20-21).

2.4.3 The Chasm
Before encountering the chasm, though, new products need to cross a ‘crack’ between the innovators and early adopters (see Figure 7). The crack represents a slight but important distinction between innovators and early adopters: innovators will try new products because of their enjoyment of technology while early adopters require the new product to impart a new benefit (Moore, 1991: p18). It is not expected that m-commerce will fall into the first crack as it fulfils a real need not met by other products: it enables people to access the Internet and conduct payment transactions while mobile. If the new technology is to gain widespread acceptance, though, it is necessary that it crosses the chasm. This phenomenon can be seen with the introduction of mobile phones. Prior to mobile phones reaching a 15-20% penetration of the market, they were regarded as pricey toys for business people. Once they reached the crucial mass – that is, the chasm had been crossed – mobile telephony
took off rapidly (The Economist, 1999: p6), with market penetration increasing by at least 10% per year, thereafter (Szczesniak, 1999: p13).

The number of m-commerce users is projected to grow from six million in Europe and America in 2000 (www.jupitercommunications.com, 2000: p1) to 600 million worldwide in 2004 (Price, 2000). If this projection is to be realised, mobile operators and other industry participants will need to cross the chasm. The European m-commerce industry is likely to fall into the chasm, though, before reaching the other side: industry commentators expect that disillusionment with m-commerce will develop in 2001 and only in 2002 will the industry begin making strides in gaining widespread adoption (Attwood and Duncan, 2000: p20; Muller-Veerse, 2000: p13). This disillusionment is the result of growing disenchantment with WAP, the technology in which European industry participants have put much faith. WAP is slow and expensive to use, and, most damagingly, it has failed to deliver what its promoters have claimed: that it is the Internet on mobile phones (Fox, 2000: p84; Wilson, 2000: p50).

If m-commerce in Europe were to avoid dying in the chasm, it is necessary that industry participants focus on execution and effective implementation of the promised technologies (www.jupitercommunications.com, 2000: p2), as well as finding ways to encourage the early majority to utilise its offerings. Successfully crossing the chasm necessitates meeting the needs of customers at the frontier of the early majority (Moore, Johnson and Kippola 1998; pp29, 31). Japan’s DoCoMo succeeded in making the transition across the chasm and so gained widespread use: in excess of 10 million of Japan’s 60.2 million mobile users, are m-commerce subscribers (Financial Times, 2000b). The company’s success was partially the result of its focus not on technology but on providing customers with what they wanted: rich content (Rohwer, 2000: p67). DoCoMo also provides a lesson to European mobile operators in that it developed its offerings using simple, non-WAP technology (Fox, 2000: p84).

In addition to meeting customers’ expectations and fulfilling their needs, competing companies participating in an emergent industry must work together to promote the new technologies and products associated with that industry, despite their desire to
pursue their own interests independently of one another (Porter, 1980: p230). This combination of co-operation and competition is known as co-opetition.

2.4.4 Co-opetition

It is sometimes necessary for a company to co-operate with its competition and compete with its suppliers - referred to as substitutors and complementors, respectively by Brandenburger and Nalebuff (1996: pp60-61). As competitors within an industry are mutually dependent, there are occasions when they need to co-operate with one another. The motivations for co-operating with competitors include the need:

- to avoid detracting from an industry’s attractiveness. Some kinds of competitive behaviours could result in the industry becoming less attractive. Price wars, for example, are unstable and could result in the industry’s overall profitability being undermined (Porter, 1980: p17).
- to promote an emergent industry to ensure its long-term viability (Porter, 1980: p230).
- to overcome limited resources, such as finances, depth of management or capabilities (Jonash and Sommerlatte, 1999: pp26-27). By working together, resource-constrained companies are able to leverage available resources (Hamel and Prahalad, 1994: pp163-174).

Such industry or intrafirm co-operation can take place on four levels as shown in Table 1 (Jonash and Sommerlatte; 1999: pp26-27).

### Table 1: Levels of co-operation

<table>
<thead>
<tr>
<th>Level of co-operation</th>
<th>Degree of co-operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level four co-operation</td>
<td>Informal exchange of knowledge and information about a new area</td>
</tr>
<tr>
<td>Level three co-operation</td>
<td>Formation of structures to monitor new trends or developing technologies</td>
</tr>
<tr>
<td>Level two co-operation</td>
<td>Facilitation of emergence of new products or services resulting from new technologies or trends</td>
</tr>
<tr>
<td>Level one co-operation</td>
<td>Mutual defence of their successful products against competition</td>
</tr>
</tbody>
</table>

Source: Jonash and Sommerlatte, 1999
The alliances formed to support the development of Symbian and WAP are examples of level two co-operation: industry participants banded together to bring promising new technology to fruition. Ericsson, Motorola, Matsushita and Nokia, who collectively manufacture 58% of the world’s mobile phones, backed Psion’s Symbian. Symbian’s EPOC is an operating standard which would enable mobile phones and palmtops to communicate with one another. This alliance was driven by the desire to prevent Microsoft’s Windows CE from becoming the industry standard (Muller-Veerse 2000: p27). Should Microsoft attempt to establish Windows CE as the industry standard, the backers of Symbian may display level-one co-operation to maintain Symbian’s dominance (Jonash and Sommerlatte, 1999: p27).

This is not the only example of co-opetition in the industry. SIM (subscriber identification module) smartcards have facilitated data applications by providing an interface between handsets and mobile operators. If SIM smartcards were allowed to become the industry standard, providers of smartcards would have created a new source of value between handset manufacturers and mobile operators. The handset vendors, who ordinarily compete with each other to sell their hardware to customers, were prompted by their concern as to the possibility of a new function on the value chain to co-operate in developing WAP and so protect their turf (Attwood and Duncan, 2000: p38).

In the same manner in which hand-set manufacturers have co-operated with one another and other industry players to promote the growth of the emergent industry and to limit the development of competition, so it will be necessary for the mobile operators to co-operate with other industry participants in order to acquire the core competencies required to compete in some of the segments proposed by Barnett, Hodges and Wilshire. The mobile operators lack the necessary skills, such as fraud detection and dispute resolution, required for providing transaction support (Fox, 2000: p81). They also lack the capabilities, such as selecting, customising and aggregating contents, required as content aggregators (Daugherty, Eugster, Roche and Stovall, 1999: p7).
In some instances, such co-operation will be regarded as co-opetition. Credit card companies, concerned about the threat mobile operators pose to them in terms of their ability to provide transaction support, are working with mobile operators to develop mobile phones which can be used as transaction devices while maintaining the credit card companies as billing agents. (Attwood and Duncan, 2000: p54). In other instances, though, such co-operation will be an attempt by the mobile operators to gain access to the skills of others; that is, the mobile operators will aim to borrow resources (Hamel and Prahalad, 1994: pp163-181). One way in which mobile operators could establish a portal, would be to form an alliance with an existing Internet portal such as Yahoo! (Barnett, Hodges and Wilshire, 2000: p4).

2.4.5 Gorilla company

Assuming an industry makes the transition across the chasm, it could be expected that companies would pursue niche markets within the frontier of the early majority. Market growth is niche by niche, with the successful companies leveraging their skills and knowledge acquired in the previous niche. Should companies fail to move beyond their niches and mass adoption of a particular technology is never achieved, then the market may evolve into what can be called ‘bowling alley forever’. However, should a dynamic develop that the entire market rushes to adopt the new technology, the market would experience hypergrowth, which is known as the tornado (Moore, Johnson and Kippola 1998; pp29-32).

Out of the tornado emerges a ‘gorilla’ company. A gorilla company is one that emerges as the overwhelming market leader following the first surge of random mass-market adoption of any new technology (Moore, Johnson and Kippola 1998; p33). In terms of the ‘Law of Increasing Returns’ – which applies only to knowledge-based industries – the market leader tends to extend its lead while other companies tend to fall further behind. Following the mass-market adoption of the new technology, software and hardware companies develop and manufacture further applications and products, which further entrenches the market leader’s position. As the market leader’s position is entrenched so the switching costs to customers rise, leading to the market leader becoming more powerful (Arthur, 1996: pp3-6). Industry participants and customers effectively adopt a single company’s architecture as the industry standard: this company becomes the gorilla. The gorilla secures control of the value
chain and is able to influence the future direction of the market (Moore, Johnson and Kippola 1998: pp37, 44).

Those companies in the industry which failed to become the gorilla either become chimps or monkeys. Monkeys copy the gorilla’s technology and sell their product at a discount to the gorilla’s price. As they are cloning products, they have no competitive advantage and are, therefore, vulnerable to the gorilla capturing their customers. Chimps are companies which failed to become gorillas but as they invested heavily in their own architecture, their technology is incompatible with that of the gorilla. They have two choices. Either to compete directly with the gorilla for that status or to focus on a niche market in an attempt to become a local gorilla within a niche (Moore, Johnson and Kippola 1998: pp54-55).

**Figure 8: DoCoMo: A gorilla emerges**

![Graph showing subscriber growth from February 1999 to October 2000](Source: www.nttdocomo.com)

DoCoMo has achieved gorilla status through the success of i-mode – its version of the wireless Internet – as shown in (Figure 8). One reason for DoCoMo’s success is its provision of content to attract customers to its portal. Once sufficient customers supported the portal, other content providers entered the market. This additional content provision attracted even more customers, thus the company entered a virtuous cycle (Attwood and Duncan, 2000: p114). Furthermore, i-mode technology facilitates
easy access to the Internet because its phones are always on and content is downloaded faster as programmes are written in WML, a stripped-down version of HTML (Rohwer, 2000: p64). The company has 80 - 90% of the Japanese m-commerce market and, as shown in Figure 8, its subscriber base has grown rapidly and is expected to reach 17 million by the end of the year (Rohwer, 2000: p64). The success of i-mode may displace WAP as an industry standard if i-mode were to be rolled out beyond Japan’s borders (Allard, Young, McAteer and Wigder, 2000: p2).

2.4.6 Conclusion to strategic manoeuvring
The gorilla company, through its overwhelming market dominance, stands to profit handsomely. Subsequent to the tornado which lasts three to five years, the market moves to ‘Main Street’. Main Street represents a transition from hyper-growth to a slower growth. Attention is focused on variations to standards to enhance their application (Moore, Johnson and Kippola, 1998: pp35-39). As the gorilla remains indomitable and as Main Street is long, the mobile operator which attains gorilla status during the tornado phase of the m-commerce industry’s technology adoption lifecycle stands to make extra-ordinary profits during its lifetime. It can, therefore, be expected that the mobile operators will face fierce competition once the chasm has been crossed and the new technology adopted by the mass-market.

2.5 Conclusion to the literature review
In terms of Porter’s Five Forces (1980), the mobile operators are in a relatively strong position to the other industry participants, with the exception of suppliers. Moreover, the two 10X forces, complementors (Grove, 1988) and pre-existing industry structure (Hubbard, Pocknee and Taylor, 1996), are both facilitating the development of the industry. However, the success of a firm within in an industry is dependent on the firm’s position along the industry value chain in addition to the industry’s overall attractiveness (Lewis, 1999: p10). Barnett, Hodges and Wilshire (2000) propose an m-commerce industry value chain which comprises of several segments. While they argue that the mobile operators could compete along all segments of the value chain, they suggest that the mobile operators should compete along four: one of which, transport, they currently compete on.
As the m-commerce industry is nascent, technological uncertainty facing the industry is high. Industry participants will need to work together to overcome the uncertainty facing the industry (Porter, 1980). Through this co-opetition (Brandenburger and Nalebuff, 1996), mobile operators will improve the likelihood of the industry crossing the chasm, so making the transition from the early adopters to the early majority (Moore, 1991). Once the industry crosses the chasm and so achieves widespread adoption, aggressive competition amongst mobile operators will ensue as each operator seeks to become the industry’s gorilla within their chosen segments (Moore, Johnson and Kippola, 1998). Those operators which become gorillas stand to make superior profits. The risk, though, is high: some mobile operators will merely attain chimp status. The battle lines are drawn. The race is on.
3 Research methodology

The research aspect of the study was primarily qualitative. It sought to establish the scope of the industry’s development, some of the players in the South African m-commerce industry and the strategies that the players might pursue. The study made extensive use of primary data, obtained through:

- desk research,
- e-Mailed surveys and
- interviews.

Secondary data sources were obtained through extensive desk research.

Aside from the data obtained through the desk research, all referencing refer to the manner in which data was obtained; for example, whether data was gleaned from surveys, telephonic interviews or interviews.

