

https://dspace.org/

Evaluate the impact of recent regulation changes on mobile consumers in South Africa

Khan, Yusuf

2012-10-04
http://hdl.handle.net/10539/12041

Downloaded from a DSpace repository. https://dspace.org/

Evaluate the impact of recent regulation changes on mobile consumers in South Africa

Yusuf Khan

A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2012

February 2012

Abstract

In recent years, the cellular industry has seen a massive growth in terms of providing cell phone services to people in different parts of the world including South Africa. This technology has made the world a smaller place to live in and has allowed people to communicate with anyone anywhere in the world for both joyous moments and emergencies. At the same time, there are claims that cellular towers in very close proximity to residential areas affect people negatively by causing ailments such as headaches and even cancer. The impact of regulation changes for the cellular industry in South Africa has caused much debate recently. This debate has been around the high interconnection charges that operators charge subscribers for calls to other networks. Mobile Virtual Network Operators are thriving mainly because of these high interconnection fees, their bulk buying power as well as one-sided regulations that are favourable to them.

The objective of this research report is to evaluate the impact of recent regulation changes on South African cell phone consumers. The research is based mainly on four regulations in different areas of the cellular industry. These are the reduction in interconnection fees, the deregulation of infrastructure based on Telkom's monopoly in the market, the spectrum allocation for new market players and the enforcement of service level agreements by ICASA based on licensing conditions.

Twenty in-depth Interviews were conducted with various cell phone users from the various South African cell phone companies in order to obtain data for the research. This included seven different individuals who are using cell phone services from more than one service providers. Interview data was content analysed to see how the change in regulations has impacted cell phone users in South Africa and how the industry can improve the affordability of cell phone services in South Africa.

Researcher's key findings are that reforms in South African telecommunication sectors have been slow leading to poor competition in South African Cellular industry. Thus ICASA failed to improve the cell phone affordability for cell phone

users in South Africa in the past. However, in recent past ICASA has taken right steps in right direction to improve the overall cell phone consumer experience in South Africa by opening up frequency spectrum for new market players, allowing all cell phone operators and Neotel to rollout transmission network, enforcing reduction in interconnection fees between the cell phone operators and fixed line operators as well as implementing service level agreement with cell phone operators' on behalf of cell phone consumers.

Declaration

I, Yusuf Khan, declare that this research report is my own work, except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the University of Witwatersrand, Johannesburg. This exact work has not been submitted before for any degree or examination in this or any other University to my knowledge.

.....

Yusuf Khan

Signed at .....

On the ..... day of 2012

Dedication

To my wife Ferial Khan, who played mom and dad's roles for my two kids for the last three and half years. Also to my two young sons, Amir and Ameen who understood at a tender age that dad has to devote some time for studies and cannot always play with them. I thank you for all the sacrifices and on-going support that led to my completion of the MBA.

Acknowledgements

This research would not have been possible without the support and guidance of others. I wish to express my sincere thanks, appreciation and gratitude to all those who played a role in the materialisation of this report. Thank you:

- Thabo Mosala, my supervisor, for this experience, advice and encouragement offered throughout the course of this research. Thabo you are a great guide and very patient man.
- My employer Vodacom that supported me financially as well as giving me sufficient time off from work for the last three years of my MBA studies.
- Mrs Barbara Shaw for your patience and understanding and assistance in finalising this report.
- Quewin Reddy, MBA colleague and a close friend as well as all others who made this research possible.

TABLE OF CONTENTS

Abstract ..... **i**

Declaration ..... **iii**

Dedication ..... **iv**

Acknowledgements ..... **v**

List of Tables **3**

List of Figures **4**

Chapter 1: Introduction **5**

1.1 Purpose of the study 5

1.2 Context of the study 5

1.3 Problem statement 8

1.4 Significance of the study 11

1.4.1 Cellular least cost routing in South Africa 14

1.4.2 Major players 14

1.5 Delimitations of the study 15

1.6 Assumptions 15

Chapter 2: Literature review **16**

2.1 Introduction 16

2.2 Definition and background 18

2.2.1 Interconnection fees 18

2.2.2 Regulatory structure 26

2.2.3 MVNOs business model (discount base model) 33

2.2.4 South African telecommunications industry 37

2.2.5 Conclusion of Literature Review 44

Chapter 3: Research methodology **45**

3.1 Introduction 45

3.2 Research Design 46

3.3 Research Population 47

3.4 Sample size and selection 48

3.5 Sampling Methodology 49

3.6 Data Collection 50

3.7 Reliability and Validity 51

3.7.1 Reliability 51

3.7.2 Internal Validity 53

3.7.3 External Validity 53

3.8 Data Analysis 53
Chapter 4: Research Findings 55
4.1 Composition of respondents 55
4.2 the Interview process 56
4.3 Regulations changes in terms of interconnect fees 56
4.4 Slow and ineffective Telco reforms in South Africa 58
4.5 Cell phone affordability for South African public 59
4.6 Limited deployment of converged networks due to delays in frequency spectrum allocations by ICASA 61
4.7 Introduction of service level agreements by ICASA 62
4.8 Competition in the retail cellular market in South Africa due to MVNOs 64
4.9 Revenue loss for cellular operators and MVNOs 65
4.10 Cost of ownership for mobile communications in South Africa 67
4.11 Transmission network infrastructure in South Africa and smart data devices 68
Chapter 5: Discussion of the results 70
5.1 Demographic profile of the respondents 70
5.2 Regulation changes in terms of interconnection fees 71
5.3 Slow and ineffective Telco reforms in South Africa 72
5.4 Cell phone affordability for the South African public 73
5.5 Limited deployment of converged networks due to delays in frequency spectrum allocations by ICASA 73
5.6 Introduction of service level agreements by ICASA 74
5.7 Competition in the retail cellular market in South Africa due to MVNOs 75
5.8 Revenue loss for cellular operators and MVNOs 76
5.9 Cost of ownership for mobile communications in South Africa 77
5.10 Transmission network infrastructure in South Africa and smart data devices 77
Chapter 6: Conclusion and Recommendations 79
6.1 Introduction 79
6.2 Conclusion of the study 79
6.3 Recommendations 85
6.4 Recommendations for future research 87
References 89
Appendix A: List of interview respondents 96
Appendix B: List of abbreviations 97
Appendix C: Questionnaire 99

List of Tables

Table 1: Interconnection revenue and tariffs 14

Table 2: MVNOs size by revenue 2007 15

Table 3: Interconnection fees 19

Table 4: MVNOs Model 36

List of Figures

Figure 1: Data traffic growth prediction..... 7

Figure 2: Network interconnectivity for main market players in SA 9

Figure 3: SA telecommunications industry size by revenue 12

Figure 4: Interconnection revenue..... 13

Figure 5: MVNOs connectivity with MNOs 35

Figure 6: MNOs and MVNOs profit margins..... 36

Figure 7: Porter’s micro economic diamond model 38

Figure 8: Mobile communications costs 41

Figure 9: Broadband growth device forecast..... 42

Chapter 1: Introduction

1.1 PURPOSE OF THE STUDY

The purpose of this research is to evaluate the impact of recent changes in Telecommunications regulations on the South African mobile consumers. ICASA introduced a few main changes to the existing regulations. These include:

- A reduction in network interconnection fees applicable when calls are made across networks.
- A stipulated fifteen days SLA period for resolving queries from the subscribers who have repeated network-related problems.
- A frequency spectrum allocation for new operators and own transmission infrastructure rollout by networks.

In line with above regulation changes, this researcher is trying to establish:

- whether cell phone customers are able to see any visible impact on their cell phone bills because of lower interconnection rates;
- whether cell phone customers feel that cell phone operators are providing a better quality of service or if standards for service levels have dropped;
- whether the transmission infrastructure rollout by operators is providing better transmission networks with increased bandwidth that will translate to much faster data transfer speeds;
- whether South African consumers have access to high end data devices; and
- whether improved transmission network coupled with high end available data devices will result in high data traffic growth.

1.2 CONTEXT OF THE STUDY

With a network that is 99.9% digital and includes the latest in fixed-line, wireless and satellite communication, South Africa has the most developed telecoms network in Africa (Limi, 2007). Telecommunications are one of the fastest growing sectors of the South African economy reflecting the rapid growth of mobile telephony in the

country. The communications sector, together with transport and storage, accounts for almost 10% of gross domestic product (Limi, 2007).

As per SA – INFO (2011):

> Rapid growth in the telecommunication industry in South Africa is owing to the recent regulatory evolution and technological advancements. All Southern African regions have increased provision for telecommunication and internet services as compared to other infrastructures. As a result there are new entrants in the market, leading to stiff competition and price wars in order to gain market share. However, poor industry regulations that favoured existing industry operators worked as a barrier to entry for new entrants. They had to pay very high prices for calls that terminated on to existing network operators. Cash flow problems were further compounded for new entrants as they also had to spend huge sum of cash on infrastructure rollouts. Existing operators were competing on pre-existing network infrastructures.

New regulations do not completely alleviate infrastructure-based competition; however, they improve the situation for new entrants and level the playing field for all players in the South African market.

The South African cellular industry is characterised as being a mature market with almost 110% penetration in the voice market with three national operators country-wide. Vodacom is leading with a 54.3% market share followed by MTN with 37%, and Cell C holding the balance of market share at 8.7% (Vodacom, 2010).This makes it difficult for new market entrants like Telkom mobile to gain a market share. In order to gain a market share, new market players are obliged to lower their prices for the products that they sell or to provide superior service levels.

A market research report conducted by CISCO (2011) emphasized that the data market in South Africa is still mainly untapped because of a lack of internet penetration, transmission bandwidth constraints and limited availability of high speed data devices.

The report also indicates that:

- there is massive data growth predicted over the next 5 years;
- Internet penetration in South Africa is currently at 10.8% showing that there is a huge potential internet market for growth (IWS, 2011).

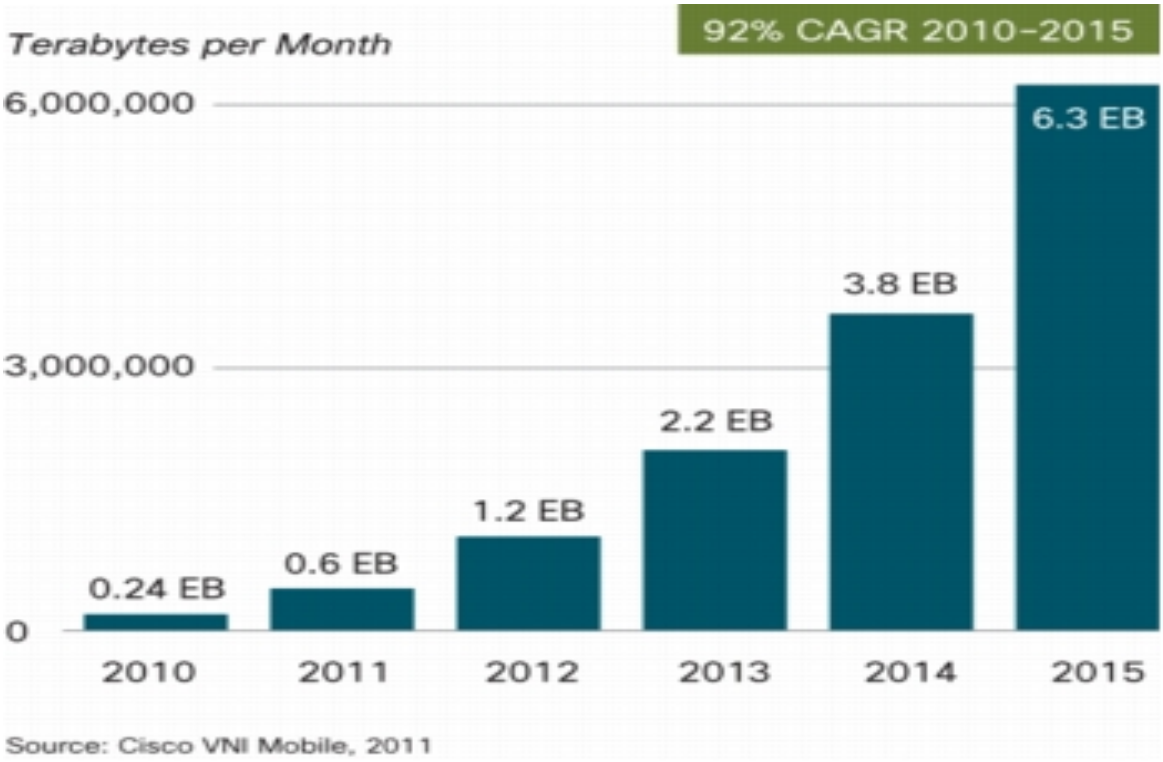


Figure 1: Data traffic growth prediction

This increased data demand is accompanied by high data rate requirements from the perspective of the user (CISCO-VNI 2011). For network operators to provide users with acceptable user throughput, they will need to upgrade their network infrastructure which will require a high capital investment for network operators.