3.1 Desk research

Desk research considered:

- Theories related to industry attractiveness, the m-commerce value chain, co-opetition, and technology adoption lifecycle amongst others. The theories used were obtained from primary sources; that is, the original authors’ work.

- The development of the m-commerce industry in Western Europe and Japan as an aid to developing a scenario for the industry in South Africa. Information was sourced from local and international newspapers and journals, such as *Fortune*, *Scientific American*, *The Economist* and *The Financial Times*. As the industry is in its infancy, there is a dearth of books and reports which discuss developments within a theoretical framework. Consequently, this study has quoted extensively from two particular reports. They are:
  - *Mobile Commerce: Strategies for the new business Paradigm* by R Attwood and S Duncan; and
  - *Mobile Commerce Report* by F Muller-Veerse.
The South African mobile operators, their strategies and the issues with which they have been grappling. This information was sourced from local newspapers and business magazines, such as *Business Report*, *Engineering News* and *Financial Mail*, as well as equity analysts’ reports.

While the bulk of the data gathered through desk research was of a secondary nature, primary data was obtained by accessing companies’ web sites. Data was obtained in this way on companies such as MTN and Fundamo.

### 3.2 Survey

#### 3.2.1 Mailed survey

The data collection method was survey-based, which was useful for capturing data on attitudes, knowledge and perceptions. The target population consisted of the top six telecommunications industry analysts as rated by the Financial Mail (Financial Mail, 2000a: p18). The Financial Mail annually polls stockbrokers’ institutional clients as to who they regard as being the best analysts in their sector. The criteria used include:
- the quality of research in terms of content and value;
- the accuracy of forecasts;
- consistency throughout the preceding year; and
- the effectiveness of communication (Financial Mail, 2000a; p28).

The analysts and the companies for which they currently work are shown in Table 2 (Financial Mail, 2000a; p18).

As the Financial Mail only names the top six analysts, the survey was restricted to these highly-regarded individuals. The survey, therefore, was equivalent to a census as every member of the target population was polled (Easterby-Smith, 1993: p122). As leading analysts, they would have a good knowledge of the industry, emerging technologies, industry players and their strategies.

The purpose of the survey was to:
- establish their perceptions of the attractiveness of the local m-commerce industry;
- identify potential industry participants and where they are likely to position themselves on the industry value chain; and
• To establish which m-commerce applications are likely to gain widespread acceptance.

Table 2: Rated telecommunications analysts

<table>
<thead>
<tr>
<th>Analyst</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craig Tate</td>
<td>ING Barings Southern Africa Limited</td>
</tr>
<tr>
<td>Franca di Silvestro</td>
<td>HSBC Simpson McKie (Pty) Ltd</td>
</tr>
<tr>
<td>Vaughan Henkel</td>
<td>Warburg Dillon Read</td>
</tr>
<tr>
<td>Sunil Varghese</td>
<td>Deutsche Bank</td>
</tr>
<tr>
<td>Rob Bezuidenhout</td>
<td>CLSA</td>
</tr>
<tr>
<td>Andre Szczesniak</td>
<td>ING Barings Southern Africa Limited</td>
</tr>
</tbody>
</table>

Source: Financial Mail

Questionnaires were e-mailed to participants. The advantages of using an e-mail-based survey include the increased speed of delivery and the ease with which participants can respond (Wegner, 2000: p21). The disadvantage, though, is the associated low response rate (Wegner, 2000: p21). Easterby-Smith (1993: p125) quotes an example whereby a questionnaire distributed within an organisation garnered a 50% response rate. To increase the likelihood of a one hundred percent response rate, all the analysts were contacted in advance, the purpose of the survey was explained to them and permission was obtained to include them in the survey. Despite taking these measures and repeated requests for returns three of the six analysts failed to return completed surveys.

In developing the questionnaire, extensive referrals were made to the stated aims of the research report and the underlying theory of the literature review to ensure the relevance, appropriateness and usefulness of the questions (See Appendix A). The bulk of the questions on the mailed survey were open-ended to ensure richness of data and free expression of views (Easterby-Smith, 1993: p120). A disadvantage associated with open-ended questions, though, is the difficulty in tabulating and analysing responses (Wegner, 2000: p23).
One of the respondents was emailed a pilot questionnaire, enabling the researchers to assess the internal consistency of the questionnaire and the clarity of the questions (Wegner, 2000: p28). On receipt of the pilot questionnaire, it was noted that a few questions had not been answered. Attempts were made to discuss this with the respondent and to obtain feedback. The respondent refused to take phone calls, citing work pressures. It is suggested that these questions were left unanswered because the questions touched on issues the respondent had not previously considered: not because of problems inherent in the questionnaire. As time was running short, and as the researchers felt that the questionnaire was a robust one, it was decided to email the survey to the remaining analysts.

Subsequent to the development of the research proposal where it was suggested that the analysts would be surveyed using only a mailed survey, it was decided that it would be beneficial to follow up the responses to the e-mailed survey with a telephonic interview. Telephonic interviews, it was felt, would enable the researchers to obtain clarification as to the respondents’ replies, to glean additional information and to add depth to the responses. Two of the three survey respondents were amenable to being polled telephonically. Each of the interviews was of about half-an-hour’s duration.

3.2.2 Interviews
Leading industry participants were interviewed using semi-structured questions to:

- establish their perceptions of the attractiveness of the local m-commerce industry;
- identify where on the industry value chain their companies hoped to position themselves;
- identify their companies’ competitive strategies;
- establish which m-commerce applications were likely to gain widespread acceptance; and
- elicit possible scenarios of the future development of the m-commerce industry.

An interview guide (See Appendix B) was developed to ensure that the interviews would remain focused and constructive. In developing the interview guide, referrals were made back to the stated aims of the research report and the underlying theory of
the literature review to ensure the relevance, appropriateness and usefulness of the questions. The format was semi-structured so that the major issues were addressed while not excluding the opportunity to gain insight into issues that had not been previously considered (Easterby-Smith, 1993: p120). Moreover, interview guides were tailored to accommodate the available time and to place the emphasis on the area in which the stakeholder has greatest expertise. Interview guides were emailed or faxed to interviewees ahead of the interview, enabling them to consider the issues in advance.

It was originally intended to have face-to-face interviews with executives from the two South African mobile phone operators, MTN and Vodacom, responsible for new business development for their respective companies and, therefore, involved in crafting m-commerce strategies, on their business trips to Cape Town. The executives later informed the researchers that Cape Town-based interviews would not be possible; thus, the researchers arranged to conduct the interviews in Johannesburg. As the bulk of industry participants are located in Johannesburg, the researchers decided it would be opportune to interview a broader range of industry stakeholders.

Nedcor was approached as it was the first company to offer a WAP-based application to the South African market and the second bank internationally to offer mobile banking services (Wood, 2000: p79). Exactmobile.com, owned by the local distributor of Nokia handsets, was approached as it is regarded as the country’s most successful WAP service (Wood, 2000: p80), and, as a portal, it is located on that segment of the value chain which is expected to be most heavily contested (Attwood and Duncan, 2000: pp63-64; Muller-Veerse, 2000: pp63-65). Motorola was approached as the company is both a leading handset manufacturer as well as a supplier of the underlying cellular telephony technology. Furthermore, the company’s representative is currently working on his doctorate in 3G technology, making him one of the most highly qualified individuals in this field in the country. Table 3 shows the interviewees, the companies they represent and the length of the interviews.
Table 3: Interviewees

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Stakeholder role</th>
<th>Length of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karen Drop</td>
<td>Nedmobile</td>
<td>User applications: mobile banking</td>
<td>1.5 hrs</td>
</tr>
<tr>
<td>Senior Manager – Electronic Banking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dennis Magaya</td>
<td>Motorola</td>
<td>Handset manufacturer</td>
<td>1.5 hrs</td>
</tr>
<tr>
<td>Business Development Manager – GPRS/UMTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Francis Malema</td>
<td>Department of Communications</td>
<td>Government</td>
<td>1.0 hrs</td>
</tr>
<tr>
<td>Assistant Director – Multimedia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sam Michel</td>
<td>MTN</td>
<td>Mobile operator</td>
<td>2.0 hrs</td>
</tr>
<tr>
<td>Group Executive for e-Business</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gavin Penkin</td>
<td>Exactmobile</td>
<td>Content aggregator</td>
<td>1.5 hrs</td>
</tr>
<tr>
<td>Head of South African Operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pambos Soteriades</td>
<td>Vodacom</td>
<td>Mobile operator</td>
<td>1.5 hrs</td>
</tr>
<tr>
<td>Executive Head of Business Development Division</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total time spent in interviews</td>
<td></td>
<td></td>
<td>9 hrs</td>
</tr>
</tbody>
</table>

3.3 Limitations of the study

Due to the infancy of the industry, the literature on m-commerce is limited. Research generated thus far is prohibitively expensive and is not widely available in local academic libraries; hence, it was not possible to gain full exposure to the knowledge accumulated to date.

The failure of all the chosen analysts to respond to the questionnaire imposed a limitation on the study as a wider range of views may have been elicited.

3.4 Cost considerations

The cost of the study is shown in Table 4. The main expense item was the cost of two tickets to Johannesburg, where industry participants were interviewed over a two-day period.
Table 4: Cost breakdown

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airfare to Johannesburg</td>
<td>R2 832</td>
</tr>
<tr>
<td>Travel</td>
<td>R 135</td>
</tr>
<tr>
<td>Telephone interviews</td>
<td>R 90</td>
</tr>
<tr>
<td>Photocopying and printing</td>
<td>R 300</td>
</tr>
<tr>
<td>Total</td>
<td>R3 357</td>
</tr>
</tbody>
</table>

3.5 General lessons learnt

3.5.1 Data capture
As the study focused on establishing the status and development of the m-commerce industry in South Africa, the survey was geared towards the collection of qualitative data. Consequently very little quantitative data was collected. It is, therefore, not possible to draw lessons from their use.

3.5.2 Comparative analysis of telephonic and face-to-face interviews

Of the three methods used, face-to-face interviews yielded the richest data as:

- Appointments were made. As appointments were made in advance of the face-to-face interviews, the participants blocked off time to discuss the industry dynamics. They therefore did not feel pressured to move onto other issues and were able to devote their attentions to the discussion. While telephonic interviews were easy to initiate, they were brief as the participants had not blocked off the time as no appointment was made. As they needed to address other work demands, responses were shorter and there was less opportunity to delve into greater detail on areas of interest.

- Respondents could be observed. As respondents could be observed, the researchers could respond to cues to probe deeper or move on to further questions.
• Trust was established. As trust was established during the course of the interview, respondents were forthcoming with information as the interview progressed. They were also more candid than they might have otherwise been and were amenable to follow-up calls for additional information or clarification.
4 Findings

Through the use of surveys and interviews, data was garnered from analysts and industry participants, which reflected the South African m-commerce industry’s attractiveness and the critical positions along the industry’s value chain which participants believe the mobile operators will pursue. The ultimate success of the industry, though, will be determined by whether this new technology will gain widespread adoption. Accordingly, three scenarios were developed based on the respondents’ vision of the future. Each scenario considered the role of government and mobile operators in determining whether the industry will fail or succeed in gaining widespread adoption. Before discussing the industry’s dynamics, it is worthwhile to consider the analysts’ definition of m-commerce.

4.1 Definition of m-commerce

There is widespread consensus as to a definition of m-commerce. Industry analysts’ definitions include: “business to consumer commerce via a mobile network” (Survey – Bezuidenhout); “any transaction with monetary value which is transacted over the mobile telephony environment” (Survey – Henkel); and, most succinctly, “transacting over mobile phones” (Survey – Varghese). Common to the definitions is the notion of m-commerce being a means of transacting via wireless technology with mobile devices. This is in keeping with the definition as proposed in Section 2.1, page 8.

4.2 Eight Forces industry analysis

In section 2.2, page 11, the attractiveness of the m-commerce industry was assessed using Porter’s Five Forces (1980), Grove’s Sixth Force (1988), the role of government and the impact of pre-existing industry structure (Hubbard, Pocknee and Taylor, 1996). It was felt that Grove’s Sixth Force - the role of complementors - and the pre-existing industry structure were 10X forces. That is, complementors and the pre-existing industry structure were exerting a disproportionate influence on the emergence of the industry and its overall attractiveness. In South Africa, by contrast, it is felt that the pre-existing industry structure and government are the 10X forces.
This section considers each of the Eight Forces, with the exception of competitive rivalry, which is considered in greater depth in Section 4.3, page 57.