The South African government is committed to increasing the accessibility and bringing down costs in the telecommunications sector. In order to drive these high costs down, the South African government has facilitated the rollout of fibre optic networks in the metropolitan cities of the country for all operators. This rollout started in late 2007 with over 5000 kilometres which will be available for Vodacom, MTN, Telkom, Neotel and Cell C. Major projects are also under way to lay submarine fibre-optic cables along both the east and west coasts of Africa to boost the continent's connection with the rest of the world (Snead, Whyman and Sousa, 2010).

SA-INFO (2011), citing from Nielsen/Net Ratings, explains that wider access to broadband, ADSL and 3G access has boosted internet connectivity with the number of South African internet browsers increasing by 121% in two years, from 1.8million in May 2005 to 3.8million in May 2007 (SA-INFO, 2011). However, latest statistics show that internet users have almost doubled in South Africa since May 2007 and, at 31st March 2011, stood at 6.8 million (IWS, 2011).

1.3 PROBLEM STATEMENT

In South Africa, ICASA is responsible for regulating the telecommunications sector. After a long wait, ICASA has taken the initiative of modifying the old cell phone legislations that were regarded as monopolistic and which favoured older operators. These legislations were also not considered to be in the best interests of the cell phone consumers. For example, interconnection rates as well as costs of mobile communications South Africa were still very high in 2010 as compared to the rest of the world (Snead et al, 2010). The transmission network infrastructure lagged far behind that of the developed world where Internet TV has already become a reality. This research will investigate whether the recent changes in regulations have made any difference towards improving the situation for cell phone users in South Africa.

As the mobile subscribers continue to grow in developing countries, the reach of networks and especially mobile coverage, is growing and the capacity of the spectrum to carry information is expanding. Over time, technology has evolved in ways that make it possible to build much more efficient and dynamically responsive radio systems that can allow many users and uses to simultaneously share the same frequency bands. Technologies like smart antennas, spread spectrum modulation, and cognitive (software) radios are making it feasible for transceivers to dynamically change their frequency, modulation, or power levels to enable more efficient and intelligent spectrum sharing (Khalil and Kenny, 2008). However, frequency reuse also has its limitations as frequency reuse, beyond a certain point, results in poor voice and data service. Additional frequency spectrum is needed to keep up with the growing demands of subscribers on the networks and the new additional services that are being developed over time by network equipment suppliers. Frequency

spectrum allocation delays in South Africa by ICASA have kept the South African telecommunications sector from becoming a fully converged ICT network.

Mobile telecommunications appear to be a successful and competitive high-growth sector of the modern economy. Yet mobile termination charges, that is, the charges that mobile operators levy on each other and on fixed network operators for terminating calls on their networks, have become a concern in most countries throughout the world. These charges are perceived to be too high which inhibits the economic growth of telecommunications services generally. A regulatory focus on mobile telephony has shifted from stimulating growth and competition to scrutinising and limiting termination charges (Littlechild, 2006). The effect of high termination rates is that subscribers from one network subsidize subscribers of another network. There is no inflow of funds into the sector, just a transfer between operators (Stork, 2011).

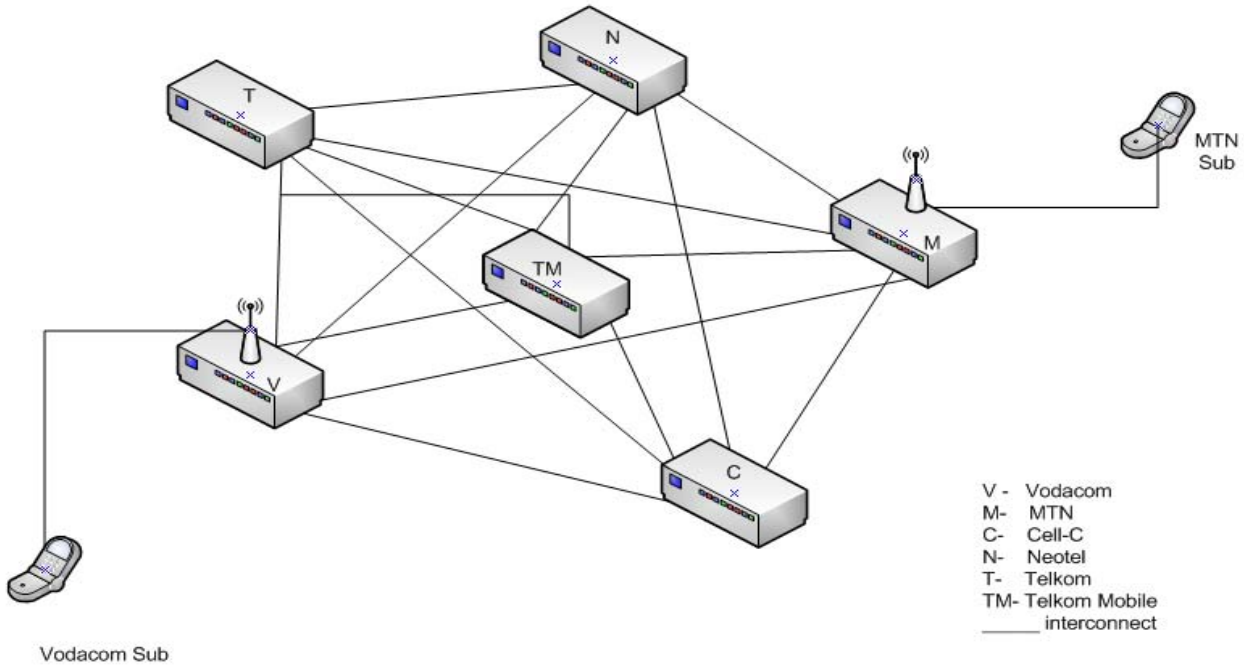


Figure 2: Network interconnectivity for main market players in SA

As shown above in Figure 2, network interconnection means connecting a call between two subscribers on different networks. It could be between two different

mobile networks, two different fixed line networks or between mobile to fixed line and vice versa. In the South African environment, if a subscriber from Vodacom's network wants to make a call to another subscriber from any of the other network providers (Telkom, MTN, Neotel or Cell C), then Vodacom would charge the caller additional charges that Vodacom would have to pay to the network provider where the call terminates. Operators make investments in deploying infrastructure (laying cables) between networks in order to have connectivity among all networks. Therefore, interconnection charges are a way to recover the investment made upfront and operational costs that occur in maintaining that specific network infrastructure. Hence there is some cost involvement for operators to enable subscribers to be able to make calls to different network service providers. For mobile terminating calls, charges would include part of interconnection fee that would be paid to the call terminating party (Eeden, 2009).

In theory, the level at which these tariffs are set should reflect the true cost involved in connecting one subscriber to another subscriber on a different network. However, in practice, this is not necessarily the case, both because interested parties differ as to what the true cost of interconnection is and because these costs may change over time as the market matures (Eeden, 2009).

In 2010, a parliamentary committee suggested that the peak time interconnection rate be reduced immediately by 65c from its level of R1.25 per minute at that time. In addition, further cuts of 15c on the peak rate per year for the next three years have been suggested, bringing the eventual rate down to 15c per minute. This has been supported by a strong argument in favour of lower interconnection rates as they will reduce the cost of calls between mobile subscribers, thereby providing consumers with a lower priced service (Eeden, 2009). This has resulted in the need for the mobile network operators (MNOs) to exploit the data market in order to make up for lost revenues due to reduced interconnection fees.

ICASA have introduced the fifteen day period response service level agreement with current operators in relation to repeated customer complaints that were ignored by the operators. However, based on the large number of cell phone users, ICASA may

not have sufficient manpower to handle the logistics required to monitor that all queries with all network operators are responded to within the stipulated time frame.

According to Khalil and Kenny (2008),

> reform of spectrum allocation procedures will become increasingly important in developing countries, and may prove more straightforward if regulation of the entire spectrum falls under one body. By one estimate, about one half of the total value of the spectrum in the United States today is wasted because it is underutilized by those with spectrum rights.

Furthermore, Khalil and Kenny (2008), citing from the report “Financing information and communication infrastructure needs in the developing World” by the World Bank (2005), state that many developing countries have yet to extend the benefits of well-regulated competition throughout the ICT sector. Although 90% of the world’s population lives in countries with competition in mobile provision, the figures drop to 78% for fixed local and 60% for international services (Khalil and Kenny, 2008).

With recent regulation changes taking place in the South African telecommunications industry, much of the debate is around if and how the mobile consumer would be impacted. This includes:

- The impact on mobile consumers who use services from Cellular Least Cost Routing companies that generally enjoy the benefits of discounted prices on cost of infrastructure deployments for CLCR companies due to very low investments.
- The introduction of SLAs, additional frequency spectrum allocations and licensing of fibre network rollout to various new operators will result in improved network quality and better cell phone customer experience.

1.4 SIGNIFICANCE OF THE STUDY

There has been no significant research on the impact on cell phone consumers who use the service directly from main cell phone network providers as well as by mobile virtual network operators (MVNOs). MVNOs, predominantly, have a tariff discount

based business model due to bulk interconnection negotiation from connectivity providers. The telecommunications industry contributes more than 10% of the gross domestic product towards the South African economy. Reduced revenue for operators would also contribute less towards SA tax income.

Eeden (2009) says that “the level of interconnection rates, specifically mobile termination rates, in South Africa has recently been highlighted with various parties, both public and private, suggesting these rates are too high and should be lowered”. ICASA and the Department of Communications (DoC) have been more restrained in their recommendations, but still proposed an immediate cut of 30c, coupled with further reductions to bring the peak time mobile interconnection rate to 60c by the end of 2010. More recently, MTN and Vodacom agreed on a reduction of 19% on the blended interconnection rate between these two mobile operators.

A popular argument in favour of lower interconnection rates is the suggestion that this will reduce the cost of calls between mobile subscribers, thereby providing consumers with a lower priced service. At the same time, mobile operators are believed to benefit by way of the increased demand stemming from lower call costs because higher call volumes coupled with lower call charges could possibly increase total revenue (the product of call volumes and call charges) (Eeden, 2009).

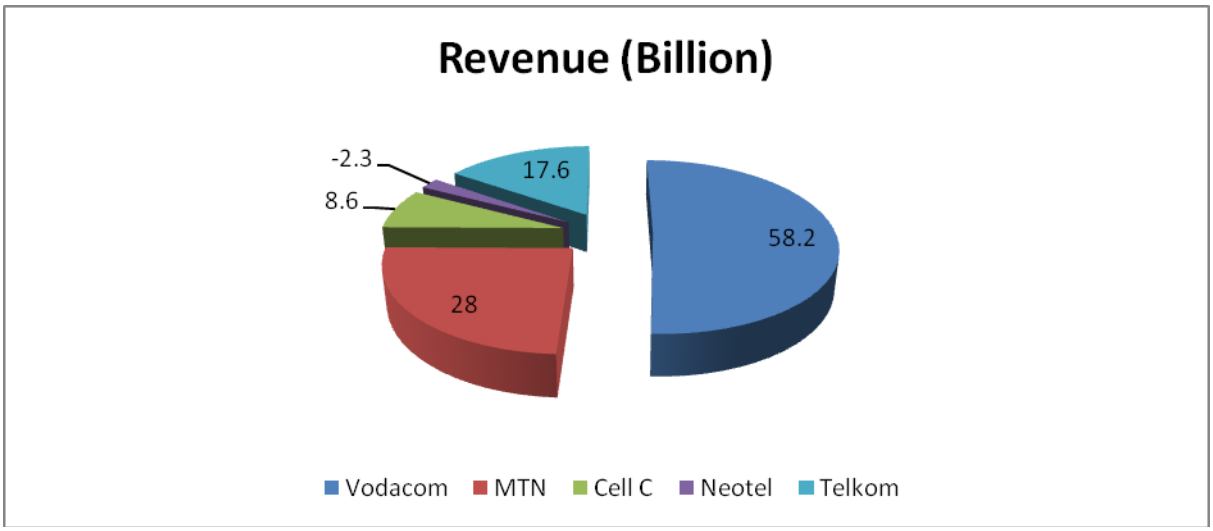


Figure 3: SA telecommunications industry size by revenue

The South African telecoms industry is worth R110 billion. Recently ICASA proposed substantial interconnection fee reductions that would have significant financial impacts on current business revenues for all operators, especially on CLCRs and the cellular low cost call routing operators (MTN, 2010; Telkom, 2010; Vodacom, 2010). Nominal interconnection revenue has continued to increase in excess of inflation for all SA mobile operators. The relative contribution made to the total revenue pool of these very same operators has remained constant at around 20%. This reflects not only the total aggregate revenue growth of mobile operators in South Africa, but also their evolving revenue structure (Eeden, 2009).