4.2.1 Threat of new entrants
The South African telecommunications industry is on the verge of witnessing an increase in competition. Consequently, the industry is likely to see a number of new participants in the coming years. At the end of 1999, the regulatory authority at the time, the South African Telecommunications Regulatory Authority (SATRA) announced the winner of the third mobile phone licence, Cell-C. Companies which failed to win the licence claim the selection process was marred by irregularities. Consequently, the case has been adjourned to court (The Economist, 2000c). At the time of writing, the issue had not been resolved as there is a lack of clarity as to which regulatory authority has final jurisdiction in this matter. It is expected that the issue will be resolved within the next year (Interview – Malema). Moreover, it is possible that the government will extend a fourth mobile licence in the short- to medium-term (Interviews – Malema, Magaya).

Expectations of the third mobile operator’s market share over the next three years are largely muted, as shown in Table 5, as the third mobile operator will be facing competition from the cash-rich incumbents (Telephonic interview – Varghese). Furthermore, MTN and Vodacom have secured the first-tier subscribers, who are affluent, tech-savvy and tend to be heavier users (BMI-TechKnowledge, 2000: p419). Should the incumbents be granted access to the 1800MHz band in advance of the third operator, then the “third operator’s bargaining power will be lost”, so encumbering its potential performance further (Interview – Magaya). Varghese, in calculating his figures, assumed that the third mobile operator would capture 20% of net market additions to achieve market share of 8.8% in its third year of operations. At the more optimistic end of the forecasts is Bezuidenhout, who expects the third operator to enjoy market share of 10-19% by its third year of operations as the advent of competition with the introduction of the third operator will serve to stimulate the growth of the industry.
Table 5: Projected market share of third mobile operator

<table>
<thead>
<tr>
<th></th>
<th>First year</th>
<th>Second year</th>
<th>Third year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rob Bezuidenhout</td>
<td>&lt;10%</td>
<td>&lt;10%</td>
<td>10 – 19%</td>
</tr>
<tr>
<td>Greg Brady</td>
<td>3%</td>
<td>Not provided</td>
<td>5%</td>
</tr>
<tr>
<td>Vaughan Henkel</td>
<td>&lt;10%</td>
<td>&lt;10%</td>
<td>&lt;10%</td>
</tr>
<tr>
<td>Sunil Varghese</td>
<td>4.3%</td>
<td>6.9%</td>
<td>8.8%</td>
</tr>
</tbody>
</table>

Sources: Surveys – Bezuidenhout, Henkel, Varghese; Standard Equities 2000

However, Knott-Craig, Chief Executive of Vodacom, believes the optimal period for a new mobile operator to enter the market has passed as a result of the ongoing delays (Bennet, 2000). The longer the delays, the less willing banks will be to extend finance to the ultimate licence holder – it will cost close to R4bn to establish its network - as the incumbents will have:

- signed up more customers in the interim; and
- secured market share in data provision: an area in which the third provider was originally expected to have faced a level playing field (Interviews – Drop, Soteriades; Szczeniak, 1999: p17).

Added to these woes, the third mobile operator may be required to focus on extending mobile services to currently under-serviced rural areas. This is an onerous coverage requirement as the capital expenditure per subscriber will be higher as the communities are widely dispersed (Interview – Soteriades).

While not of immediate consequence to the m-commerce industry, the emergence of a second landline operator is worth considering as it will be of relevance when considering the strategies of the mobile operators. In 2003, a second landline operator will begin operations (Interview – Malema). The skeleton of the second landline will be created from the telecoms arms of Denel, Eskom and Transnet, all existing government parastatals (Bidoli, 2000a: p101). The introduction of competition in this sector is likely to place price pressure on fixed-line tariffs as well as serve to stimulate the provision of innovative products and services by the fixed-line operators. As Telkom is allied to Vodacom through its 50% shareholding, alliances could be formed between MTN or the third cellular operator with the second fixed-line operator (Interviews – Magaya, Malema). It is more likely that the second landline operator...
would form an alliance with MTN as Transnet would have substantial interest in both Bidoli, 2000b).

4.2.2 Suppliers
The South African mobile operators are in a weak position relative to their suppliers as their network infrastructure needs are met by a small number of firms which provide their services and products to the world’s leading operators – both fixed and mobile. Motorola supplies two-thirds of Vodacom’s base stations, while Alcatel supplies the remainder. Siemens supplies Vodacom with switches. All of MTN’s network and technology requirements are met by Ericsson (Interview – Magaya). The leading handset suppliers in South Africa are Nokia, Ericsson, Motorola, Alcatel and Siemens.

4.2.3 Customers
The development of m-commerce will be constrained by some of the characteristics of the South African market. These characteristics include:

- the lack of awareness of the possibility of m-commerce as well as of the functionality provided by handsets. For example, Markinor found that as many as 30% of Capetonians are unaware of short messaging services (SMS): the starting point for m-commerce (Interview – Soteriades);
- technophobia. People are scared of using computers (Interviews – Magaya, Michel, Soteriades);
- a large number of functionally illiterate people (Interview – Michel, Soteriades); and
- a large lower-income population, which has little need for the advanced data services offered by m-commerce (Survey – Bezuidenhout).

Therefore, if m-commerce were to succeed, it would be necessary for the industry to educate users (Interview – Soteriades).

On the positive side, the youth market (defined as those between the ages of 18 and 25) has been found to be ready adopters of m-commerce as they are comfortable with mobile phones and SMS (Interviews – Drop; Penkin). Moreover, youth purchases of mobile technology is growing rapidly (Interview – Drop).
South African mobile subscribers are increasingly gravitating towards the use of pre-paid option as opposed to contracts. Ninety percent of all new subscriptions are pre-paid subscribers and the majority of subscribers are now pre-paid customers (Brady, 2000: p2). The shift to prepaid users could pose a stumbling block to the development of m-commerce as the bulk of pre-paid customers are lower-end consumers and, therefore, may not be able to afford the advanced services offered (Telephonic interview – Bezuidenhout).

Analysts and industry participants have widely differing perceptions as to which applications and functions will be well-received and the pace with which functions will be adopted, as shown in Table 6 and Table 7. Most industry participants believe that mobile financial services will be a successful area, while they are not as optimistic as to the prospects of mobile information provisioning and entertainment. The individual areas are discussed in greater depth below.

Table 6: Expected successful m-commerce applications

<table>
<thead>
<tr>
<th></th>
<th>Drop</th>
<th>Magaya</th>
<th>Malema</th>
<th>Michel</th>
<th>Penkin</th>
<th>Soteriades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile financial services</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Mobile shopping</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile information provisioning</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile entertainment</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Interviews
Table 7: Likely pace of adoption of m-commerce applications

<table>
<thead>
<tr>
<th>Service</th>
<th>V. Rapidly</th>
<th>Rapidly</th>
<th>Moderately</th>
<th>Slowly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile financial services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mobile banking</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Mobile broking</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>- Mobile cash</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mobile payment</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mobile shopping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mobile retailing</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Mobile ticketing and reservations</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Mobile information provisioning</td>
<td></td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Text messaging</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- News provisioning</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mobile entertainment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mobile gaming</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Mobile music</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Surveys - Bezuidenhout, Henkel, Varghese

Mobile financial services

Mobile financial services are regarded as the killer application, although it is felt that this area is not being sufficiently promoted (Interview – Penkin). The analysts surveyed were more optimistic as to the take-up of mobile banking and mobile cash as opposed to mobile broking (Table 7). Mobile banking includes making electronic payments to account providers, transfers between accounts, and account enquiries (Interviews – Drop, Michel).

Mobile money would be useful for making smaller transactions (Interview – Soteriades). To this end, government is currently seeking to embed a chip on SIM cards which would facilitate micro-payments – such as payment of taxi fare. If this succeeds, the use of mobile phones for micro-payments would be high (Interviews – Drop, Malema). Both government and the Reserve Bank view the use of mobile phones for financial transactions favourably as they feel that mobile financial services will provide the previously under-banked segment of the population access to financial services (Interview – Drop; Department of Communications, 2000: p63-64). The Reserve Bank, though, would prefer mobile phones to work as debit cards as opposed to credit cards so limiting the growth of consumer credit (Department of Communications, 2000: p64). It is expected that mobile cash could be a reality within
a year (Interview – Michel). If mobile financial services are to succeed, it is necessary that transactions be executed in real time (Interview - Drop).

**Mobile shopping**
Some industry participants feel that mobile shopping would be successful: “transactions would be small and of an impulsive nature” (Interview – Penkin). Industry analysts felt that mobile ticketing and reservations would be better received than mobile retailing (Table 7). Mobile retailing is likely to fail as:
- it cannot replicate the human aspect of shopping; and
- 50% of customers are lost when they have to work through a new page when making an Internet transaction. This problem is compounded when using mobile phones (Interview – Michel). The challenge for the industry is therefore to provide the user with a “one-button purchase experience” (Engineering News, 2000).

**Mobile information provisioning**
Of all the applications, analysts are most upbeat as to the pace with which South African consumers would adopt text messaging (Table 7). This has been borne out by the pace at which consumers have signed up with MTNsms.com, MTN’s text messaging Internet site: 16 000 per day. Further, 750 000 messages are sent from that site daily (Interview – Michel).

News provisioning was viewed less favourably as there is no demand for time-sensitive information in South Africa (Table 7) (Telephonic interview - Varghese). Information and services should be community focused, whether that community be defined by culture, religion or shared sporting interests. If information is provided for communities of users, then that information is important and, therefore, of use (Interview – Michel). The information must be real-time and local, enabling consumers to act on information received (Interview – Drop).

**Mobile entertainment**
Mobile gaming could be rapidly adopted by South African consumers for three reasons (Table 7). Firstly, the populace’s enthusiasm for the lottery combined with the development of micro-payment mechanisms, as discussed under ‘Mobile financial
services’, page 46, could result in the use of mobile phones for gaming enjoying strong success (Telephonic interview – Varghese). Spending on the lottery and mobile phones have transformed the South African consumer patterns. It is expected that R1.1 billion will be spent on the lottery in 2000. Moreover, the lottery is expected to appeal especially to the lower income group as tickets are so affordable (Kruger, 2000: pp6-7). Secondly, it is argued that mobile entertainment would be a successful m-commerce application as South Africa has a rapidly growing youth market, (Interview – Magaya). Finally, it is argued that mobile entertainment will be successful as “people want fun” (Interview – Penkin). Purchasing and downloading ringing tones is currently a popular selling item (Interviews – Michel, Penkin). Industry analysts were least optimistic as to the prospects of mobile music (Table 7); however, some industry participants saw strong potential in this area provided it would be affordable (Interview – Penkin; Telephonic interview – Varghese). If mobile entertainment is to succeed, though, it is important that it be personalised, localised and bespoke (Interview – Michel).

Other
As security concerns in South Africa are high, tracking services could be a successful m-commerce application (Interview – Michel). None of the analysts surveyed identified other applications which would be well received by the market.

4.2.4 Substitutes
In keeping with Moore, Johnson and Kippola’s (1998: p41) admonition that the threat of substitution in high-tech comes from further innovations, interviewees were asked what potential new technologies could supersede m-commerce. None was identified.

4.2.5 Adding to Porter’s Five Forces - Complementors
As mentioned previously, after 2001, mobile handset manufacturers will only produce Internet-enabled mobile phones (Muller-Veerse, 2000; p60). The handsets manufacturers have sought to facilitate the development of m-commerce as it provides them with a means to increase handset sales in addition to giving them a new way in which to interface with customers. Furthermore, as the handset manufacturers are anxious that the applications reside on the handset and not on a server, they have been driving the development of the industry to protect their interests (Interview –
South Africa stands to benefit from the international trend towards the development of Internet-enabled phones and all phones sold in this country will soon have the necessary capabilities to facilitate m-commerce transactions via the Internet.

4.2.6 Adding to Porter’s Five Forces - Pre-existing industry structure

It is often remarked upon that m-commerce is the product of two rapidly growing industries: mobile telephony and the Internet.

Mobile telephony

The South African mobile telecommunications market is currently regarded as the fastest growing mobile market in the world (Interview – Drop). As of the end of 1999, there were some 5.3 million subscribers (ITU, 2000). There are currently roughly 7.6 million subscribers: Vodacom has 4.1 million subscribers while MTN has 3.5 million (Interview – Soteriades). Vodacom’s market share is larger than MTN’s as Vodacom enjoyed a lead over MTN in establishing its infrastructure (Brady, 2000: p3; Interview - Michel). Nevertheless, MTN has increased its market share from 32% in 1995 to 44% currently (Brady, 2000: p3).