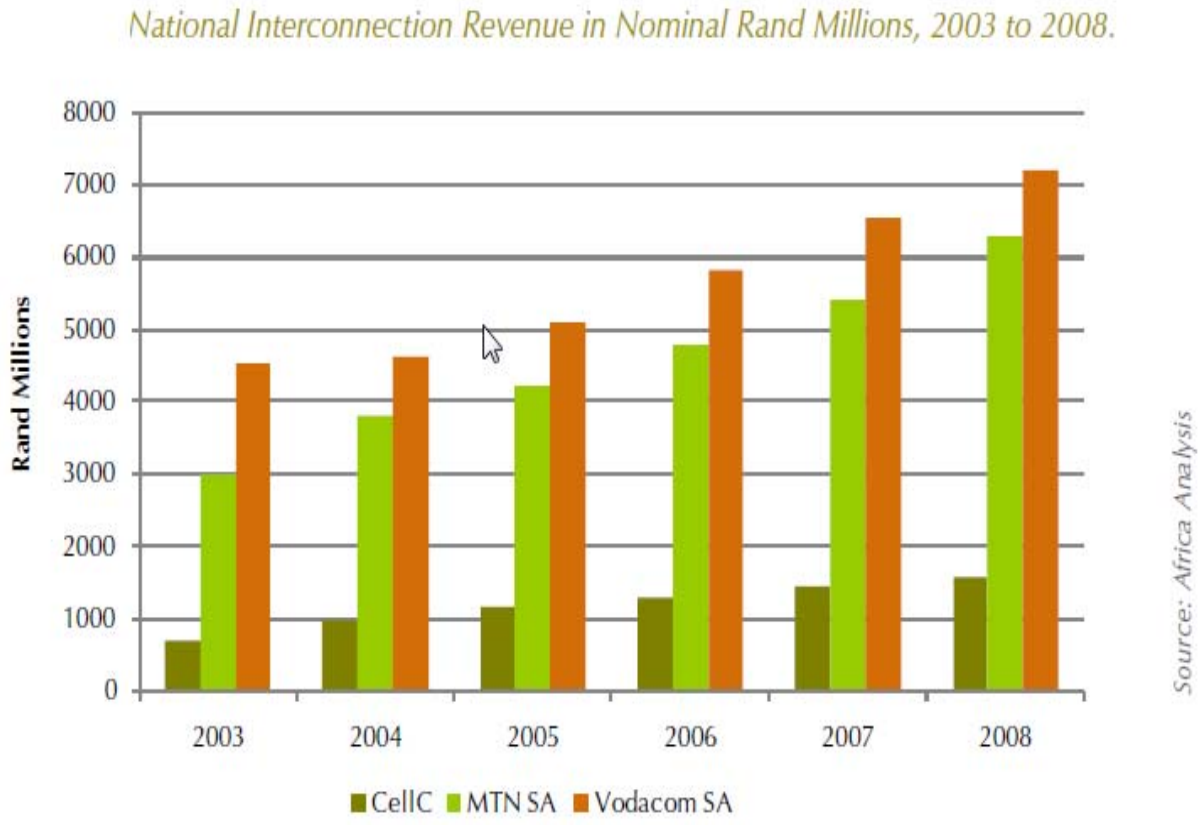


Figure 4: Interconnection revenue

Table 1 below depicts the interconnection fee structures “until regulations changed by ICASA in late 2010and mobile operators were forced to reduce these rates” (Snyman, 2007).

Table1: Interconnection revenue and tariffs

Interconnect — the numbers

Rand per minute, unless otherwise stated

Traffic	Comment	Tariff Peak	Tariff Off-peak	Tariff JPM estimate	Mar-07 Traffic (m min) Total	Interconnect revenue (Rm)
Mobile-to-fixed	Paid by MNOs to Telkom	0.27	0.16	0.34	2,419	815
Fixed-to-mobile	Received by MNOs from Telkom	1.25	0.77	1.32	4,103	5,435
Mobile-to-mobile	Paid by MNOs to MNOs for off-net traffic	1.25	0.77	0.89	22,377	9,195

Source: JPMorgan estimates, Company data.

Fixed-to-Mobile traffic and revenue

Rand in millions, unless otherwise stated

Year end March	2000	2001	2002	2003	2004	2005	2006	2007	CAGR
Fixed-to-mobile revenue - Telkom SA	5,325	6,845	7,323	7,539	7,321	7,302	7,647	7,646	5.3%
Fixed-to-mobile traffic (m minutes)	3,659	4,319	4,364	4,135	3,980	3,911	4,064	4,103	1.6%
Revenue per minute (Rand)	1.46	1.58	1.68	1.82	1.84	1.87	1.88	1.86	3.6%

Source: Emerging markets equity research 2007

1.4.1 Cellular least cost routing in South Africa

The estimate size of the CLCR market is R2.5bn per annum at an ARPU of R1,450 growth even though the market is slowing down at a rate of between 6% and 8% per annum based on this author's industry analysis. Given the author's view that CLCR is approaching maturity, consolidation appears inevitable, and two recent listings on the JSE ALTx of LCR companies could be viewed as a means of achieving consolidation (Snyman, 2007).

1.4.2 Major players

Vox Telecom (previously Datapro with Orion Telecom) and Nashua Mobile (Nashua) account for 67% of the total CLCR market in South Africa at the service-provider level. In the case of Nashua, CLCR accounts for 27% of Nashua's total revenue (Snyman, 2007).

Vox Telecom is the biggest supplier for CLCRs with more than 2800 customers and 46,750 lines. Vox Telecoms generates almost 1 billion Rand from the operations annually (Snyman, 2007).

Table 2: MVNOs size by revenue 2007

Rand in millions, unless otherwise stated

Company	Number of customers	Number of lines	Annual revenue
TelePassport (The Huge Group)	5,000	15,000	261
TeleMasters	3,000	7,200	125
Storm Telecoms		12,000	209
Centracell		10,000	174
Intelegence Telecom		7,000	122
Du Pont		5,000	87
Vox Telecoms (Orion)	2,800	46,750	814
Nashua Mobile		27,000	470
Autopage		10,800	188
Other		9,250	161
Total		150,000	

Source: JPMorgan research.

1.5 DELIMITATIONS OF THE STUDY

This research will be limited to the impact on cell phone consumers of the reformed telecommunications regulations of mobile interconnection fees, the introduction of ICASA's service level agreement, spectrum allocations and transmission network rollout by all mobile operators in the South African telecommunications industry.

1.6 ASSUMPTIONS

- The main revenue stream for CLCRs is in the form of discounts received from interconnection fees and CLRC operators may not be able to pass earlier subsidies to their cell phone consumers.
- There will be enough knowledgeable respondents available in order for the researcher to draw the conclusion of whether there has been any impact of regulation changes on cell phone users.
- Participants will be free to talk and be honest about their view.

Chapter 2: Literature review

2.1 INTRODUCTION

The interconnection fee in the telecommunications mobile industry has thus far been an integral part of the revenue generation for mobile operators and for CLCRs. It contributes almost 13% of the cellular operators and very close to 100% of revenue generation for CLCRs (Eeden, 2009). On the other hand, mobile subscribers are paying much higher fees in South Africa as compared to rest of the world for mobile calls that they make to subscribers on other networks (Blackman, 2007). The high interconnections fee serves two purposes for existing mobile operators:

- It generates higher revenues for existing mobile network providers as they recover money from other operators for terminating calls on their networks.
- It helps operators with most subscriber numbers to generate higher revenue as most of the calls using interconnect are made to operator.
- It acts as barrier to entry for new main market entrants as they will have to pay large sums of money to existing network providers for the calls that would be terminating on their networks as most of the subscribers are on existing network providers.

Blackman (2007) citing Sterling et al (2003) explains that

> in the past when telecommunications networks were in their infancy, telecommunications were regarded by many as a monopoly, and telecommunications operators were regarded as public utilities, providers of essential services. Regulation was deemed necessary to protect the public from potential abuses in the marketplace.

Because of the high cost of entry due to network infrastructure investments, Blackman argues against repetition, as implying redundancy, because of economies of scale or scope, it was held that telecommunications services could be provided more efficiently and cheaply by a single operator than by many providers (Blackman, 2007).

Blackman (2007) further states that

> Telecommunications infrastructure competition will continue in the early part of development until 2030. Fixed infrastructure operators will attempt to rival the mobile operators with converged (fixed and mobile) services. Cable operators and internet service providers (ISP) will increasingly enter telecommunications with either a fibre network for backhaul or a service offering with use of unbundled capacity. Business models of the operators are likely to change as a result of price competition and lower costs of entry, so the service competition from new players such as ISPs, media and cable companies will be important. Most of these traits are very visible in the South African market at the moment. Despite rapid progress and global leadership in business models in some parts of the ICT sector, developing countries still face many challenges to ensure they can fully reap the benefits of the next decade's changes in ICT provision and use.

2.2 DEFINITION AND BACKGROUND

2.2.1 Interconnection fees

Interconnection can be defined as the connection of a call between two subscribers on different networks. For instance, a Cell-C subscriber originates a call to a fixed line subscriber at Telkom. In this case, there will be interconnection fee charges to the Cell-C subscriber as he terminates his call on the Telkom network. These interconnection rates are the rates charged for connecting these calls and are often referred to as mobile termination rates (MTRs) in the case of mobile telecommunications operators. The level at which these tariffs are set should reflect the true cost involved in connecting one subscriber to another subscriber on a different network. However, in practice, this is not necessarily the case because interested parties differ as to what the true cost of interconnection is and because these costs may change over time as the market matures. This is evident in the South African case, where interconnection rates were set without the expectation that the total number of mobile subscribers would be in excess of 40 million only fifteen years after the launch of mobile services. Interconnection rates are applicable to both fixed and mobile telecommunications operators (Eeden, 2009).

Telkom South Africa Limited is a partly government owned entity that controlled the fixed line market until 2005 when Neotel started its operations. ICASA issued an SNO license to Indian based telecommunications company, Neotel, in 2003 for fixed and partially mobile wireless technology. Neotel was also permitted to rollout its own fibre network to provide backhaul leased lines to other market players. Because the provision of fibre line by Neotel to suppliers would erode Telkom's revenue streams, Telkom argued that mobile charges in South Africa are still above costs and contends that the 1993 interconnection agreement with the mobile operators, upon which the current charges are based, effectively fixed Telkom's share of revenue from calls made from its network to mobile users, and calls made from mobile users to Telkom customers (Gillwald, 2005).

Table 3: Interconnection fees

Telkom and Mobile Operator Interconnection Fees (Incl. VAT)

Type of Call	Peak Rate	Off-Peak Rate
Fixed (Telkom) to Mobile (Vodacom, MTN, Cell C) Call	R1.88	R1.11
Termination Rate paid by Telkom	R1.40	R0.83
Amount Retained by Telkom	R0.48	R0.28
Mobile (Vodacom, MTN, Cell C) to Fixed (Telkom) Call26	R2.20 – R2.85	R0.86 – R1.55
Termination Rate paid by Mobile Operator	R0.27	R0.14
Amount Retained by Mobile Operator	R1.93 – R2.58	R0.72 - R1.41
Mobile (Vodacom, MTN, Cell C) to Mobile (Vodacom, MTN, Cell C) Call	R2.00 – R2.85	R0.90 – R1.55
Termination Rate paid by Calling Mobile Operator	R1.40	R0.83
Amount Retained by Calling Mobile Operator	R0.60 – R1.45	R0.07 – R0.72

Source: Telkom annual report 2007

From the table above, it can be seen that the current ratio of mobile termination rate to fixed termination rate stands at R1.40 to R0.27 at peak hours. This indicates that

in percentage terms, mobile termination rates are 519% of fixed termination rates. This 2003 ratio is an improvement over the corresponding ratio of 2002 which was R1.40 to R0.24 or 583%. This change in the fees resulted in improved ratios because the mobile termination rate was not increased between 2002 and 2003. Gillwald et al (2007), quoting officials at Vodacom, said that interconnection rates in South Africa are governed by a commercially negotiated agreement, whereby on the 1st of January each year all operators can raise interconnection rates by the previous year's consumer price index or by R0.02 – whichever is higher. Telkom did raise its termination rates from R0.24 (peak)/R0.11 (off-peak) to R0.27 (peak)/R0.14 (off-peak) for year 2002, and this increase accounted for the improvement in the mobile to fixed termination rate ratio. Given the parameters of the interconnection agreement between the South African operators, it is hard to see how the ratio of mobile to fixed termination rates will improve unless the mobile operators voluntarily continue to freeze their termination rates (Gillwald and Kane, 2003).

As further explained by Gillwald et al (2007) there is international support for Telkom's view that mobile termination rates should be decreased. In the past few years, regulatory authorities around the world have reassessed their views regarding the high levels of mobile termination charges. While these asymmetrical charges were originally intended to reflect the higher costs of mobile networks in the early stages of their development, with the growth of mobile has come a realisation that these costs should fall as economies of scale are gained. Internationally, mobile operators have fought the designation of their termination charges as excessive and argued that competitive pressures within the industry constrain termination charges. The mobile industry also argues that the costs of mobile networks are fundamentally different from those of fixed networks. Specifically, the mobile networks allow their customers to originate and terminate calls to and from customers regardless of their location. This functionality requires specific equipment and does not have an equivalent on the fixed network. The mobile operators argue that it is this additional equipment investment and functionality that causes mobile termination rates to be set at such a high level. Mobile operators also argue that terrain and availability of spectrum can have a significant impact on the performance and costs of constructing

their networks and that these cost drivers also have no fixed line equivalent (Gillwald and Kane, 2003).

Regulators have also been concerned about the misallocation of resources resulting from excessive or distorted prices. This is because misallocation represents a ‘real’ or net loss to society, not just to a transfer between members of society (Littlechild, 2006).

2.2.1.1 Interconnection in next generation networks

Dodd, Jung, Mitchell, Peterson and Reynolds (2009) citing Vogelsang (2006) explain that current networks are in transition and are being upgraded for data networks. Regulatory bodies are already busy determining how to charge for interconnection fees and also for regulating interconnection charges between network operators for traffic which passes between their networks. A focus of the regulatory debates has been whether the “bill-and-keep” (BAK) interconnection charging model (whereby no interconnection payments are made for either termination or origination) is preferable to other charging models, and, in particular, to the initiating party network pays model (IPNP) under which the originating network pays a termination fee to the terminating network. BAK is seen as having a key advantage over IPNP by eliminating termination charges. BAK also saves regulators from the resource-intensive and often contentious task of setting termination charges.

Proposition 1: Interconnection fees in the South African telecommunications industry are too high.

2.2.1.2 South African telecommunications market regulation and reforms

2.2.1.2.1 Background on South African Telco reforms

With the first democratic election in 1994, South Africa emerged from three centuries of racially based minority rule, including a final 46 years of virulent ideological apartheid. By systematically practicing race-based discrimination for many decades, the minority white population accumulated most of the resources of the country. A new constitution came into effect in 1996 and the ANC-led government (re-elected in

1999) has undertaken a broad legislative programme that attempts to redress the legacy of apartheid (Makhaya and Roberts, 2003).

In line with global trends, and in compliance with World Trade Organisation (WTO) commitments, the South African telecommunications market has been overseen by a sector regulator since 1997, the South African Telecommunications Regulatory Authority (SATRA) until 2000, and then the Independent Communications Authority of South Africa (ICASA). The South African telecommunications sector has clearly made significant gains between 1992 and 2001 as it grew to R43 billion in 2001 from about R7 billion in 1992 (Gillwald and Kane, 2003).

2.2.1.2.2 Need for reforms

The very basic reason for reforms in any sector, in any country, range from:

(i) Fiscal crises or a lack of adequate capital to improve infrastructure;
(ii) The desire to acquire technology and managerial expertise;
(iii) The desire to improve service delivery;
(iv) A combination of the above factors (Ayogu and Hodge, 2002).

In the South African context, reforms were required for infrastructure development and economic growth of previously disadvantaged groups. Ayogu and Hodge (2002) citing ITU (1998) explain that there is a correlation between the performance of a country's economy and its sequencing of reforms, with either privatisation or liberalisation. Countries facing economic difficulties are forced to privatise first while countries enjoying a healthy growth are more likely to open various segments to local competition.

Further, Gillwald (2005) citing Teljeur et al (2003) explains that South Africa's telecommunications sector has been at the forefront of the country's infrastructural reform process, and was the first sector to confront some of the inherent tensions within the country's core policy objectives, which include:

- an accelerated sector growth and modernisation;
- the achievement of universal access/service;
- the promotion of economic efficiency;

- Black economic empowerment (BEE).

Gillwald (2005) further states that “the stated national strategies to achieve these policy objectives, although slow in implementation, have broadly conformed to international economic reform ‘best practice’ and include:

- restructuring and privatisation of state-owned enterprises (SOEs);
- market reform/liberalisation;
- economic regulation;
- universal access/service funding mechanisms; and
- promotion of foreign direct investment (FDI)”.

Despite South Africa rejecting the World Bank and International Monetary Fund support, the country’s economic reform strategies have generally been aligned with internationally accepted best practice and the telecoms reform has been no different (Gillwald, 2005).

Gillwald (2005) further explains that the reform model includes three integrated components—privatisation, competition and independent regulations. Even though there were some concerns about the models, and particularly the emphasis on privatisation and sequencing of reform during the mid-1990s, this widely accepted ‘best practice model’ was being perpetuated through the activities of network experts operating across the globe who flourished because of the perceived complexity and uncertainty in the area and the belief that they have a one-size-fits-all solution. South Africa, like most developing countries, had little local expertise in the area of policy, regulation and specifically privatisation, though this was often not adequately acknowledged. It was highly dependent on the advice of its international financial and policy advisors who proposed the three-pronged strategy that underlay the international reform model:

- The incumbent fixed-line operator (Telkom) was partially privatised with the standard extension of the incumbent’s monopoly as was practice in the early days of the reform model in order to induce investment (in the case of South

Africa this was only for 5 years, several other countries were tied into far longer exclusivity periods) (Gillwald, 2005).

- In the cellular phone market, a third mobile licence was proposed to compete with the incumbent duopoly in mobile and the VANS market which includes the ISPs. It was opened for competition but with restrictions on their operations (Gillwald, 2005). For example, they are permitted to rollout network infrastructure with the exception of own transmission and are required to acquire their facilities from the fixed-line monopoly operator (Gillwald, 2005).
- A sector regulator (SATRA in1997, then ICASA from 2000) was created to implement policy in line with the model of developing a transparent and stable regulatory environment for investors and consumers and to contribute to building a well-functioning market (Gillwald, 2005).

2.2.1.3 Effectiveness of reforms

Mwanza (2006) citing an interview with Mike Silber, an attorney at Michaelsons Attorneys who specialises in the information and communication technology (ICT) sector says that;

> South Africa's telecoms regulator ICASA urgently needs an overhaul. For a regulator operating in the rapidly evolving ICT space, Silber argues that ICASA lacks the managerial and technical competency to deal adequately with key industry issues.

Mwanza (2006) further stresses that “the regulator is in dire need of an overhaul. It needs to beef up its staff headcount, improve staff conditions of service and above all employ staff with appropriate skills required”.

Mwanza (2006) continues by saying that;

> Consumers battling with high telecoms costs have sought ICASAs intervention to no avail. A recent hearing on cell-phone pricing and handset subsidies has turned out to be a mere talk shop, with the public still waiting for ICASA’s ruling. Following its recent failure to impose fines or censure cellular

service providers for reneging on their promise to adopt mobile number portability (MNP), ICASAs competency has again been called into question.

Now tasked with the implementation of the Electronic Communications Act (ECA), which has even more far-reaching implications for SA's local ICT landscape, ICASA’s mandate has been stretched further. "While SA's ICT industry has grown in the past few years, ICASA’s staff complement has remained static. Key divisions, such as the licensing enforcement and numbering division, need immediate attention.

Furthermore, ICASA's CEO, Manche (2005) says that;

> ICASA will meet its stakeholder objectives by satisfying the needs of its customers of putting in to effect appropriate regulation, providing transparent and responsive processes that address the need of the sector it serves and providing relevant information needs.

Also stressing policy execution, Manche (2005) mentioned that:

> The new organisational strategy is based on the drive to bring about efficiencies to the internal functioning of the organisation – at both administrative and Council level.

Proposition 2: The telecommunications sector reforms in South African industry have been slow and ineffective.

2.2.2 Regulatory structure

In post-apartheid South Africa, the government adopted a three-tier separation of policy, regulation and implementation functions. The overall responsibility for the formulation of telecoms policy resides with the Ministry of Communications supported by the Department of Communications. The Minister is responsible for the development, review and implementation of policy through the issuing of policy directions. The Department (headed by a Director-General) supports the Minister in the policymaking function by primarily monitoring of the policy. The key implementation and administration agencies in this regard include the recently restructured Independent Communications Authority of South Africa (ICASA) and the Universal Service Agency (USA). The Ministry of communications has the right to veto all regulations (Barendse, 2004).

Ten years have now passed since the passing of the Telecommunications Act. By most accounts, the reform of South African telecommunications has been, at best, a bare success and, at worst, a medium-term failure. The Act granted Telkom a 5-year

period of exclusivity to expand the network and prepare itself for eventual competition (Horwitz and Currie, 2007).

The primary objective of this initial reform period was to increase affordable access to communications through the gradual liberalisation of the market. The policy envisaged a market structure to orientate the sector towards accelerated development and universal service as well as take into account technological and international trends. The strategy to achieve this focused on the expansion of the fixed line network through the partial privatisation of the incumbent, accompanied by the granting of a five-year exclusivity period to the operator in exchange for an obligation to double the network. While the monopoly on the Public Switched Telecommunications Network was extended, competition in the mobile sector was to be increased in the cellular market through the introduction of additional operators, and service based competition in the value-added network services (VANS) market was opened up (Gillwald, 2003).

Barendse (2004) explains that during the first five years of the first democratic post-apartheid government (1994–1999), massive legislative reforms were undertaken, three within the telecoms sector in particular. The regulatory reforms signalled an end to the incumbent's exclusivity rights in May 2002. During this period (1994-2002), the government adopted broad telecoms reform measures as well as specific regulatory initiatives designed to accomplish universal service obligations and facilitate the emergence of competitive markets.

Telecommunications regulation problems and ineffectiveness is not only a problem in developing countries but is an issue even in developed countries, paralysing the competition. Underlying most of regulatory economics is the existence of problems associated with the lack of competitive entry. It is this which makes markets fail or succeed. If prices rise above competitive levels, entry occurs and the increased supply forces prices down. A process of exit restores equilibrium if there is an oversupply (Cave, 2006).

Unsurprisingly, the EC's 2003 Recommendation on relevant markets locates barriers to entry and to the development of competition as the first (of three, cumulative)

criteria for subjecting a market to ex-ante competition, “for instance, high structural barriers may be found to exist when the market is characterised by substantial economies of scale, scope and density and high sunk costs”. These factors will erode prospects for duplication, or – more generally – replication, of the assets needed to provide the service. If such replications occur, the competitive outcome described above should be achievable. As the Recommendation makes clear, the EU regulatory framework defaults to the use of competition law alone in the absence of high and non-transitory barriers to entry (Cave, 2006).

Stork (2011) said that;

> The assumption that reduced interconnection charges will necessarily result in lower call charges and gains in both consumer and producer welfare has been challenged in what some have dubbed the ‘waterbed’ effect. This term is used to describe a situation where the pressure to reduce one element of the final retail price of mobile services may lead to an increase in the other elements and even to an increase in the final retail price. A study into the existence of the waterbed effect in 24 developed countries found that a decrease in mobile interconnection rates led to an increase in the final retail price of these services.

Similar to current developments in South Africa, the European Commission (EC) published a recommendation in May 2009 suggesting a framework that would lead to significant cuts in mobile interconnection rates under the assumption that this would lead to an increase in consumer welfare (Eeden, 2009).

The long-standing popular concern about monopoly is that prices will be set ‘too high’. One argument for price control is to redress the balance by stopping or reducing this transfer. Because of the waterbed effect, regulatory authorities have been additionally concerned that high termination charges involve subsidies and cross-subsidies, effectively transferring wealth from some consumers to other consumers and from some producers to other producers. So another aim is to reduce such inappropriate transfers (Littlechild, 2006).

Proposition 3: Telecommunications reforms in the South African industry have made mobile communications affordable to the masses of the country.

2.2.2.3. Spectrum Allocation in South Africa

Despite rapid progress and global leadership in business models in some parts of the ICT sector, developing countries still face many challenges to ensure that they are able to fully reap the benefits of the next decade's changes in ICT provision and use (Hodge, 2004). These challenges are illustrated by the fact that, although the number of secure servers in low and middle income countries doubled between 2001 and 2004, reaching above 10,000, this has still left the developing world's share of secure servers at about 3% of the global total (Kenney, 2005). Barriers to progress include the need for further regulatory reform, issues surrounding the taxation of ICTs, continued concerns about the extent and quality of transmission backbones, and perhaps most importantly, attention to the broader business environment (Hodge, 2004).

Many developing countries have yet to extend the benefits of well-regulated competition throughout the ICT sector. Beyond the basic reform agenda is the need to adapt to an increasingly intertwined set of delivery mechanisms for information. As a result of convergence, separate institutions to cover Internet, broadcast, and other media content will face cases that overlap (Hay, 2005). For example, South Korea's 1995 Electronic Communication Business Law established a separate Information and Communication Ethics with broad powers to censor Internet content. If the content being provided is a podcast of a television show previously shown on free-to-air television, it is not clear who should regulate this content, or why it should go through an additional regulatory hoop. One response to the process of convergence has been the creation of "converged" regulators covering both telecommunications and media more broadly. The United Kingdom's Ofcom and South Africa's ICASA are other examples where Internet regulation falls under the same institution as broadcast regulation. A second approach would be to split functions between a "pure" infrastructure regulator and a content regulator, the first basing decisions on economic issues related to pricing and to market dominance, while the second regulates on the basis of cultural and social norms (Khalil and Kenny, 2008).