There appears to be two schools of thought as to the saturation level in South Africa. One school argues that saturation will occur once penetration reaches between 35 – 40% (Bennet, 2000; Brady, 2000: p2; Kruger, 2000: p6). Another believes that saturation will occur once mobile penetration reaches 20 – 25% as a result of limited disposable incomes (Interview – Magaya; Szczesniak, 1999: p12). The rate at which the market will grow, too, is subject to widely differing impressions. Knott-Craig gives different numbers in different interviews: in one he suggests 300 000 to 400 000 new subscribers are joining the industry per month, in another he states 100 000 (Bennet, 2000; Van der Kooy, 2000: p15).

The tendency of the mobile operators, though, to announce the number of subscribers signed up as opposed to net subscriptions – that is, taking into account the impact of churn – results in the numbers being overstated (Brady, 2000: p2). BMI-TechKnowledge estimates that new cellular subscribers are joining at the rate of 100 000 per month; ABN Amro suggests that 200 000 subscribers are joining per month; and Standard Equities estimates monthly net subscriptions to be between
150 000 and 220 000 (BMI-TechKnowledge, 2000; Szczesniak, 1999: p10; Brady, 2000: p2).

Part of the success of mobile telephony in South Africa is a consequence of the failure of Telkom, the fixed operator, to provide wide access to telephones: there are only 4.6 million landline connections (Szczesniak, 1999: p6). Mobile phones are, therefore, a substitute for landlines in South Africa, as is the case in many other developing countries, as opposed to being a complementary telecommunications tool which is the case in many developed economies (Szczesniak, 1999: p11). Analysts, on the whole, seem to feel that the rate at which the industry is growing is likely to slow down as shown in Table 8.

Table 8: Penetration growth expected to slow

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rob Bezuidenhout</td>
<td>↓10%</td>
<td>↓15%</td>
<td>↓20%</td>
</tr>
<tr>
<td>Vaughan Henkel</td>
<td>↓4.3%</td>
<td>Not provided</td>
<td>Not provided</td>
</tr>
<tr>
<td>Sunil Varghese</td>
<td>↑10%</td>
<td>↓17%</td>
<td>↓12%</td>
</tr>
</tbody>
</table>

Sources: Surveys – Bezuidenhout, Henkel, Varghese

By contrast, market participants expect the market to continue growing at its current strong rate. As the third provider will result in increased competition, prices are expected to fall (Interview – Magaya; Szczesniak, 1999: pp17-18). Mobile telephony will, therefore, become cheaper so attracting those who were previously unable to afford phones (Interviews – Magaya, Malema). Factors constraining growth of the industry, though, include economic growth and network capabilities (Interview – Penkin). Network capabilities refers to the concerns as to whether the incumbent mobile operators have sufficient bandwidth. This issue is discussed in greater detail under ‘Allocation of spectrum’, on page 53.

Although the mobile operators’ total revenue is expected to continue rising (see Figure 9), average revenue per user (ARPU) is under pressure in South Africa as mobile operators pursue the lower-end of the market (Interview – Penkin). ARPU is expected to come under further pressure as real prices – if not nominal prices – are
expected to fall once the third mobile operator commences operations (Interview – Michel; Szczesniak, 1999: p17). m-Commerce will provide mobile operators with an opportunity to increase ARPU as:

- people use SMS for relay chatting;
- the youth market becomes more sophisticated in their usage of m-commerce applications;
- lower spenders adopt the usage of SMS; and
- additional voice calls are made in response to data applications (Interviews – Magaya, Michel, Penkin; Szczesniak, 1999: p21).

However, as Soteriades believes the size of the South African m-commerce market to be limited, he maintained that m-commerce revenues were unlikely to make a substantial impact on the falling ARPU.

**Figure 9: Mobile operators' revenue**

![Bar chart showing mobile operators' revenue from 1999 to 2003.](chart)

Source: Standard Equities

**The Internet**

It is estimated that there were some 1.8 million Internet users in South Africa in 1999 and that there will be 2 million users by 2002 (BER, 2000: p5; ITU: 2000). The industry enjoyed strong growth – 500 000 new subscribers in 1999 – until recently but this growth is slowing down as demand for personal computers is close to saturation (BER, 2000: pp5-6). Few South Africans are able to afford computers: only 16% of
the population earn more than R42 000 per year, while 37% of the economically active population is unemployed (BER, 2000: p4).

The growth of Internet usage is further limited by the relatively high cost of Internet access: consumers are charged a monthly subscription fee by their service providers while Telkom charges for time spent on the Internet. By contrast, European consumers have free access to the Internet and American consumers are not even charged for the cost of the call (BER, 2000: p4).

**Mobile phones as a means of accessing the Internet**

In countries with low Internet and credit card penetration, mobile phones could play an important role (Fox, 2000: p80). In Japan, fewer than 12% of the population has access to the Internet. Accordingly, DoCoMo correctly deduced that i-Mode would become the main way in which people would access the Internet (The Economist, 2000a: p85). Similarly, it is argued that many South Africans will experience the Internet through their mobile phones as they are cheaper than computers (Interview – Soteriades; Planting and Bidoli, 1999: p91), and will find their mobile phones to be a useful means of payment – particularly for micro-payments (Interviews – Drop, Malema, Soteriades). It has been suggested that in 18 months time, the value of m-commerce transactions will exceed the value of e-commerce transaction (Interview – Drop).

**4.2.7 Adding to Porter’s Five Forces - Government**

The government’s priorities in the telecommunications arena are:

- promoting universal access to services and the protection of consumers’ interests;
- ensuring technical standardisation and efficient use of frequency spectrum;
- empowering the historically disadvantaged; and
- promoting competition and economic development (SATRA, 1999: pp3-4; Interview - Malema).

Accordingly, government has focused on the control of new entrants, the allocation of spectrum impact and regulating the practices of mobile operators so as to protect the interests of consumers. However, as the industry is monitored by a weak regulator the
control of new entrants and allocation of spectrum has been mismanaged (Surveys – Bezuidenhout, Henkel, Varghese).

**Licensing of new entrants**

The government mishandled the awarding of a third mobile operator’s licence. Two of the losing bidders have accused the regulatory authority of awarding the licence to a company which they felt did not have the required technical expertise and the matter is presently before the courts (The Economist, 2000c). There are two broad ramifications of the mismanagement of the licensing process.

- First, the third operator’s licence was to have been awarded through a beauty contest. However, as a result of the failure of the beauty contest, future licences are likely to be awarded through the use of an auction or a hybrid (Interview – Malema). If a hybrid were to be used, the two most important criteria that government would be likely to apply would be the provision of universal access and that the candidate company is a black empowerment vehicle (Interview – Malema). However, it is argued that auctions are inappropriate as they could undermine the affordability of the licence to the winning investor, and as the limited size of the South African market would make it difficult for the winner to recoup its investment (Survey – Henkel; Telephonic interview – Bezuidenhout).
- Second, investor sentiment is likely to be harmed (Survey – Henkel; Telephonic interview - Varghese).

**Allocation of spectrum**

Industry participants are of the view that government has not managed the allocation of spectrum efficiently nor has it been customer-centric (Di Silvestro, 2000: p5; Interview – Michel; Telephonic interviews – Bezuidenhout, Varghese). SATRA invited applications from the incumbents for access to the 1800MHz band in early 2000 (Sharon, 2000: p63). As MTN and Vodacom believe that they will soon run out of capacity on the 900MHz band, they duly responded (Sharon, 2000: p63). They are concerned that the failure to obtain increased bandwidth will result in an increase in the number of dropped calls and the number of attempts needed to connect a call (Interviews – Michel, Soteriades). As Vodacom has been inefficient in its allocation
of phone numbers (Stones, 2000a), there is doubt as to whether the incumbent operators are really constrained by a lack of capacity (Interview – Magaya).

The Independent Communications Authority of South Africa (ICASA) (successor to SATRA) argues that the congestion experienced by the operators could be overcome through the use of upgradeable 900MHz equipment. However, the mobile operators contend that the required technology is too expensive (Interview – Soteriades). Furthermore, government is withholding access as it feels the ability of the third cellular operator to compete will be compromised if it were to allow the incumbents access to the 1800MHz band (Di Silvestro, 2000: p4). It has been suggested, though, that government is preoccupied with the issues surrounding the granting of the third mobile- and second fixed-operator licences, and has, therefore, not focused on the issues surrounding the incumbents’ need for increased bandwidth (Interview – Malema).

In the light of the government’s decision not to grant access to 1800MHz band, mobile operators will have to make more efficient use of existing bandwidth; that is, they will need to find ways to allow customers to make calls without using the full channel (Interview – Michel). Nevertheless, government has been criticised for treating the bandwidth as a “national treasure” and not as the commodity it is (Survey – Bezuidenhout)

**Imposition of additional conditions**

Government has displayed a tendency to impose additional conditions when awarding licences. When the original licences were awarded, Vodacom and MTN were required to provide community telephone services in under-serviced areas. Moreover, they were required to pay a yearly charge equivalent to 5% of their yearly operating income (Szczesniak, 1999: p4). It has been suggested that government would grant the incumbents access to the 1800MHz band in exchange for increased social responsibility obligations (Interview – Soteriades). The third mobile operator, too will be faced with additional conditions: it will be required to extend coverage into the rural areas (Interview – Soteriades).
Uncertainty as to issues relating to m-commerce

While government has issued a green paper on e-commerce (which was only issued in November 2000), it has no policy documents relating to m-commerce. m-Commerce is regarded as a micro-policy making area within the broader field of e-commerce. Discussions with government yielded conflicting comments. When Mr Malema was questioned on government’s policy as to the emergence of different standards, he stated that government would not allow for different standards. Yet, he later stated that government would not use its regulatory powers to impose uniform standards on the operators even if the standards used were to diverge as a result of innovation, but would instead make recommendations to industry participants (Interview - Malema). This is of concern for the mobile operators as it adds uncertainty to an area already fraught with them.

Industry liberalisation expected

While industry participants expect government intervention to remain high (Interviews – Magaya, Soteriades), government argues that the level and nature of regulation will change. It expects to be less involved in regulating the industry as its role would be to balance access to mobile communication services between urban and rural communities as well as to ensure the affordability of services (Interview – Malema). A reduction in government intervention in the forthcoming years is likely, as:

- There will be more competition is the telecommunications field as Telkom’s monopoly in the provision of fixed-line services will have ended by 2003 (Interview – Malema); and
- South Africa is a signatory to the World Trade Organisation, which requires that telecommunications markets be liberalised by 2007 (Creamer, 2000). While this milestone is outside of the boundaries of this report it is useful to bear it in mind as it will inform stakeholders’ strategies.
4.2.8 Conclusion to Eight Forces industry analysis

Porter’s Five Forces

- Threat of new entrants - Moderate force. The m-commerce industry faces the prospect of additional competition as a result of the awarding of a third mobile and second fixed licence. While the entrance of a third operator may not be good news for the incumbents, the new entrant is expected to stimulate further industry growth.

- Suppliers - Strong force. The industry’s infrastructure requirements are met by a small number of specialist, multinational firms with dominant roles in the world-wide telecommunications industry.

- Customers – Weak force. The customer base is a dispersed one, however, the operators will struggle to promote the new applications as the market is technophobic and relatively uneducated.

- Substitutes – Weak force. m-Commerce, itself an emerging technology, faces little threat from the advent of alternative technologies; that is, the industry currently has no substitutes.

Adding to Porter’s Five Forces

- Complementors – The industry’s development is being aided by the enthusiasm handset manufacturers have exhibited due to their need to stimulate handset sales and their hopes of developing handsets capable of making the wireless Internet a reality.

- Pre-existing industry structure - This is a 10X force. A large part of the industry’s attractiveness stems from pre-existing industry factors: the extraordinary success that mobile telephones have enjoyed in South Africa as well as the relatively low level at which Internet saturation is expected to occur. These two factors, which are similar in profile to many European countries, combine to increase the attractiveness of the industry.
Government – This is a 10X force encumbering the industry’s development. Government has handled the mobile communications industry ineptly. Its inconsistency and lack of clarity as to its policy direction with regard to m-commerce are of concern.

On the basis of the five forces analysis, the South African m-commerce industry is attractive. The considerable strength of suppliers is offset by the weak remaining forces, resulting in an attractive industry for mobile operators to participate in. The industry is made more attractive by the enthusiasm demonstrated by the industry’s complementors in facilitating the industry’s development and the pre-existing industry structure: commentators optimistically project mobile penetration to reach 40% before levelling off while Internet penetration is expected to remain fairly low. However, the industry is beset by the way government has played its role. While some industry participants see government playing a smaller role in future, it still has a long way to go before the uncertainty regarding policy-making is overcome. The overall picture, though, is a positive one, albeit not as promising as that in Europe, which in turn is not as attractive a market as is the Japanese market.