Something needs to be done to encourage more efficient use of total aggregate spectrum, developing the methods to do this in an equitable manner and within a market-based price-cost structure that is also sound scientifically and technologically (Jabbari, Pickholtz and Norton, 2010). The landscape of emerging spectral access technologies promises to change from a clear channels paradigm to a more contentious environment, allowing users to coexist without major conflict. This will require a transformation of the technology as well as the spectrum management community. There are many approaches to spectral access methods as well as different implementations underway. As per Jabbari et al (2010) "review coexistence and cooperation, spectrum access, management, and control techniques, and provide a perspective on techniques and technologies that will enable the next generation of spectral-efficient communications".

Proposition 4: Delayed frequency spectrum allocations as well as delays in opening of transmission network rollout for operators by ICASA in South Africa have resulted in inefficient frequency utilisation and restricted cellular network growth.

2.2.2.4 ICASA's role in the current South African market situation

> The Electronic Communications Act (ECA) has a key objective of ensuring fair and non-discriminatory access to interoperable networks. Access to networks i.e. interconnection, is an obligation which all licensees bear under Section 37(1) of the ECA. To support this obligation ICASA is mandated to develop and release regulations that facilitate the conclusion of interconnection agreements by stipulating certain minimum agreement principles. These regulations were released last week in the Government Gazette and are not designed to address matters of pricing at all (Makhakhe, 2011).

He further states that;

> In 2008 ICASA released a range of regulations specific to each segment of Section 67(4) for public comment. The commentary received raised numerous issues. Among them was the reality that markets are specific and therefore it begs the question as to whether '"framework' regulations were necessary. Based on the submissions received, a holistic review of the ECA

> as well as the process for conducting a market review was carried out. ICASA concluded that regulations addressing competition matters should only be released on a market-by-market basis. Further to this, ICASA is of the view that the ECA, from Sections 67(5) onwards, more than adequately explains what is required to be included in a market review. In October 2009, ICASA took a further step by releasing a request for information in order to evaluate the effectiveness of competition in the call termination market. The questionnaire sought information on market shares, network coverage, revenues and other factors deemed relevant to evaluating the effectiveness of competition.

Makhakhe (2011) further explains that ICASA's view for call termination is ineffectively competitive, although there are mechanisms through which larger service providers may exert some countervailing buying power (CBP) on smaller service providers. The use of CBP has the potential to limit the extent to which smaller service providers are able to price wholesale call termination at excessive levels.

ICASA has identified the following general market failures in the provision of call termination services:

- A lack of sufficient access to networks;
- A lack of transparency;
- Discrimination concerns;
- Inefficient pricing.

ICASA has come up with following proposed remedies applicable to each identified market failure above:

Access, non-discrimination and transparency: ICASA proposes that there be a two-tier regulatory approach to addressing these matters, based on the above categorisation of licensees, where SMP licensees are required to comply with the recently released Interconnection regulations. Established SMP licensees are required to comply with a more intrusive regulatory obligation through the provision of a reference interconnection offer to fast-track interconnection requests with a

Reference Interconnection Offer (RIO) in place. ICASA believes that interconnection requests could be completed within 15 days (Makhakhe, 2011).

All licensees are required to provide relevant market data on a bi-annual basis so that ICASA is enabled to monitor trends in the market (Makhakhe, 2011).

Inefficient pricing: The characteristic of the call termination market means that there is very little incentive to compete on termination rates and larger networks are in a position to be price-setters. ICASA therefore proposes that cost-orientation be introduced in the provision of call termination services (Makhakhe, 2011).

Established SMP licensees: For those licensees with an established presence in the market, ICASA proposes the imposition of a single set termination rate, removing the distinction between peak and off-peak termination rates. ICASA did consider a blended rate but believes that a single set rate is more beneficial in terms of tariff transparency as well as a lighter regulatory burden. ICASA also believes that a glide-path from the current rates to a cost-oriented rate is necessary to secure and support continuous investment in the ICT sector in South Africa. ICASA therefore proposes a 3-year glide-path for both mobile and fixed service licensees. Mobile termination rates are proposed to be reduced to R0.65 from July 2010 and further reduced to R0.40 by July 2012 (Makhakhe, 2011).

Mobile Call termination rates		*Fixed call termination rates*
From July 2010	*R0.65*	*R0.15*
From July 2011	*R0.50*	*R0.12*
From July 2012	*R0.40*	*R0.10*

Source: ICASA 2011

All other licensees: All other licensees will be required to comply with a cost-oriented obligation by determining termination rates that are “fair and reasonable”. ICASA expects that these licensees will charge symmetrical rates with the established SMP licensees. This means that if a licensee provides termination to a fixed location, it will be expected to offer termination rates as set for Telkom. If a

licensee provides termination to a mobile location, it will be expected to offer termination rates as set for MTN, Vodacom and Cell C (Makhakhe, 2011).

ICASA two weeks turnaround SLAs with Operators

Based on the Cellular operators' license conditions, ICASA also introduced another regulation whereby if any cell phone user was having network related problems and they lodged the complaints with ICASA, ICASA will force operators to provide a resolution to the problem lodged in the complaint. Detailed procedural steps for lodging official complaints are provided by ICASA as highlighted below (Mabulu, 2011)

As per Mabulu (2011), a complaint needs to be filled in with coordinator at ICASA detailing the name, physical address and postal address of the complainant followed by the service provider's details, nature of details of his/ her complaint including when and where a stipulated time frame of response from the operators has been exceeded.

Where a complainant has logged a dispute or complaint or a motion with a regulatory body or in court and where the subject matter of the complaint is the same as the subject matter of complaint logged with CCC (Complaints and Compliance Committee) this will be dropped by ICASA (Mabulu, 2011).

A party to dispute, arising under an interconnection agreement that has been filed with the Authority, may notify the Coordinator of the CCC in terms of section 40 of the ECA in writing for the resolution of the dispute (Mabulu, 2011).

Proposition 6: ICASA will help customers in getting repeated cell phone service related problems resolved that go unnoticed by the service providers.

2.2.3 MVNOs business model (discount base model)

2.2.3.1 Least cost routing (LCR)

According to Snyman (2007):

> LCR is simply the process of identification and implementation of the most cost-effective way to reduce telephone (voice) call charges. These calls, including all types of traffic, are routed along the path of least cost. Obviously, LCR is only possible when there is access to more than one route at any point of given time.

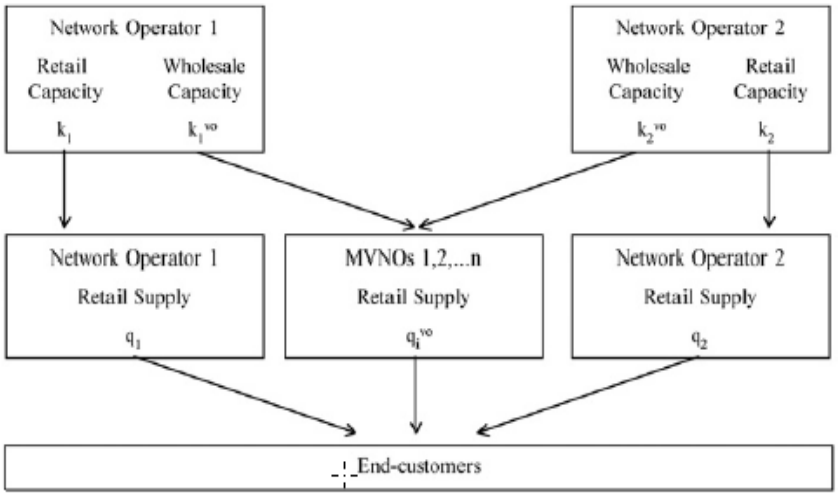
Snyman (2007) further explains that the advent of GSM in 1994 and liberalisation of the South African telecom market since February 2005 with VANs and ISPs able to offer voice services now provides an alternative to Telkom's fixed-line network. Neotel's entry into the South African market would provide additional routes for traffic rerouting giving MVNOs more choice for discount bargains from backhaul providing companies. These events are likely to result in a significant increase in telecoms routing alternatives and represent significant growth opportunities for telecom service providers and managed services players. Although price in the past has been the number one factor to determine the best route; 1) quality of network or route and 2) level of customer service, are gaining in popularity in determining which routes are the best (Mijares, 2001; Snyman, 2007).

2.2.3.2 Cellular least-cost-routing (CLCR)

As a derivative of LCR, it is the routing of calls from fixed-line to cellular via like networks, ensuring that the voice calls are made "on-the-network" or commonly referred to as on-net, being much cheaper than "off-the-net" or commonly referred to as off-net. In general, an off-net call is a voice call originating from one telecom network (for instance Telkom's fixed-line) that "breaks-out" onto another network (for instance Cell C's GSM network). Given the "break-out" for off-net calls, it is no surprise that such calls are more expensive than on-net calls, given the interconnection rate (or what we term interconnect) that is payable for termination of calls by the originating network to the terminating network (Snyman, 2007).

Mobile Virtual Network Operators (MVNOs) offer mobile telecoms services to customers by purchasing capacity or wholesale minutes from a Mobile Network Operator (MNO) and selling it under their own brand to end-customers. In this way, MVNOs avoid the need to own and operate their own end-to-end mobile radio access networks (Kalmus and Wiethaus, 2010).

Kalmus and Wiethaus (2010) further citing from EC(2007) reports, explain that MVNOs are interesting both from a regulatory and a competition policy perspective as the European Commission has considered the MVNO entry as a remedy for unsatisfactory market performance, yet, in light of numerous commercial agreements between MVNOs and MNOs, the European Commission (2007) removed the market for wholesale access to mobile networks from the list of markets to be looked into by national regulatory authorities. They also mention that an increased number of operators at the retail level increases competitive intensity and reduces prices for end-customers. MNOs might refuse to offer wholesale capacity to MVNOs for this reason. Yet, the threat that a rival might offer capacity could create a dilemma for hosting MVNOs and induce competition in the retail market.



Mobile communication industry structure with network operators and MVNOs.

Figure 5: MVNOs connectivity with MNOs

2.2.3.3 Size of the CLCR market and key players

A good starting point is the structure of the CLCR market. At the top of the pyramid, are the three MNOs – Cell C, MTN and Vodacom. EBITDA margins are typically around 35% with the exception of Cell C, a late starter in the game and currently with an EBITDA margin of 7.0% (FY06).Down from the MSP level, we have another two levels in the value chain, being super dealers and then sub-dealers. Typical

operating margins at the three levels of Cellular industry operations and industry structure are shown below in Figure 6and Table 4respectively (Snyman, 2007).

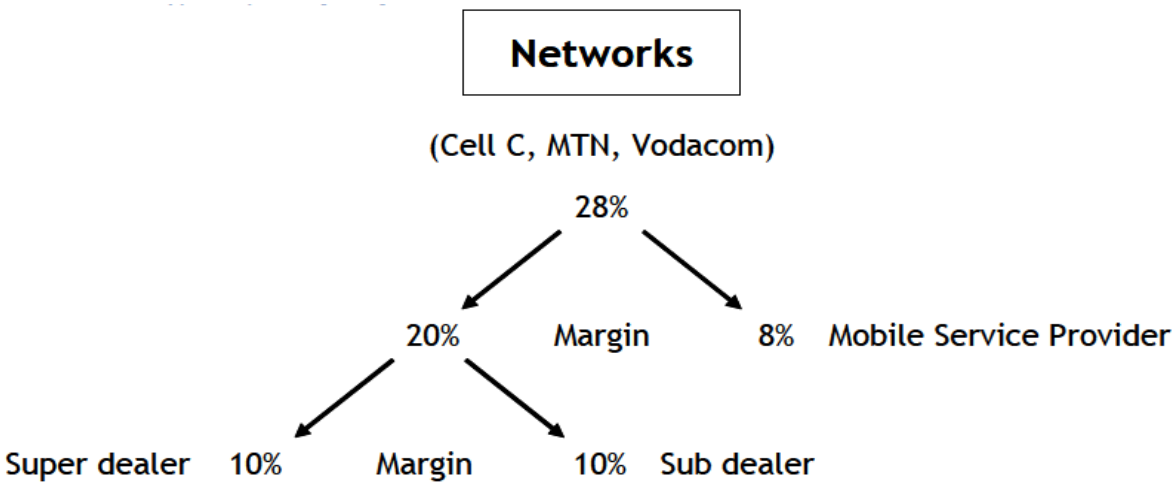


Figure 6: MNOs and MVNOs profit margins

Table 4: MVNOs Model

Structure of the CLCR industry

Level	Number of players	EBITDA margin
Mobile network operator (MNO)	3	35%
Service Providers (SP)	10	10%
Super Dealers	Tens	10%
Dealers	Hundreds	8%

Source: JPMorgan research.

There are 10 mobile service providers (MSPs) in South Africa. Of the 10 MSPs, only two are truly independent, having service provider agreements (SPAs) with all three MNOs – Autopage Cellular and Nashua Mobile (Snyman, 2007).

Proposition 6: The entry of MVNOs in to the South African telecommunications sector has induced competition in the retail market.

Proposition 7: MVNOs will be able to afford further tariff discounts for their subscribers as the MVNOs' revenue generation margins reduce because of Telco regulation changes.

2.2.4 South African telecommunications industry

2.2.4.1 The Microeconomic business environment

The Micro economic telecommunications business environment in South Africa is more industry generic, as some of the new market entrants are trying to gain market shares, while other players are trying to defend theirs. The leading fixed line player Telkom controls the majority of fixed line market shares. Neotel (SNO) has been trying to gain market share from Telkom in the fixed line environment. However, it has failed so far and has been making huge revenue losses. On the other hand, in Mobile space, Vodacom and MTN control the majority market share and they defend it from Cell C and Telkom mobile.

As the diamond framework below reveals, *almost everything matters* for competitiveness. The schools matter, the roads matter, the financial markets matter, customer sophistication matters among many other aspects of a nation's circumstances, many of which are deeply rooted in a nation's institutions, people, and culture. This makes improving competitiveness a special challenge, because there is no single policy or grand step that can create competitiveness, only many improvements in individual areas that inevitably take time to accomplish (Porter, Schwab, Martin and Lopez-Claros, 2004). Improving competitiveness is a marathon, not a sprint. How to sustain momentum in competitiveness improvements over time is among the greatest challenges facing countries (Porter, 2004).

There are distinct influences on competitiveness at *multiple geographic levels*; national, state, and local. In many countries, we observe striking differences in economic performance among sub national regions. In countries such as China, India, and the United States, the benefits of decentralisation of economic policy and strong initiative in individual regions are evident. The crucial need for economic strategies for sub-national units such as states or regions is among the most important new directions in competitiveness thinking and practice (Porter, 2004).

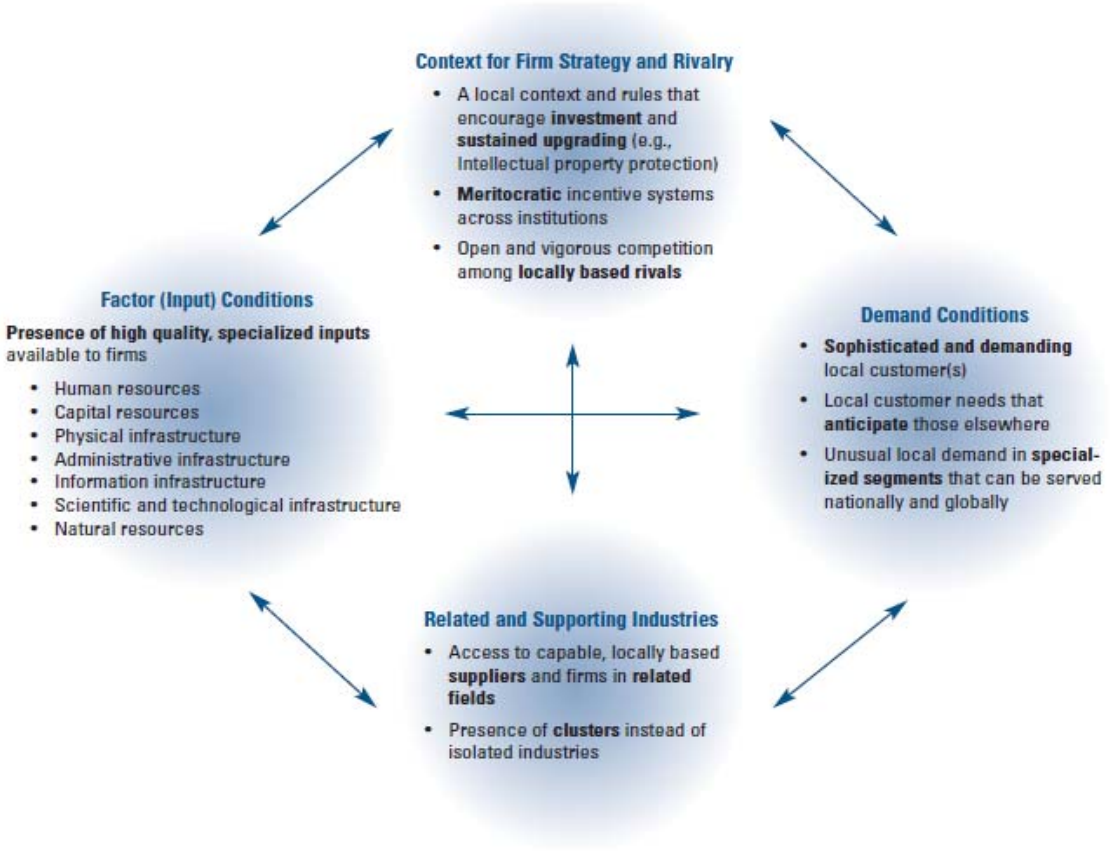


Figure 7: Porter's micro economic diamond model

a. **Context for firm strategy and rivalry**

The core strategy of the businesses remains defend-and-grow in both the fixed line and the mobile market. After Telkom lost its monopoly when ICASA issued a license for a second national operator to Indian company TATA, competition in the telecoms market has increased. Neotel, TATA's telecoms vehicle, is speeding up the network infrastructure rollout and targeting major corporate companies in order to gain market share.

In the mobile sector, new licenses have also been issued. However, both new players are trying to grow while the existing players are defending their market share. Higher interconnection fees and high initial infrastructure rollout costs work against them as barriers to entry.

b. Factor Conditions

All market players poach staff from each other especially new market entrants as they offer much higher wages and benefits to the employees. However, the existing operators seem to have been more pro-active in developing and constantly training in-house staff, awarding bursaries and taking on apprentices.

Due to the South African technological environment and the higher input costs, all telecommunications companies rely on overseas suppliers for their technology which results in the need to import their major technological equipment.

c. Related and supporting industries

Due to market share and size, all market players have significant impacts on their local suppliers. The supplier relationships are driven by tenders, by preferred, approved suppliers and by price.

The telecommunications industry often requires specialised equipment and this often leads to SME industries being totally reliant on big market players for their survival, resulting in them forming joint ventures with global suppliers to supply the local market.

d. Demand Conditions

A more demanding local market is forcing all market players to develop their own fibre network and state of the art network equipment in order for them to be able to provide good quality of service with high network availability.

However, the global trend is towards mobile networks. This is severely affecting the fixed line operators' revenue and their ability to sustain themselves in the long run, due to the loss of customers to the mobile network suppliers. This adds to the fact that the mobile network rollouts can be achieved at much faster rates than fixed line networks. Also, in the local market, the theft of fixed line copper cable has been a major challenge to the

industry. Telkom thus needs, and is currently launching, its mobile network to allow it to remain a sustainable business.

Mobile telephony is considered to be particularly important for development, especially in countries lacking a fixed-line infrastructure. There is some evidence that mobile phones raise long-term growth rates, that their impact is twice as big in developing nations as in developed ones, and that an extra ten phones per 100 people in a typical developing country increases GDP growth by 0.6% points (Waverman, Meschi and Fuss, 2005).

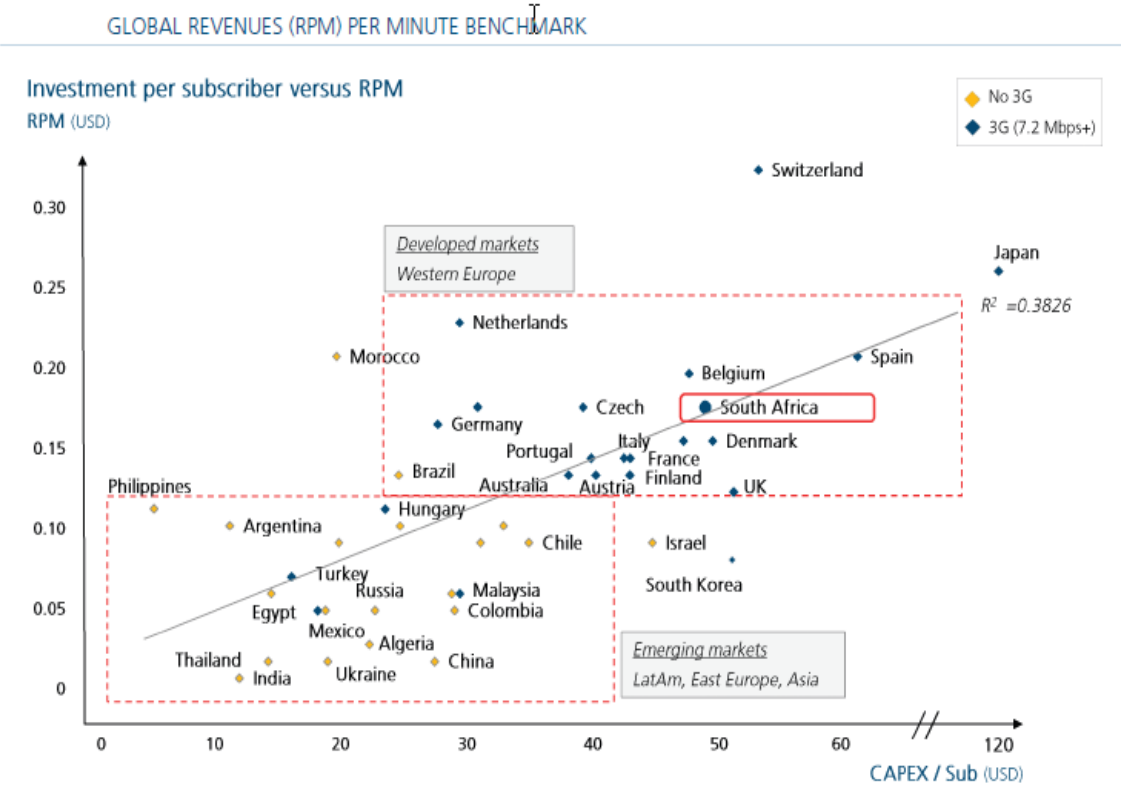
James and Versteeg (2007) citing Gillwald (2005) explain that in sub-Saharan Africa, more than 90% of the mobile subscribers have a pre-paid subscription. In fact, it has been argued that the real breakthrough of mobile telephony in Africa has been the introduction of pre-paid services that do not require monthly payments, but make payment dependent on usage. Pre-paid subscriptions are appealing to people with lower or irregular incomes, since their use does not require a bank account, a physical address, a postal address or a minimum fixed monthly subscription fee. However, South African government has introduced another regulation Regulation of Interception of Communication Act (RICA) in 2010 where by all existing subscribers as well as new subscriber will require a permanent physical address verification in order to use mobile services from operators (Kruger, 2009).

2.2.4.2 Cost of mobile communications in South Africa

Consumers have been taught by operators that handsets are effectively ‘free’ whilst they also offer attractive post-paid promotions (including fridges, freezers and microwaves) to entice new customers. Whether these customers deliver positive value to the operator over their respective contract periods, is highly questionable (Snead et al, 2010).

Cost to serve – including urbanisation and fuel costs. When viewed in a global context, South Africa is not a particularly dense country; it has a medium degree of urbanisation and has high energy prices (with unreliable sources that call for costly back-up alternatives) which contribute to the cost per minute (Snead et al, 2010).

Cost of entry– such as the price of a handset and SIM card. South Africa, in relative terms, offers very low-cost SIM starter packs (costing the customer very little, if anything) and highly subsidised handsets, even for pre-paid, which is a rare practice worldwide (Snead et al, 2010).



Source: Merrill Lynch Wireless Matrix Q3 09; Delta Partners analysis

Figure 8: Mobile communications costs

Proposition 8: The cost of ownership for mobile communications in South Africa is as affordable as it is in other developing countries.

2.2.4.3 Mobile broadband and ICT services

Whilst the voice market growth was lower than previous years, the broadband market (as predicted) grew considerably, albeit from a low starting point, reinforcing expectations of considerable latent demand. The demand for valued-added information and communication technology services is increasing as many corporate, small and medium enterprises (SMEs) require more sophisticated

services and look for ways to outsource non-core business functions. The telecom value chain is converging and telecom operators need to expand their focus and better serve the Corporate and SME market in order to take advantage of the opportunity (Snead et al, 2010).