4.3 MTN and Vodacom

4.3.1 Company backgrounds
Both Vodacom and MTN were awarded their licences in October 1993. Vodacom, though, was the first to launch its network. Consequently, Vodacom was able to build a lead over MTN and has consistently held the larger market share (Brady, 2000: p9). Table 9 is useful for establishing some of the more pertinent information about MTN and Vodacom.

The two companies enjoy different customer profiles. Vodacom is strong in the rural and black markets. This is the result of the firm’s successful Yebonet campaign, which established the company as the people’s operator. Nevertheless, Vodacom is also strong at targeting corporate customers. Vodacom also has the higher proportion of contract subscribers (Survey – Henkel; Brady, 2000: p9). Pre-paid consumers,
though, are not all lower-end consumers. Many customers opt for the pre-paid option as it offers them alternative payment methods (Interview – Penkin). MTN’s market is “younger, more urbane” and, therefore, more innovative (Interview – Michel).

Table 9: Company profiles

<table>
<thead>
<tr>
<th></th>
<th>MTN</th>
<th>Vodacom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major shareholders</td>
<td>Johnnic Holdings: 36.8%</td>
<td>Telkom: 50%</td>
</tr>
<tr>
<td></td>
<td>Transnet: 24.1%</td>
<td>Vodafone: 31.5%</td>
</tr>
<tr>
<td>Turnover (March 2000)</td>
<td>R5 929m</td>
<td>R9 666m</td>
</tr>
<tr>
<td>Earnings before interest and tax</td>
<td>R1 369m</td>
<td>R2 328m</td>
</tr>
<tr>
<td>Subscribers</td>
<td>3.5m</td>
<td>4.1m</td>
</tr>
<tr>
<td>Market share</td>
<td>46%</td>
<td>54%</td>
</tr>
<tr>
<td>Number of employees</td>
<td>2 600</td>
<td>4 500</td>
</tr>
<tr>
<td>(March 2000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lines per employee</td>
<td>1 346</td>
<td>911</td>
</tr>
<tr>
<td>Licence granted</td>
<td>October 1993</td>
<td>October 1993</td>
</tr>
<tr>
<td>Length of licence</td>
<td>15 years</td>
<td>15 years</td>
</tr>
<tr>
<td>Network launched</td>
<td>June 1994</td>
<td>March 1994</td>
</tr>
<tr>
<td>Standard</td>
<td>GSM 900</td>
<td>GSM 900</td>
</tr>
<tr>
<td>African operations</td>
<td>Cameroon, Rwanda, Swaziland, Uganda</td>
<td>Lesotho, Tanzania</td>
</tr>
</tbody>
</table>

Source: Brady, 2000; www.m-cell.co.za, 2000; Szczesniak, 1999

4.3.2 Organisational cultures

The findings indicated that the two companies have different organisational cultures. MTN is regarded as the more enterprising of the two mobile operators (Interview – Soteriades). Its staff are innovative, talented and believe strongly in m-commerce (Survey – Henkel; Telephonic interview – Varghese). It has been suggested that as many of Vodacom’s senior management are former Telkom employees, a parastatal organisation, its staff are less aggressive than those of MTN (Interview – Drop).
As MTN is perceived as being the “more mature organisation”, it is believed that it would be more willing to co-operate with other companies and to pursue and adopt the ideas of middle managers (Interview – Soteriades). In co-operating with other companies, MTN is more likely to form alliances as it is the more entrepreneurial of the two operators (Interview – Drop): alliances are easily formed and dissolved with relatively little disruption to operations (Interview – Magaya). MTN views alliances as an opportunity to acquire best of breed technologies (Interview – Michel). Vodacom, by contrast, would prefer to form joint ventures as it “expects greater loyalty from its partners” and is more averse to risk (Interview – Drop). Vodacom expects alliances or joint ventures to be mutually beneficial so that the company can gain knowledge and skills (Interview – Soteriades). This should not be read to suggest that the two companies are averse to acquisitions, though: both MTN and Vodacom have acquired their mobile service providers, such as M-Tel and Teljoy respectively (Survey – Henkel; Telephonic interview – Bezuidenhout; Computing SA, 2000).

4.3.3 Approaches to m-commerce

MTN and Vodacom are criticised for lacking vision in the m-commerce field as they are said to be focused on maintaining their networks (Interview – Penkin). MTN, though, is the more advanced of the two companies in the m-commerce field (Survey – Bezuidenhout, Henkel, Varghese), as it has been more focused on and “willing to experiment with m-commerce” (Interview – Soteriades). MTN has benefited from its association with the Johnnic group, a multimedia company (Survey – Bezuidenhout), and Vodacom’s wait-and-see attitude towards m-commerce (Interview – Penkin; Telephonic interview – Varghese). Vodacom maintains it “has bigger priorities than m-commerce” (Interview – Soteriades). The company’s attention is being distracted by pressing operational issues, which include:

- its perceived need to obtain additional bandwidth; and
- organisational restructuring, which has resulted in changes in senior management and the loss of good technical staff (Interviews – Drop, Penkin).

Vodafone, owner of 31.5% of Vodacom’s shares, is positioning itself as a content provider and aggregator. In order to avoid duplication in applications development, it has constrained Vodacom from aggressively pursuing m-commerce opportunities
(Interview – Michel). This is a missed opportunity for Vodafone as South Africa is an “ideal test market as the mobile market is growing rapidly while the market is smaller than those of European countries” (Interview – Drop). Nevertheless, should m-commerce take off, Vodacom would be able to quickly close MTN’s lead as it would be able to leverage off Vodafone and its customer base, more weighted to contract subscribers, are likely to adopt m-commerce applications more rapidly than MTN’s (Interview – Michel; Survey – Henkel, Varghese).

In keeping with the two companies’ different approaches to m-commerce, MTN, the more enterprising player, proposes to position itself on five of the segments of the industry’s value chain, while Vodacom, the more restrained company, intends to restrict itself to three of the segments (see Table 10).

<table>
<thead>
<tr>
<th>Table 10: Operators' proposed m-commerce roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTN</td>
</tr>
<tr>
<td>Transport</td>
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<tr>
<td>Basic enabling services</td>
</tr>
<tr>
<td>Transaction support</td>
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<tr>
<td>Presentation service</td>
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<tr>
<td>Personalisation support</td>
</tr>
<tr>
<td>User applications</td>
</tr>
<tr>
<td>Content aggregation</td>
</tr>
<tr>
<td>Source: Interviews – Michel, Soteriades</td>
</tr>
</tbody>
</table>

### 4.4 m-Commerce value chain

While Barnett, Hodges and Wilshire (2000: p3) propose that the m-commerce industry value chain consists of seven links, as discussed in Section 2.3.2, page 20, they suggest that the mobile operators pursue only four of the segments: namely transport, transaction support, personalisation support and content aggregation. As shown in Table 10, the roles envisaged by the operators are different from that suggested by Barnett, Hodges and Wilshire (2000: pp3-5). Neither of the operators propose competing in personalisation support, a segment Barnett, Hodges and Wilshire (2000: p3) view favourably, while both intend providing user applications: a segment which Barnett, Hodges and Wilshire (2000: p5) felt was best left untouched.
While all survey and interview respondents agreed that the mobile operators ought to continue providing transport services, analysts and industry participants have widely differing views as to the other roles that the mobile operators ought to pursue along the industry value chain (see Table 11). Two of the three analysts felt that mobile operators ought to pursue as many positions as possible. The other analyst and industry participants took a less aggressive view on the roles the mobile operators ought to assume, with most in favour of transaction support and content aggregation. Again, personalisation support was viewed dimly despite the appeal of that segment by Barnett, Hodges and Wilshire (2000: p3). In keeping with Barnett, Hodges and Wilshire’s (2000: p5) views most respondents were averse to the mobile operators assuming basic enabling service provisioning.

Table 11: Analysts and industry participants proposed m-commerce roles for operators

<table>
<thead>
<tr>
<th></th>
<th>Bezuidenhout</th>
<th>Drop</th>
<th>Henkel</th>
<th>Magaya</th>
<th>Penkin</th>
<th>Varghese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Basic enabling services</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction support</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation service</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personalisation support</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>User applications</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content aggregation</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

Source: Interviews and surveys

Each of the segments on Barnett, Hodges and Wilshire’s (2000: p3) m-commerce industry value chain, shown below in Figure 10, is discussed in greater depth below. The relevant segment and the preceding and subsequent segments are shown next to the heading of each section for the reader’s ease of use. Under each heading, issues around existing competitive advantage, required core competencies and current activities and developments are explored.
4.4.1 Transport

Currently, the mobile operators compete in the transport segment of the value chain. Transport provision is becoming increasingly commoditised with little opportunity for the mobile operators to differentiate their services; therefore, they should diversify into other value-adding segments (Interviews – Magaya, Soteriades). Failure to do so would limit the operators’ long-term viability (Planting and Bidoli, 1999: p91). Some industry participants, while recognising the need for the mobile operators to move beyond transport, suggest that mobile operators should wait for the current hype and uncertainty surrounding the industry to pass before they start to position themselves along the value chain (Interview – Penkin).

While the mobile operators have sufficient resources to compete along all segments of the value chain (Survey – Varghese), they ought to be careful about doing so as they lack the skills required to compete successfully in many of them (Interview – Michel). The mobile operators, in getting involved in segments of the value chain such as personalisation support, presentation support, content provision and aggregation, will have moved away from pure wireless telecommunication functions to media-related activities (Interviews – Penkin, Soteriades). Should they wish to compete along these segments, they may need to form alliances with companies in possession of the necessary skills (Interview – Soteriades).
4.4.2 Basic enabling services

Currently, the underlying enabling technology for accessing the internet from mobile phones, outside of Japan, is WAP (wireless application protocol). WAP has been criticised for attempting to put a personal computer on a mobile phone and, therefore, requires bandwidth (Interview – Michel). WAP, though, is merely an intermediary technology and will be replaced with the introduction of 2.5G technology, which offers similar functionality to 3G technology. 2.5G technology consists of:

- General Packet Radio Service (GPRS), which will enable phones to remain connected all the time; and
- Enhanced Data Rates for Global Evolution (EDGE), which will enable more rapid transmission of data (interviews – Penkin, Soteriades).

Both of the technologies are expected to be in place within the next eighteen months (Interview – Michel). MTN is currently conducting GPRS pilot studies (Interview – Penkin) and it is expected that GPRS will be launched in the first half of 2001 (Interviews – Drop, Michel). Another technology expected to be introduced to South Africa next year is Bluetooth (interview – Drop), which will enable mobile phone owners to make short-range payments on their phones while users will be able to make long-range payments using WAP-based applications – discussed further in the next section (Interview – Penkin).

The technology associated with 3G is expensive and as the local market is small, charges would be too expensive for the market to achieve widespread adoption (Interview – Soteriades). Thus, it is unlikely that 3G technology will be introduced into South Africa within the next five to eight years (Interview - Penkin). Moreover, the business case for 3G networks is unproven, thus mobile operators are nervous to invest in the necessary infrastructure (Interview – Malema). Market participants concur that South Africa should leverage its existing technology rather than upgrade to 3G technology (Interviews – Drop, Magaya, Malema, Michel, Penkin, Soteriades).

The South African mobile operators, it is maintained, have basic enabling service capabilities (Survey – Henkel; Telephonic interview – Varghese). MTN has displayed
its competency in developing its own proprietary enabling technology, Remote Interactive Voice Response (RIVR) which is based on Interactive Voice Response (IVR) technology – an open standard (Interview – Michel). MTN has succeeded in selling this technology to an Italian mobile operator, Wind, and intends to sell RIVR to other operators (Business Report, 2000b). However, while they are likely to adopt server hosting functions, it will probably be only for their own applications and content (Interview – Drop).

Basic enabling services provide the operators with an opportunity to differentiate themselves, particularly through the development of proprietary applications. While the mobile operators will share standards in many areas, they will also develop proprietary applications, such as MTN has done with RIVR (Interview – Michel). However, it is argued that the operators should develop open standards as this would minimise the risk related to widespread adoption and infrastructural costs. Instead of competing in the basic enabling services, operators should compete in value-added services (Interview – Soteriades). MTN is pursuing a competitive advantage through proprietary technology. Vodacom, by contrast, is seeking greater co-operation with its main competitor. If this were to occur, it would be an example of co-opetition in the South African context.

4.4.3 Transaction support

Transaction support entails the provision of billing and associated security services (Barnett, Hodges and Wilshire; 2000: p2). In competing in this segment, the operators will be challenging the banks on their own turf (Survey – Bezuidenhout, Henkel, Varghese). Mobile operators already possess some of the required competencies to provide billing services (Survey – Bezuidenhout, Henkel). For example, the billing engine capability of the mobile operators is a strength: while MTN had turnover of R6 billion for the financial year ended March 2000, the average amount billed to customers monthly was R250 (Interview – Michel). Furthermore, the mobile operators have acquired credit management capabilities subsequent to acquiring their allied mobile service providers (Gordon, 2000; Telephonic interview – Bezuidenhout).
Four key layers in providing transaction support are (from the customer to back office functions):

- Transaction initiation;
- Transaction authorisation;
- Transaction fulfilment; and
- Clearing and settlement (Interview – Drop).

The mobile operators are keen to secure those functions towards the customer and expect the banks to remain in transaction fulfilment and clearing and settlement: the low-value activities. MTN, the more aggressive m-commerce player, wants to provide the top three layers, while Vodacom is content with just transaction initiation (Interview – Drop). In order to provide the transactions support services the mobile operators would need to develop or acquire skills related to resolving the associated risk. These include the need for:

- digital signatures/certification,
- non-repudiation, and
- tracking of payments (Interview – Drop; Survey - Varghese).

The banks – ABSA, Boland, Firstrand, Nedcor, Saambou and Standard Bank – wary of being relegated to low-margin functions are hoping to influence m-commerce and have, therefore, established a forum, the South African Wireless Payments Group, with the mobile operators and the card associations. This forum is considering five different payment architectures for adoption in South Africa (Interview – Drop).

If the operators were to profit from transaction support, it would be necessary that they be able to establish the value of the transactions conducted using their data stream, so enabling them to earn commission. Finance houses are expected to attempt to prevent and pre-empt the mobile operators from establishing the value of transactions transmitted through their data streams (Interviews – Penkin, Soteriades). Consequently, Sanlam, a financial giant, is backing Fundamo, which intends to provide a payment platform based on open architecture, which will allow account holders to make mobile-to-mobile payments, Internet-to-mobile payments and mobile-to-point-of-sale payments. The company intends generating revenue by
charging a commission on all transactions generated by the payment platform (www.fundamo.co.za; Interview - Drop).

4.4.4 Presentation services and personalisation support

Personalisation is crucial as people need fast access to their desired content on the Internet when using their mobile phones (Interview – Penkin). Presentation services require competencies better suited to public relations and media companies (Telephonic interview – Bezuidenhout), while personalisation support require skills related to customer and database management (Survey – Henkel). However, as the mobile operators lack these skills, they ought not to undertake activities related to presentation services and personalisation support. If the mobile operators choose to offer content aggregation services, then they ought to outsource these functions. It would be necessary, though, that they retain a strong influence over both these services as customers’ experience of their portal will be strongly influenced by the look and feel of the site (Interviews – Magaya; Telephonic interview – Bezuidenhout).

4.4.5 User applications

User applications refers to the provision of content and applications currently available on the Internet (Barnett, Hodges and Wilshire; 2000: p2). Although content is important (Planting and Bidoli, 1999: p91), the provision of content is not attractive to mobile operators as it would require them to acquire or develop editorial skills: an area which they do not understand (Interviews – Michel, Soteriades). Further, conflicts of interests may arise; for example, it would be difficult to provide content for both NuMetro and SterKinekor (Interview – Penkin).

While the provision of content is not attractive to mobile operators, the provision of user applications is, contrary to Hodges, Barnet and Wilshire’s model (2000: p5). In the past, operators have focused on providing the necessary technology presented and
have, therefore, presented call-packages to customers without establishing their needs. If they were to establish themselves as providers of user applications, it would be important for them to adopt a customer, rather than technology, focus (Interview – Michel). They will also need to develop product management skills. Consequently, they will need to restructure themselves so that they move away from an engineering to a marketing focus. (Interviews – Drop, Magaya).

As mentioned above, the technology through which users can currently access the Internet is WAP: one of the fastest growing technologies (Business Report, 2000a: p7). In order to access WAP-based functions, the user will require a WAP-enabled device and Internet access (Wood, 2000: p79). Moreover, it is expensive to use as call charges are high and connection times long (Wood, 2000:79; Interview – Drop). These factors will limit the extent to which WAP-based functions will be adopted in South Africa.

Despite the drawbacks of WAP, several companies have developed WAP-based applications. Sanlam has developed an application whereby users can access information on healthcare providers, Siemens has launched a shopping application, known as WAP Intershop and Nedbank has launched a WAP-based mobile banking application, NedMobile (Business Day, 2000; Engineering Report, 2000; Business Report, 2000a). NedMobile was the first WAP-based application introduced in South Africa (Wood, 2000: p79).

The provision of mobile banking services is one example of a user application that operators are keen to provide (Interview – Michel). However, to provide mobile banking services would require the operators to obtain banking licences: a move already attempted by both (Interview – Penkin; Wood, 2000: p79). The big four banks have some four million customers: equivalent to the number of subscribers that Vodacom currently has. Thus, if Vodacom were to assume banking functions it would be larger than all the big banks put together (Interview – Soteriades). The banks, aware of mobile operators’ desire to disintermediate them as well as the threat this poses to their long-term prospects, are determined not to be made redundant. Accordingly, the banks are developing m-commerce applications, although such
applications will serve to complement their existing electronic banking services rather than replace them (Interview – Drop; Wood, 2000: p79).

While Nedmobile is a WAP-based application, ABSA and Standard Bank have focused on developing applications based on wireless internet gateway (WIG) technology in conjunction with MTN. WIG offers the same functionality as WAP (Interview – Soteriades), but differs in that the application is transferred to the SIM card as opposed to remaining on the server as is the case with WAP (Interview – Drop). This enables the transaction to be conducted on mobile phones which have not been WAP-enabled but will limit these services to MTN customers only (Interview – Drop). Moreover, customers need to purchase a new SIM card, a process which can be time consuming and difficult (Interview – Drop, Penkin).

4.4.6 Content aggregation

Content aggregation is an attractive segment for the mobile operators as it offers them the opportunity to differentiate their services and own the customer (Interview – Michel; Planting and Bidoli, 1999: p91). In differentiating their services, mobile operators would hope to reduce the level of churn (Interview – Soteriades; Survey - Henkel): currently 18% for contract subscribers and 25% for pre-paid subscribers (Szczesniak, 1999: p18). Furthermore, operators are likely to compete as portals so as to increase their understanding of customers demand, which would enable them to develop further user applications and to sell their own products to customers via their portals (Interviews – Michel, Soteriades).

Vodacom and MTN have established Internet portals and have, therefore, developed the necessary capabilities to establish mobile portals (Interview – Drop). Both companies have established portals which operate on fixed and mobile lines: MTN has its ICE (Information, Content and Entertainment) portal, while Vodacom, with its partner, iTouch, established Yebonet (Interview – Michel; iTouch, 2000: p1). Further, MTN’s mtnsms.com is the largest site in South Africa with 3.5 million subscribers (Koenderman, 2000; Interview - Michel). In order for the mobile operators to succeed
as content aggregators, it is necessary that they acquire content sources (Survey – Bezuidenhout). MTN, through its close alliance with Johnnic, has an advantage over Vodacom in this regard (Interview – Michel; Telephonic interview – Varghese).

Of the seven segments, competition is likely to be fiercest within this one (Interview – Drop). In addition to competing with one another, the mobile operators can expect competition from the existing Internet service providers, such as M-Web (Telephonic interview – Varghese), and from media groups as a result of their ready access to content (Survey – Bezuidenhout). Finally, pure portal plays such as Exactmobile.co.za have entered the fray (Wood, 2000: 80).

4.5 Conclusions to the findings

As discussed earlier, the South African m-commerce industry is an attractive one, although not as attractive as the industry Western Europe and Japan. Of Porter’s Five Forces (1980), only the suppliers are in a strong position relative to the mobile operators. The industry is benefiting from the popularity of mobile phones in South Africa. This combined with the low penetration level of the Internet bodes well for m-commerce applications. The two drawbacks facing the South African m-commerce industry, though, are the customer profile – technophobic, relatively large portion of uneducated people and limited incomes – and the interventionist role government is playing.

Consequently, the two mobile operators have widely divergent views as to the viability of m-commerce in South Africa. MTN, the smaller of the two and the more enterprising, according to industry participants, is gearing itself up for this market and intends to locate itself on five of the seven possible links on the industry’s value chain (Figure 10; page 62). Vodacom, by contrast, restrained by its significant shareholder, Vodafone and distracted by internal operational issues has taken a more subdued view of the industry’s potential. The company is participating in the industry to ensure that it does not develop a competitive disadvantage by avoiding the market altogether. It has staked its claim to a mere three of the seven segments of the value chain.
What is suggested by theory does not necessarily amount to what is practicable or is desirable in reality. This point has been well demonstrated by the divergent views of the theoreticians on the one hand, and industry analysts and participants on the other, as to which of the segments along the industry’s value chain are most attractive for the mobile operators to operate in. For example, analysts and participants believe that there is much opportunity for the operators in the basic enabling services segment while Barnett, Hodges and Wilshire (2000) thought that this segment was unattractive.

m-Commerce is rapidly becoming a reality and the two mobile operators have begun – albeit with differing levels of conviction and enthusiasm – moving into segments along the industry value chain. MTN has developed a proprietary basic enabling technology and has worked with other companies to develop user applications. The banks, fearful of disintermediation by the mobile operators, have entered into the fray and are attempting to influence the direction in which transaction support will be undertaken and have developed mobile banking applications. Finally, numerous role players are seeking to establish themselves as content aggregators, viewed as the most attractive role along the industry’s value chain. Both MTN and Vodacom have established portals as they perceive the benefits to be had from this role: reduced churn and improved customer knowledge.

Although the industry players are currently positioning themselves along the value chain and are pursuing the opportunities offered by the industry, the ultimate success of the industry is by no means assured. The approach the role players undertake will determine whether the industry fails or becomes a sustainable and profitable one for all participants in general and for the mobile operators in particular.
5 Scenarios

When developing scenarios it is useful to recognise that there are two types of forces:
- predetermined forces, which are reasonably predictable; and
- uncertain forces, which account for the majority of forces influencing the outcome (Senge, 1994: p276).

The boundaries within which the scenarios are developed, are set by the predetermined forces (Senge, 1994: p277).

Accordingly, in developing the following scenarios, boundaries were set.
- Cognisance was taken of the fact that South Africa is a small player in the global economy. Therefore, it was assumed that:
  - The momentum built up around m-commerce internationally will continue.
  - As handset manufacturers intend producing only Internet-enabled phones after 2001, all phones sold in South Africa after this date, will be Internet-ready.

Figure 11: The Chasm, Bowling Alley and Tornado

One of the aims of this study was to develop scenarios of the South African m-commerce industry from the perspective of the mobile operators. In pursuit of this aim, three scenarios were developed, based on the findings and Moore, Johnson and Kippola’s (1998) ‘Gorilla Game’, the gist of which is depicted in Figure 11. Interviews with industry participants and responses from analysts suggested two overarching scenarios: a worst case and a best case scenario. Some findings, though,
did not fall into either scenario but lent themselves to an intermediate view of the industry. Therefore, an intermediate scenario was developed. Consequently, a range of potential outcomes of the m-commerce industry may be considered. They are from most pessimistic to most optimistic:

- **Falling into the Chasm**, where the industry fails to make the transition across the chasm;
- **Bowling Alley Forever**, where the industry crosses the chasm but remains in the area depicted by the bowling balls in Figure 11; and
- **Mass Adoption**, where the industry enjoys good long-term prospects after undergoing the tornado, which is illustrated in Figure 11.

### 5.1 Falling into the Chasm

In the ‘falling into the chasm’ scenario, m-commerce applications fail to gain acceptance beyond the innovators and early adopters, who account for 16% of the market (Moore, 1991). This scenario is characterised by industry participants continuing to pursue a techno-centric approach to developing applications (Interviews – Michel, Soteriades), and an inconsistent and interventionist government (Interview – Penkin). Consequently, m-commerce falls into the chasm and dies there.