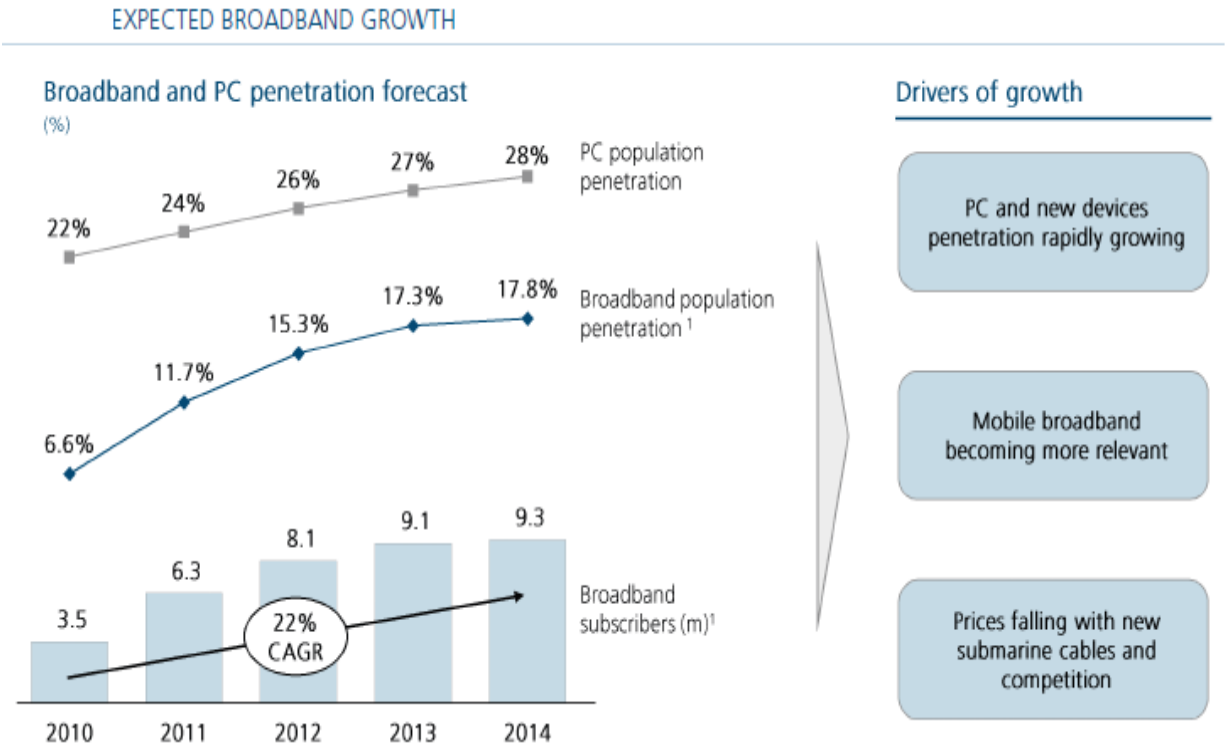


Figure 9: Broadband growth device forecast

Currently, the telecommunications industry is in the midst of a disruptive technological development phase as various network operators race to upgrade their network infrastructures in order to be capable of handling broadband and data requirements. Next generation networks (NGN) allow the increase of data transmission speeds in the local fixed network from the current 16 Mbit/s to at least 100 Mbit/s (Nitsche and Wiethaus, 2010).

This enables new applications such as IP based and high definition TV as well as interactive gaming. While the technology exists today, it is uncertain when and to what extent it will be deployed by operators. European telecommunications incumbents cite a tight regulatory regime, in which the investor bears the risk alone

but has to share potential benefits, as a major barrier to investment (Nitsche and Wiethaus, 2010).

2.2.4.4 Micro economic impact of regulation changes

Interconnection fees and mobile communications price reductions might be beneficial for mobile consumers and telecommunications infrastructure developments. However, they can also have adverse impacts as telecommunications players would still want to generate healthy revenues and not suffer potential revenue losses because of reduced charges and more players in the South African market (Davies and van Seventer, 2006).

As per Davies et al (2006), “these price reductions due to policy reforms can have, broadly speaking, three channels through which reducing over-pricing will have economy-wide impacts”:

Supply side effects: Reducing prices will reduce costs to users. Mobile operators are producers so there will be further knock-on effects on the economy. It is likely that this will have a positive effect on GDP and employment.

Demand side effects: Reducing costs to consumers raises their real incomes, increasing demand not only for the services directly but also for other goods. Expanding employment will also have a demand promoting effect.

Other less obvious effects: Over-pricing creates an income for some agents in the economy. Removing it can therefore affect the distribution of income. The precise manner in which it does so will depend on the nature of the over-pricing. For example, reducing a monopoly price can reduce the income of agents that benefit from the monopoly. This can have compositional effects on demand. Demand will fall for those goods that are high in the monopolist’s consumption bundle and rise for those high in the consumption of groups who benefit from removing monopoly. The beneficiaries could be other consumers, government or foreigners.

Proposition 9: High data growth is high transmission network bandwidth, speeds and smart data device availability dependent.

2.2.5 Conclusion of Literature Review

The literature review has suggested that the following impacts would be due to the recent changes in telecommunications industry in South Africa:

- Regulation changes would have an adverse impact on MVNOs' revenue generation to the point that they could go out of business in the very near future. MNVOs would need to own their current subscribers in order to sustain their businesses.
- It also becomes clear that major cellular operators would lose a healthy revenue stream and would face stiffer competition from new market entrants if new market entrants deploy a high quality of customer service and lower price differentiation strategies.
- Reduced interconnection fees do not necessarily mean that benefits would be passed to mobile consumers, rather, MNOs might increase other charges in order to compensate for lost revenue.
- Interconnection fees in the South African telecommunications industry have been used as a barrier to entry for new market entrants as they had to spend substantial amounts of money for interconnection fees and for their network infrastructure rollouts.
- Reforms in the South African telecommunications industry have been slow and inefficient.
- Various telecommunications authorities around the world have been working proactively in order to address the problems of interconnection fees for next generation networks and they already have a preferred choice for BAK (bill and keep) charging.
- The South African market has a huge potential for data traffic growth. However, the current network infrastructure needs to be upgraded for networks to be able to support high speed data transfer. Availability of electronic gadgets like smart phones, tablet PCs, IP TV and high speed

transmission networks with sufficient bandwidth will play a significant role in data growth.

- The cost of mobile phone ownership in South Africa is very comparable to the rest of the world despite certain limitations like the cost of energy and the cost to serve. Mobile operators subsidise the handsets in order to make the product affordable to the South African masses by means of specialized packages that suit different LSMs.
- MVNOs operate for different segments of the market and they do not compete directly with big three network providers.

Chapter3: Research methodology

3.1 INTRODUCTION

This section describes the research methodology to be used to investigate the propositions listed in Chapter 2. The research design, research population, sampling, data collection and data analysis are discussed.

The research is to be conducted in order to address the propositions that are exploratory and descriptive in nature since its purpose is to explore and evaluate the impact of current regulatory changes on cell phone consumers in the area of mobile telecommunications in South Africa. Leady and Ormrod (2001) further explain that this type of research problem lends itself well to qualitative research.

Research that intends to understand the logic of individuals and their understanding of the subject matter requires a research paradigm that is qualitative in nature (Shaw, 1999). A content analysis, together with elements of phenomenological study is proposed, as the research is focused on determining an individual's perspective on the research problem and, as indicated by Leedy and Ormrod (2009), phenomenology attempts to understand an individual's perception of a problem or situation and a content analysis to identify patterns, themes or biases.

The following statements are further reasons why a qualitative research paradigm is suitable for the research being undertaken:

- In contrast to the natural world, the human subjects of the social world possess the ability to think for themselves, comprehend their own behaviour and have an opinion of the social world of which they are part (Shaw, 1999).

- Hyde (2000), in his article on analysing deductive processes in qualitative research, reasons that a researcher expands and generalises theories in qualitative research instead of establishing the frequency of the event.

- The reality of each participant is individualistic in nature, and differs from others and thus suits a qualitative research paradigm (Hill and McGowan, 1999).

- A qualitative study attempts to unveil multiple viewpoints on the topic rather than a particular truth (Leedy and Ormrod, 2005).

The research thus utilises a semi-structured interview framework. Powell (1999) describes the approach of following the closed form of questions commonly associated with structured interviews, with probing questions that are designed to extract additional clarifying information.

3.2 RESEARCH DESIGN

According to Coldwell and Herbst (2004):

> The research design represents the strategy to be followed in the study and includes the plan by which the strategy is to be executed. The research design is also termed as the structure of the research and forms the holistic perspective of the study and demonstrates how the different parts of the samples, measurements and methods work together to address the research questions and objectives. The design is also responsible for specifying the procedures for collection, measurement and the analysis of the data.

Coldwell and Herbst (2004) also suggest that the design must be experimental in nature which assists in the acceptance and validity of the findings. This aspect is

linked to the feasibility of the design in which a good design must be able to be implemented. The anticipation of potential problems of measurement and database construction must also be carefully thought out so as to proceed effectively with the investigation. The design must also consider potential access to information and the sensitivity around publicising this data. The necessary approval or stakeholders of the data need to be notified about the study. By proactively gaining access to the necessary data sources and resources, time can be saved during the period of study.

Confidentiality and ethical issues also need to be addressed as soon as possible during the design phase. This will also provide the comfort to the researcher that the study will not have to stop midway through to retrieve the necessary information (Coldwell and Herbst, 2004).

3.3 RESEARCH POPULATION

The population was drawn from cell phone users with a working background in the telecommunications sector, across all the network providers and based on the cell phone usages to make sure that every segment of the consumer was represented (i.e. high spenders of R1500 per month and above, medium range spenders around R500 per month and pre-paid cell phone users). Also, new technology adaptors (i.e. I-phone users, BB users and tablet pc users) have been interviewed as this gave an insight into the product range that mobile operators are making available to the consumers. Business entrepreneurs have also formed part of the study as these individuals are generally frequent overseas travellers and have better idea about product prices in foreign markets as well as in the South African market. Also, some of the individuals may have taken a contract out with more than one network service provider. The researcher also tried to interview some of the ICASA telecommunications regulatory individuals in order to understand their perspective of the regulation changes and to explore if their perspective was any different to that of the general cell phone users. However, the researcher was unable to get any interviews from ICASA individuals who had appropriate knowledge of regulation changes and their intended outcomes that ICASA had in mind.

3.4 SAMPLE SIZE AND SELECTION

Twenty in-depth interviews were conducted with various cell phone users from the various South African cell phone companies in order to obtain data for the research. This included four different individuals who are using cell phone services from different service providers. A mix of individuals with technical and commercial backgrounds was included in the interviews. This researcher's MBA colleagues were interviewed as some of them have subscribed to services from different network providers. This researcher included customers from all network providers. However, it was bit difficult to get enough representation of subscribers from relatively new and smaller networks like Telkom mobile as not many people are subscribed to their service because of lack of continuous network coverage. The researcher looked for cell phone consumers who have been loyal to their prime network providers or have been with their network providers at least for the past two to three years. Besides choosing the respondents who were using the service from one network provider, the researcher also chose to use a majority of the respondents who were using services from more than one network provider. Respondents who were using services from more than one network had a much better understanding of the network problems and also the impact on cell phone bills due to calls made to different networks as interconnection fees became applicable.

Respondents from Networks	Numbers
Vodacom	4
MTN	4
Cell C	3
8.ta	2
Subs using more than one network	7
Total	20

A sample of twenty in-depth interviews may seem to be a very small number considering the fact that there are around 48 million cell phone users in South Africa (Vodacom, 2010). However, this researcher is of the opinion that most cell phone users will not have sufficient understanding of recent regulation changes and the potential impact of these changes on cell phone users as well as an understanding of the South African economy. This researcher targeted individuals with higher

qualification levels, who are economically active and who have working backgrounds in the telecommunications sector. There are a limited number of individuals in South Africa who have an insight and understanding of regulation changes and their economic impact, thus a small sample size is justifiable and appropriate for the intended research.

3.5 SAMPLING METHODOLOGY

Leedy and Ormrod (2001) suggest that qualitative researchers should select a few people who can provide the most comprehensive insight into the problem being investigated as opposed to selecting a large sample in order to make a generalisation.

Sampling is a very complex issue in qualitative research as there are many variations of qualitative sampling and much confusion and overlapping of types of sampling, particularly in the case of purposeful and theoretical sampling. The terms purposeful and theoretical are viewed synonymously and used interchangeably in the literature. Many of the most frequent misinterpretations relate to the disparate meanings and usage of the terminology (Coyne, 1997).

The researcher obtained the MBA class list for past the few years and has established a network with a few senior management members of various companies in South Africa. The researcher also contacted some of his ex-colleagues working with different operators in various positions in the telecoms sector in South Africa. These commercial/technical respondents are economically active and are classified as high cell phone bill spenders for voice as well as data usage. This researcher found that these individuals were able to provide insight on the research topic. These high cell phone bill spenders were interviewed first with the aim of establishing contact with other high cell phone spenders and early technology adaptors via the initial interviewees. This researcher also has access to some pre-paid cell phone users via friends and family members who were interviewed to gain insight across different product ranges. Hence, snowball sampling has been used to a certain extent. The remaining respondents were contacted privately via company web pages, email or by telephone.

3.6 DATA COLLECTION

Because of the need to probe and ask follow up questions in-depth face-to-face and telephonic interviews were selected as the means to complete the research. The interviews allowed the respondents to share required information for the business model and possible broad future business strategy perspectives. Prompts and guiding questions have been used to address the propositions adequately.

The interviews were exploratory, unstructured in nature and revolved around a few leading questions. In order to foster an environment conducive to an open discussion of current issues regarding telecommunications regulations changes, participants were offered confidentiality regarding the attribution of their comments. Further conversations were electronically recorded on voice recorders. Also, the interviewees were assured that the records of their interviews would be destroyed once this researcher has analysed the contents and submitted the research report.