An interventionist and inconsistent government dominates the industry (Interview – Penkin, Soteriades). It unilaterally imposes standards on the mobile operators and so stifles the development of innovative products and services (Interview – Malema). Moreover, continued delays in the resolution of the third operator licence will result in the third operator being unable to raise finance (Interview – Soteriades). Consequently, the hoped for stimulation to the market provided by a third player fails to materialise (Telephonic interview – Bezuidenhout). Further, the mobile market reaches saturation at the 20-25% penetration level as a result of limited disposable incomes (Interview – Magaya; Szczesniak, 1999: p12).

The mobile operators remain techno-centric. Technologically advanced applications, rather than products and services that appeal to consumers, are developed (Interview – Soteriades). The industry fails to develop applications which are cheap and easy to
use and so appeal to the low end of the pre-paid market (Interviews – Michel, Soteriades). Finally, the industry fails to educate consumers as to the capabilities of their mobile phones and the potential of m-commerce applications (Interview – Malema, Soteriades).

As the industry fails to develop m-commerce applications which meet the needs of the market, a new technology emerges; that is, m-commerce is supplanted by a substitute. The new technology’s sponsors, having learnt from the mistakes made by m-commerce industry participants, co-operate to promote the industry as well as to develop products that are customer-focused. As a result of the failure of m-commerce and assuming the substitute is not developed by the mobile operators, the mobile operators fail to arrest the decline in ARPU. Consequently, with the passage of time, the industry will cease to earn above-average profits. Mobile telephony will lose its attractiveness and the mobile operators will become mere utilities.

5.2 Bowling Alley Forever

In the ‘bowling alley forever’ scenario, the m-commerce industry succeeds in crossing the chasm; however, the tornado fails to materialise and, therefore, the technology does not achieve widespread adoption. Rather, the applications developed are utilised by niche markets within the early majority. Consequently, the industry is said to be in bowling alley forever (Moore, Johnson and Kippola, 1998).

The third mobile operator will have been announced so enabling the incumbents to trade access to bandwidth with the newcomer as opposed to being dependent on government for access (Stones, 2000b; Interview – Malema). All operators will, therefore, have access to both 900MHz and 1800MHz bandwidths. Consequently, the industry will not be constrained as a result of infrastructural limitations (Interview – Penkin).

Industry participants ought to co-operate with each other in the early stages of an industry’s development (Porter, 1980); however, operators pursue the opportunity to differentiate themselves by developing proprietary applications before the industry
has made the transition across the chasm. In so doing, they fail to co-operate and ensure the widespread adoption of the underlying technology (Porter, 1980). This would be a continuation of the trend already underway as seen by MTN’s proprietary development, RIVR (Interview – Michel). As government is less interventionist and is guided by a clear policy – a White Paper on m-commerce will have been issued (Interview – Drop) – it does not intervene to limit the development of proprietary standards despite its preference for participants to use open standards (Interview – Malema).

In this scenario, saturation of mobile phone penetration is reached at 20-25% of the population because of limited disposable incomes (Interview – Magaya; Szczesniak, 1999: p12). While the mobile operators recognise the need for customer-centric applications, they compound the relatively low level of saturation by developing applications for niche markets within the high income contract subscriber base (Interview – Soteriades; Telephonic interviews – Bezuidenhout, Varghese). They fail to develop applications for the pre-paid market, which despite being comprised mostly of low-end consumers, accounts for a significant portion of the total mobile market (Interview – Michel). The applications developed include mobile banking and location-based services which have little appeal to the mass market (Telephonic interview – Varghese). Consequently, only the high income group adopts m-commerce applications which results in a maximum penetration of 30% of the total mobile market in 2004 (Interview – Bezuidenhout).

As the potential of the m-commerce industry appears to be limited to niche markets within the early majority, Vodacom will feel justified in not aggressively pursuing the opportunities presented by the industry. Nevertheless, it will provide m-commerce applications so as not to develop a competitive disadvantage (Interview – Soteriades). However, MTN will continue to pursue m-commerce opportunities aggressively. The company will be regarded as the more enterprising of the two companies. As a result, young, urbane and tech-savvy customers will gravitate towards MTN so as to enjoy the more advanced applications. While m-commerce fails to move beyond niche markets (Telephonic interview – Bezuidenhout), there will be greater differentiation between the two companies in the South African market (Interview – Michel).
5.3 Mass Adoption

The ‘mass adoption’ scenario is one whereby the chasm is crossed, the tornado ensues and widespread adoption of the technology occurs (Moore, Johnson and Kippola, 1998). In terms of this scenario mobile phones become the primary means of accessing the Internet (Interview – Soteriades). Mobile phone will become a tool for “doing anything, anytime, wherever the user is located “ (interview – Magaya).

The mobile operators, despite being competitors, co-operate to ensure the industry’s development. That is, co-opetition will enable the industry to cross the chasm (Brandenburger and Nalebuff, 1996; Porter 1980). They will co-operate by:

- Providing basic enabling services and using open standards; and
- Actively promoting the industry by educating consumers on how to use their phones (Interview – Magaya, Soteriades).

Government adopts a pro-m-commerce policy and aids the industry in overcoming the public’s technophobia and lack of education by:

- educating consumers as to the functionality of their phones and the potential of m-commerce;
- assuming the role of model user. It will play this role as a result of the ‘Foresight Project’. This is a joint project between the Department of Communication, and the Department of Arts, Culture and Science and Technology, which seeks to develop scenarios of future technology applications (Interview – Malema); and
- implementing pilot projects to aid industry development. One such pilot scheme is government’s ‘chip initiative’ as discussed under ‘Mobile financial services’, page 46 (Interviews – Drop, Malema).

Over the next eighteen months, the operators will progress from providing:

- Content-back services, which are simple requests for information which are returned to the users’ mobile phones in a short space of time; for example, an account-balance enquiry, to
- Event-driven ticketing.
These services will be delivered using existing technology (Interview – Michel). While, 2.5G technology is currently being piloted, it is expected to be in place within the next eighteen months (Interview – Michel). The introduction of 2.5G technology will facilitate the development of additional applications (Interview – Penkin).

The mobile operators will develop applications which are customer-centric, rather than techno-centric (Interview – Michel, Soteriades). Further, the operators will need to pursue the mass-market (Interview – Michel). Three examples of such applications are:

- community-based information as discussed under ‘Mobile information provisioning’, page 47 (Interview – Michel);
- micro-payments. As the majority of South Africans are under-banked, micro-payments would fulfil a need for cashless payment mechanism (Interview – Drop, Malema); and
- the marriage of the lottery and mobile phones. The introduction of the lotto as an entertainment application would lead to the widespread adoption of m-commerce, as the lottery is particularly popular – R1.1 billion will be spent on the lottery in 2000 (Telephonic interview – Varghese; Kruger, 2000: pp6-7).

As a result of the co-operation amongst the mobile operators, active promotion of the industry and development of customer-centric applications which meet the needs of the mass market, the industry crosses the chasm. Once the industry has made the transition from early adopters to the early majority, then the operators cease to co-operate with each other and begin to compete directly (Porter, 1980). The tornado ensues and the market rushes to adopt m-commerce applications as they meet their needs.

Vodacom now realises the appeal of m-commerce. Through its close relationship with Vodafone, would soon catch up with MTN in developing and providing innovative m-commerce applications (Survey – Henkel, Varghese). Furthermore, as government will have established a framework for foreign participation in the telecoms sector (Interview - Malema), an international operator could invest in MTN against a background of international consolidation amongst telecoms (Interviews – Magaya,
Michel). MTN, allied with an innovative international mobile operator, could develop into a formidable player (Interview – Michel). Finally, a wild card facing the industry, would be DoCoMo’s entry into the market. DoCoMo has adopted a policy of international expansion so as to ensure the success of its standard (DoCoMo Annual Report, 2000). DoCoMo could form an alliance with the third mobile operator as the third operator is expected to focus on data services (Interview – Penkin). The South African m-commerce industry would become competitive and dynamic as the operators struggle to achieve dominance of the market and, therefore, gorilla status.

5.4 Conclusion to scenarios

The ultimate outcome for the industry – whether it fails or succeeds and the extent to which it succeeds - depends on the conduct of government, a 10X force on the South African m-commerce industry, and the mobile operators themselves.

5.4.1 The role of government

The extent to which government is interventionist and guided by policy principles will impact on the industry’s well-being. In the worst-case scenario – falling into the chasm – government lacked a clear policy direction and played an interventionist role. Consequently, the uncertainty which industry participants experienced was greater than that which emerging industries would ordinarily experience. Further, the level of government intervention – in the form of standards being imposed resulted in the stifling of innovation. In the case of the intermediate scenario, bowling alley forever, government, while still interventionist, is at least guided by a White Paper. Its decisions are therefore predictable and understandable so reducing the degree of uncertainty to which industry participants are exposed. Industry participants are able to work around government’s interventionist instincts by trading access to spectrum, for example. Finally, in the best case scenario, mass adoption, government is guided by clear policy direction and assumes a supportive role to the industry: evidenced by its proactive promotion of the use of industry applications and education of consumers.
5.4.2 The role of the mobile operators

The industry’s ultimate success, though, is not dependent on government’s actions alone. The mobile operators, through the extent to which they co-operate and develop services which meet consumer needs will ensure that the industry crosses the chasm, so improving the likelihood of their succeeding. In the worst case scenario, the mobile operators compete to differentiate themselves through alternative standards before the industry crosses the chasm. Further, they retain their techno-centric approach to the development of applications. Consequently, the industry fails as most customers reject their offerings. In the intermediate scenario, the operators still fail to co-operate with one another. However, while the mobile operators develop customer-centric applications, they target the tech-savvy and affluent segment of the market – a small portion of total potential customers. Consequently, niche markets do develop but mass adoption remains a dream. Mass adoption, though, will become a reality when the mobile operators co-operate with one another in developing common standards and educating consumers. In addition, the development of customer-centric applications which appeal to and meet the needs of the mass market aids widespread adoption.

Finally, the industry’s ultimate success will be influenced by the penetration level at which mobile handsets reach saturation. The extent to which industry players can influence this, though, is limited: this will be determined by the country’s economic growth.
6 Recommendations to mobile operators

If the m-commerce industry is to move beyond its current nascent state and achieve a sustainable future, it is imperative that the mobile operators restructure their business operations to reflect the emergence of the new technology, and co-operate with one another to increase the likelihood of the industry’s success. As has been shown in the Theoretical Literature Review, Chapter 2, an emerging industry’s long-term success is dependent on co-opetition amongst the industry participants. Such co-opetition will ensure that the underlying technology will cross the chasm. Once the industry has crossed the chasm, mass adoption will be possible. Only then should they compete directly with each other.

While the South African m-commerce industry is in its infancy and has yet to cross the chasm, as discussed in the Findings, Chapter 4, the mobile operators are not co-operating with one another. Rather, they are competing to establish alternative technologies – as seen by MTN’s introduction of its RIVR technology. If the mobile operators were to fail to co-operate with one another, it is unlikely that the industry would achieve a sustainable outcome.

It is, therefore, recommended that the incumbents co-operate with one another by:

- Promoting a single standard and developing open architectures, as discussed already;
- Changing their approach from a technology to a customer focus (Interview – Magaya, Soteriades); and
- Stimulating the industry by educating customers as to the benefits of new applications (Interview – Malema, Soteriades).

With the exception of the need to co-operate in terms of standards and open architecture, the Findings have highlighted that industry participants are well aware of the need to develop a customer-centric approach and to educate customers. This bodes well for the industry’s development. However, what remains is for industry participants to understand the importance of open architectures and to actually co-operate across all three areas.
7 Areas for further work

As m-commerce is an emerging industry, the type of business model which industry participants believe would be successful within the m-commerce industry “changes on a daily basis” depending on how consumers transact (Interview – Penkin). A wide range of business models for the m-commerce industry have been proposed and have been grouped under the following categories:

- Internet model;
- Mobile telephony model; or
- A hybrid of the above two.

It would be invaluable to the industry’s participants if a study were to be done which investigated and identified which of the three broad business model categories would be most appropriate and likely to yield profits for the participants.

The picture as to which business model would be successful for m-commerce industry participants is clouded by a lack of understanding of the pre-paid customer segment. Not all pre-paid consumers are at the lower-end of the market: many customers opt for the pre-paid option as it offers them alternative payment methods (Interview – Penkin). It would, therefore, be worthwhile to understand the breakdown of this segment. This would enable the mobile operators to develop applications which meet the needs of this market and to develop a business model which is appropriate to the manner in which customers within this segment transact.
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<tr>
<th>Question</th>
<th>Aims of research</th>
<th>Theory</th>
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<tbody>
<tr>
<td><strong>Existing mobile industry structure</strong></td>
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<td>Eight forces</td>
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<tr>
<td>1. As at the end of 1999, the ITU (2000) estimates that there were 5.3 million mobile users in South Africa. BMI-TechKnowledge (2000) estimates that new cellular subscribers are joining at the rate of 100 000 per month. Do you think that the current rate of growth will be sustained? Yes No:</td>
<td>To assess the attractiveness of m-commerce.</td>
<td>- pre-existing industry (Hubbard)</td>
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<td></td>
<td>• Likely to increase</td>
<td>- government (Porter, Hubbard)</td>
</tr>
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<td></td>
<td>By how much over the next:</td>
<td>- new entrants (Porter)</td>
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<td>• Likely to decrease</td>
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<td>By how much over the next:</td>
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<td></td>
<td>1 yr 2yr 3yr</td>
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<tr>
<td>2. Is the average price per unit of mobile calls likely to fall with the introduction of a third mobile operator? Yes No</td>
<td>Mobile operators have seen their average revenue per unit (ARPU) fall – abroad it is the result of competition; locally it is the result</td>
<td></td>
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</table>
3. In your opinion has the government managed radio spectrum allocation efficiently?
   Yes
   No
   Please give your reasons

4. What lessons can South Africa learn from America and Europe in terms of the allocation of radio spectrums?

5. BMI-TechKnowledge (2000) research indicates that just under half the existing mobile subscribers are ‘indifferent’ about their network operator. What market share do you think the third operator will capture in its:

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<th>First year</th>
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<th>Third year</th>
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<td>&lt;10%</td>
<td>&lt;10%</td>
<td>&lt;10%</td>
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<td>10-19%</td>
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<td>20-29%</td>
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   of changed consumer profile. The introduction of m-commerce is the means whereby operators are better able to differentiate themselves and so increase their ARPU.

   Government’s management of radio-waves and licence allocation has influenced the emergence of m-commerce abroad. Similarly, the manner in which government administers radio-waves and licences locally will determine the industry's viability.

   The extent of existing customer loyalty could act as an entry barrier.
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<th>Question</th>
<th>Aims of research</th>
<th>Theory</th>
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<tbody>
<tr>
<td><strong>Development of m-commerce</strong></td>
<td></td>
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<tr>
<td>6. How would you define m-commerce?</td>
<td>To define m-commerce</td>
<td>Generic competitive strategy (Porter)</td>
</tr>
<tr>
<td>7. Do you think the introduction of m-commerce will provide opportunities for them to differentiate their services? Yes – if yes, why? No – if no, why not?</td>
<td>To establish which m-commerce applications are likely to gain widespread acceptance in the South African market.</td>
<td></td>
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<tr>
<td>8. In Europe governments have awarded 3G licenses through auctions (Germany and Britain) where the highest bidder has won, or through beauty contests (Sweden) where the winning bid has been that party which has been best able to meet a range of government objectives. Which basis do you think South African government is likely to use in awarding the 3G licenses? • Auction</td>
<td>The cost of the license will determine the return on the winners’ investment and will influence: The cost of the products to the consumer so influencing adoption The pace of the roll-out by mobile operators</td>
<td>Eight forces: government (Porter, Hubbard)</td>
</tr>
</tbody>
</table>
9. Which of the following m-commerce applications would you expect to be the most widely used in the South African market? Please indicate how rapidly you think the applications you selected will be adopted.

**Mobile financial services**
- Mobile banking
- Mobile broking
- Mobile cash
- Mobile payment

**Mobile shopping**
- Mobile retailing
- Mobile ticketing and reservations

**Mobile information provisioning**
- Text messaging
- News provisioning

**Mobile entertainment**

Technology Adoption Lifecycle (Moore, Johnson and Kippola)
M-commerce is currently in the ‘Early Market’ stage of technology adoption, where technology enthusiasts (innovators) and visionaries (early adopters) reside. The early commercial activity and media publicity generated by these groups are important steps along the road to, and beyond the ‘chasm’.

The expected speed of adoption of these m-commerce applications will be a good indicator of: whether m-commerce will make it
<table>
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<tr>
<th>Mobile gaming</th>
<th>Mobile music</th>
<th>Other</th>
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across the ‘chasm’; and how quickly the pragmatists (early majority) will adopt the technology and cause the tornado to form, ensuring widespread adoption.
<table>
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<th>Question</th>
<th>Aims of research</th>
<th>Theory</th>
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<tr>
<td><strong>m-Commerce strategy</strong></td>
<td></td>
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<tr>
<td>10. Which of the existing mobile operators do you think is best positioned for the roll-out of m-commerce?</td>
<td>To develop a scenario of the m-commerce industry from the perspective of the mobile operators.</td>
<td>Generic competitive strategy (Porter)</td>
</tr>
<tr>
<td>• MTN</td>
<td></td>
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<tr>
<td>• Vodacom</td>
<td></td>
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<tr>
<td>• They are equally positioned</td>
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<tr>
<td>And why?</td>
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Questions 11 – 14 relate to the following explanation: McKinsey suggests that the m-commerce value chain will be comprised of seven links, which are:

- Transport – facilitating data communication between mobile users and application providers;
- Basic enabling services - server hosting, data backup, and systems integration;
- Transaction support – billing services and associated security;
• Presentation services – converting content to a suitable format;
• Personalisation – customisation of the content and presentation;
• User application; and
• Content aggregators; that is, portals (Barnett, Hodges, Wilshire, 2000).

11. In which of the above position(s) do the existing mobile operators have a competitive advantage?
   MTN
   Vodacom

12. What is their competitive advantage?
   MTN
   Vodacom

13. Which of the above position(s) do you think the mobile operators will pursue up to 2004?
14. Which of the above position(s) do you think the mobile operators should pursue up to 2004?

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<tr>
<th>MTN</th>
<th>Vodacom</th>
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Questions 15 – 22 relate to the following explanation: McKinsey suggests that mobile operators should pursue four positions along the value chain which are:
- Transport;
- Transaction support;
- Personalisation support; and
- Content aggregation

15. Which other companies are likely to compete with the mobile operators in the transport segment of the m-commerce value chain? Why?

McKinsey argues that the mobile operators should position themselves along four positions on the industry value chain as identified by themselves.

The mobile companies currently enjoy a competitive advantage in the transport and transaction support segments. In establishing
16. What core skills will they have to acquire to compete in the transport segment of the value chain?

17. Which other companies are likely to compete with the mobile operators in the transaction support segment of the m-commerce value chain? Why?

18. What core skills will they have to acquire to compete in the transaction support segment of the value chain?

19. Which other companies are likely to compete with the mobile operators in the personalisation support segment of the m-commerce value chain? Why?

20. What core skills will they have to acquire to compete in the personalisation support segment of the value chain?

21. Which other companies are likely to compete with the mobile operators in the content aggregation segment of the m-commerce value chain? Why?

The mobile operators stand to make substantial profits by participating in the personalisation support and content aggregator segments. In establishing themselves along the various segments the mobile operators may have to contend with competitors from other industries.
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<tr>
<td>22. What core skills will they have to acquire to compete in the content aggregation segment of the value chain?</td>
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<tr>
<td>23. Placing an emphasis on the mobile operators, what do you think the m-commerce industry will look like in 2004?</td>
<td>themselves along the various segments the mobile operators may have to contend with competitors from other industries.</td>
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<tr>
<td>Question</td>
<td>Aims of research</td>
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<tr>
<td>ARPU has fallen in European mobile industry following the entry of additional competitors. In South Africa ARPU has fallen as a result of the mobile industry increasingly pursuing the lower, pay-as-you-go market.</td>
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</tr>
<tr>
<td>1. To what extent do you think ARPU will fall further?</td>
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<td>2. Do you think that the introduction of m-commerce services will reverse this trend?</td>
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<td>3. Will pay-as-you-go customers be able to use their telephones as payment mechanisms?</td>
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<td>4. Do you think government is likely to give the existing mobile operators access to the 1800 MHz frequency range prior to the third mobile operator license being awarded? If</td>
<td>To establish their perceptions of the attractiveness of the local m-commerce industry</td>
</tr>
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<td>yes, why? If no, why?</td>
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<td>5. Do you feel it is possible to develop m-commerce applications using the 900 MHz frequency? If yes, why? If no, why?</td>
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<td>Question</td>
<td>Aims of research</td>
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<td>6. Do you see m-commerce in South Africa relying on the progression of existing technologies or on the introduction of 3G mobile networks?</td>
<td>To establish their perceptions of the attractiveness of the local m-commerce industry</td>
</tr>
<tr>
<td>7. As at the end of 1999, the ITU (2000) estimates that there were 5.3 million mobile users in South Africa. BMI-TechKnowledge (2000) estimates that new cellular subscribers are joining at the rate of 100 000 per month. Do you think that the current rate of growth will be sustained? Yes No: Likely to increase By what percentage over the next: 1yr 2yr 3yr Likely to decrease By what percentage over the next: 1yr 2yr 3yr</td>
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</table>
8. ARPU has been declining abroad as a result of increased competition and locally as a result of the growth in the pay-as-you-go market. To what extent will m-commerce result in increased revenues from consumers?

9. In 1999, expenditure on mobile-related services was 0.9% of national disposable income (R4.5bn out of a national disposable income of R505.2bn). In 2000, it is expected to amount to 1.7% of national disposable income (R9.5bn out a national disposable income of R554.2bn) (SARB). How large a proportion of disposable income could mobile-related services ultimately grow to? And why?

10. To what extent do you think that additional growth in mobile-related expenditure would be attributable to the introduction of m-commerce?

11. Which of the following m-commerce applications would you expect to be the most widely used in the South African market?

<p>| To establish their views as to which m-commerce applications are likely to gain widespread acceptance in the South African market |
| Technology adoption lifecycle: crossing the chasm and bowling alley (Moore) |</p>
<table>
<thead>
<tr>
<th>Mobile financial services</th>
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<tr>
<td>Mobile shopping</td>
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<td>Mobile information provisioning</td>
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<td>Mobile entertainment</td>
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<td>Other</td>
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Why do you think this?
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<tr>
<th>Question</th>
<th>Aims of research</th>
<th>Theory</th>
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<tr>
<td>m-Commerce strategy</td>
<td>To identify where on the industry value chain their companies hope to position themselves</td>
<td>McKinsey’s Seven Link Value Supply Chain (Barnett, Hodges, Wilshire)</td>
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</table>

McKinsey suggests that the m-commerce value chain will be comprised of several links, which are:

- Transport – facilitating data communication between mobile users and application providers;
- Basic enabling services - server hosting, data backup, and systems integration;
- Transaction support – billing services and associated security;
- Presentation services – converting content to a suitable format;
- Personalisation – customisation of the content and presentation;
- User application; and
- Content aggregators; that is, portals (Barnett, Hodges, Wilshire, 2000).
12. In which of the above position(s) are you attempting to develop a competitive advantage?

13. What do you feel your competitive advantage should be?

14. Where do you hope to position yourself along the value chain?

15. How will your existing customer profile impact on your decision to compete in this segment of the m-commerce value chain? For example, an emphasis on pay-as-you-go customers could weaken intentions to provide personalisation support. Are there trade-offs in your particular strategy?

16. What new competencies will you need to develop to compete in this segment of the m-commerce value chain?

17. What strategy choices (alliances, joint-ventures, acquisitions) do you feel will be necessary to develop those competencies? And why?

To identify their competitive strategies to achieve their hoped-for position along the industry value chain

Levels of co-operation (Jonash and Sommerlatte)
18. What criteria do you use to form:
   - Alliances
   - Joint-ventures
And to identify:
   - Potential acquisitions?

19. In which of the above position(s) do you feel your competition has a competitive advantage?

20. What do you feel their competitive advantage is?

21. Where do you perceive the competition positioning themselves on this chain?

22. What other players could enter the industry?

23. Do you feel there will be alliances formed between the two existing operators to determine industry standards?

To identify which other companies they expect to challenge them in the links on which they intend to position themselves

To identify their competitive strategies to deal with the other existing operator

Co-opetition (Brandenburger, Nalebuff)

Eight forces: potential entrants (Porter)
24. What methods will you use to encourage mass-adoption of m-commerce?

There are two business models which determine how revenue is generated through m-commerce.
- The internet model relies on giving everything away and hoping to generate revenue in alternate ways.
- The telecom model charges users for the services and time used. It will ultimately charge for the amount of data transmitted as well as for the services used.

25. How do you think South African m-commerce providers will generate income?

26. What do you consider the key success factors to be for m-commerce players?

27. Can you paint a picture of what the industry will look like in 2004? Will the industry still be attractive? Who will be the players? What role will the government play? What will be the emerging technology after m-commerce?