A covering letter with the questions to be asked was sent out to each respondent prior to the interview in order for him or her to prepare adequately for the interview. This also maximised their sharing of knowledge and information.

This method is in line with research previously undertaken by Eeden (2009) who is clearly of the opinion that interconnection fees would have a major impact on MVNs' business model even though they may not have a major impact on licensed cellular operators as their income and expenditure from interconnection fees contributes to the company bottom line in similar proportions.

Semi-structured open-ended questions were used to provide a framework for the interviewees' responses. These questions are more likely to encourage and facilitate an in-depth discussion of the critical success factors.

The main interview themes were:

- Recent regulations change in terms of interconnection fees;
- Limited deployments of ICT networks due to delays in Frequency spectrum allocations in South Africa;

- Introduction of SLA by ICASA with network operators as per licensing conditions;
- Revenue loss for cellular operators and the impact on subsidies provided by operators;
- Competition in retail cellular market due to MVNO's entry;
- Slow and ineffective Telco reforms in South Africa;
- Cell phone affordability for the South African population;
- Transmission network infrastructure in South Africa;
- Smart data device and data growth.

All interviews were conducted at the respondents' desired location or via a telecom. This was mainly due to the detailed information sought, as well as the convenience of the respondents.

The in-depth interview data was recorded on an audio recording device (with the respondents' permission) and later transcribed. The transcription involved downloading the interviews and analysing the information via the available software.

The discussion guide, following the protocol format suggested by Creswell (2009), was used for conducting each interview. The components of the protocol are as follows:

a. A heading.
b. Instruction to the interviewer.
c. The key research questions.
d. Probes to follow the key questions.
e. Transitions messages for the interviewer.

3.7 RELIABILITY AND VALIDITY

3.7.1 Reliability

Reliability is defined as the extent to which similar research conducted in the future will result in similar outcomes (Leedy and Ormrod, 2009). In order to ensure uniformity, the researcher conducted all interviews personally and followed the semi-structured approach to provide a proper framework.

Furthermore, reliability was ensured at all times during the research process by the researcher who ensured that no data was incorrectly captured. All interviews were recorded and subsequently transcribed and any further information required was acquired by a follow-up interview or by obtaining clarity from the interviewee.

Healy and Peary (2000) highlight the importance of data validity and reliability and aim to;

> Address a gap in the literature about quality criteria for validity and reliability in qualitative research within the realism scientific paradigm. Six comprehensive and explicit criteria for judging realism research are developed, drawing on the three elements of a scientific paradigm of ontology, epistemology and methodology. The first two criteria concern ontology, that is, ontological appropriateness and contingent validity. The third criterion concerns epistemology: multiple perceptions of participants and of peer researchers. The final three criteria concern methodology: methodological trustworthiness, analytic generalisation and construct validity.

3.7.2 Internal Validity

According to Leedy and Ormrod (2001);

> Internal validity refers to the extent to which the researcher is able to draw 'accurate conclusions' from the study. They further highlight the fact that, in qualitative research, the researcher's biases and values will always influence the interpretation of the data. Subjectivity is to be minimised by linking the questions asked directly to the propositions of the research.

3.7.3 External Validity

External validity is related to generalising, i.e., the degree to which the conclusions in the research would hold true for other persons and organisations in other places and at other times (Leedy and Ormrod, 2001). The sample would be small and convenient. It can therefore not be possible to simply generalise the interviewee's responses for all persons in the population. The researcher is of the opinion that, despite this, limited generalisations should be able to be made. The interview would therefore be reliable but might have relatively good external validity (Powel, 1999).

3.8 DATA ANALYSIS

Interview transcripts were voice recorded on disks by the researcher. Transcripts of the un-coded interviews were given to the respondents for them to review and only once confirmation was received that no changes were required, are these transcripts' contents analysed.

All transcribed interviews were broken into coded segments representing complete thought statements. After coding, all of the interview segments were transferred from word processing format into a spreadsheet for further analysis.

The transcribed interviews were coded according to themes that coincided with the major areas of the research propositions. A theme may occur several times within an interview, but, for purposes of analysis, the theme was only counted once per interview transcript.

Once all the “codes” were grouped together, these supported and confirmed existing theory (literature review) or added to existing theory on the subject of evaluating the impact on cell phone consumers due to regulation changes in the mobile telecommunications industry in South Africa.

Besides the themes directly linked to the questions, the researcher found additional factors (that are not covered by the literature review) arising from the interviews. These were then grouped together into appropriate categories and discussed in the concluding sections.

Chapter 4: Research Findings

The purpose of this chapter is to evaluate the outcome of the in-depth semi-structured interviews conducted with 20 respondents from the different network providers. Throughout the discussions, information gained from the interviewees is included in this document to emphasise the interview findings as well as to provide additional insight.

4.1 COMPOSITION OF RESPONDENTS

Based on the research topic, it was decided that all interviewees were to have some form of cell phone technology operational understanding in addition to a higher educational background. The interviewees were identified from all four South African main cell phone network service providers. That included business owners who used the cellular services for both voice and data for business and for personal use. Most of these respondents were high spenders mainly because of the data usage on their cell phones. Some of the interviewees only used cell phone services for personal use and others used the services for both personal and business purposes. Some of the respondents used cell phone services for voice purposes only and were therefore classified as low spenders. Respondents who were employed by cell phone service providers were requested to be as impartial as possible during the interview in order to understand the subject from the customer's perspective. The majority of the respondents who were chosen for the study were using services from more than one network provider therefore they had a broader knowledge of the network problems across the board as well as the impact of interconnection fees on cell phone bills due to the fact that they were high end users of telecommunications services.

Due to confidentiality requests from some of the interview respondents, the contact numbers of all the individuals interviewed were removed. However, if they are required for any reason, the researcher can contact them to obtain permission to reveal their contact details.

4.2 THE INTERVIEW PROCESS

After the researcher made contact with potential interviewees, an explanation of the research topic as well as details of the regulatory body that regulates the telecommunication sector in South African market was provided to the potential interview candidates. The list of candidates was shortened to twenty candidates who agreed to be interviewed and had sufficient knowledge of the research subject. All the interviewees were sent questionnaires with the appropriate background and context explanation of the interview questions in order to make them feel comfortable with the interview and also to give them sufficient time to prepare for the interview.

At the start of the interviews, the main regulations that were changed recently in the South African telecommunication sector by ICASA were spelt out and the purpose of the interview to establish the impact of these changes on cell phone users in South Africa was explained. These regulations included the fifteen day service level agreement which came into effect in late 2010, the staggered reductions in interconnection fees, the regulation changes around transmission network deployments by various parties and the opening up of the frequency spectrum for new market players. Once interviews were formally started, the researcher asked leading questions to get further in-depth information from the respondents.

The researcher then questioned the interviewees to find out whether there were barriers that prevented the respondents from providing unbiased feedback to the questions asked during the interview. When these challenges were encountered, they were discussed with the respondents to determine whether they were actual hindrances to the sharing of information.

The results of the interviews, in terms of potential impact on cell phone users due to recent regulation changes, were captured and have been content analysed according to the nine propositions discussed below.

4.3 REGULATIONS CHANGES IN TERMS OF INTERCONNECT FEES

The researcher’s finding on this proposition was that all the interview respondents agreed that the interconnection fees were too high in the South African market. One

of the main questions linked to this proposition was whether the cell phone users had seen a difference in their monthly bills as a result of the staggered fee reduction approach by ICASA who forced the service providers to reduce the interconnection fees by 65 cents per minute. The answer to this question differed amongst the users because of the different contract types that respondents had with their network providers. Specifically, those users who took out individual contracts, as opposed to the users who had business contracts provided by their employers, tended to feel that interconnection fees were very high.

Some of the respondents mentioned that they cannot quantify whether their cell phone bills have reduced since the interconnection regulation changes came in to effect as most of the calls they made were to users on the same network. This was the case with users using cell phone services from the two big operators. Respondents from relatively new networks however, mentioned that they had seen little reduction on their cell phone bills as the majority of the cell phone calls they made were to either the Telkom fixed line network or to the other big network providers.

Some of the respondents said that if cell phone operators could afford to reduce from a base price of 220 cents per minute to 65 cents per minute, then interconnection fees had to be very high and profitable for operators otherwise the operators would not have agreed to drop to 65 cents if they were going to lose revenue. They felt that ICASA would not force any operator to reduce prices if it did not make business sense for operators as they are in business to make a profit.

Some of the interview respondents that had taken out individual contracts with cell phone operators were of the view that the amount on their cell phone bills are much lesser for calls that they make to cell phone users on other networks. However, as the number of calls made to other cell phone users on other networks was much lesser then that of the total cell phone usage it did not really reflect on their overall monthly cell phone bills. Respondents also pointed to that fact that they are using their phones for data usage more often in last couple of years to access social

networks websites as well as emails then before and it was very difficult to draw a direct correlation in bills reductions due to interconnect fee regulation changes.

4.4 SLOW AND INEFFECTIVE TELCO REFORMS IN SOUTH AFRICA

The abovementioned proposition held true in all the interviews conducted with the cellular users from all network providers as respondents mentioned that ICASA has not played a proactive role in regulating the market or driving the growth of technology in the South African market. Rather, it was the convenience of mobile technology that drove the growth of the industry. Employers provide critical staff with contracts from different network providers mainly to be able to contact their staff in case of a major network failure on one of the service providers. A few of the respondents also mentioned that ICASA generally lets the market dictate the terms for users rather than issuing guiding regulations to regulate the market and make the service more favourable to South African consumers.

A frequent business traveller to the subcontinent and China mentioned in the interview that the interconnection fee reduction saga was not ICASA's own initiative. ICASA learnt from different cellular markets in developing nations like India and China that interconnection fees were very low in those economies and decided to introduce the same concept in to the South African market after 15 year of cellular operations.

One of the interviewees mentioned that;

> ICASA was not capable of and lacked the technical skills to develop regulations. This, they believe, is due to the fact that most of the operating entities in the South African market are either parastatal like Eskom, Telkom and Transnet who are regarded as inefficient or have political influences over decision making. If ICASA attempted to bring about new regulations governing the telecommunications sector, various government bodies would have stopped the attempt during early discussion phases.

Past regulations that assured Telkom that it was to be the sole transmission network infrastructure provider proved only to paralyse the development of good quality

transmission network infrastructure in South Africa. Because Telkom had a monopoly in the field of transmission networks, it under invested in transmission network developments to its detriment. This caused respondents to believe that Telkom was playing a power game by providing transmission at its will rather than to better serve its customers. Telkom, they believed, could have developed a fibre transmission network that could take its place among the best in the world.

The interview respondents went as far as mentioning that South Africa has fallen behind by almost ten years on transmission network development due to specifically stipulated regulations that allowed only Telkom to provide the transmission network. It has set the South African economy back and resulted in poor connectivity to the rest of the world. South Africa is now forced to upgrade its connectivity links to the developed world and to developing countries such as India.

This is shown by the fact that South Africa is renting interconnection links from companies like Seacom in order to keep up with the developments in the telecommunications industry. The deregulation of policies that entrenched the monopoly of Telkom as a service provider are helping South African mobile operators to develop their own high standard transmission networks and also helping cell phone service consumers to get better service when doing data downloads and uploads.

4.5 CELL PHONE AFFORDABILITY FOR SOUTH AFRICAN PUBLIC

Besides one respondent, all interviewees denied the proposition that thetelecommunication reforms in the South African cellular industry made mobile communication affordable and accessible to the masses of the country in the past. However, respondents were of the opinion that currently ICASA does seem to be focusing on making the cell phone services affordable for cell phone consumers. All twenty respondents were of the view that it was not only convenience that drove users to subscribe or own cell phones in the past. Some respondents mentioned that owning a cell phone has become a status symbol for individuals who could afford cell phones at the higher end of the spectrum. Since the early nineties, owning a cell phone has become prestigious. This, coupled with the network operators' desire to

capture a market share, has improved the mobile service accessibility for the masses in South Africa.

Interviewees mentioned that cellular operators have joined forces with handset manufacturers to develop cheap handsets which support very basic functions such as voice and text and have targeted market segments like school children and people living in the rural areas. Respondents were of the opinion that it was not the ICASA regulations that were responsible for driving the cell phone industry's growth in the South African market.

Also, all interview respondents were of the view that the telecommunications reforms in South Africa were slow to be implemented and not proactive. Respondents suggested that it was the mobile service operators who were driving the affordability of cell phone usage in order to gain market shares by means of introducing new and innovative products for different segments of South African market.

During some of the interviews, it was revealed that cell phone users are becoming more proactive in curbing their cell phone bills by means of using available smart applications such as voice over internet protocol, Mixit, Whatsapp, etc. as these applications use shared data connections as opposed to dedicated voice connections.

Interview respondents also mentioned that smart cell phone handset manufacturers like Blackberry have developed applications such as the BlackBerry Messenger and that users take out cheap monthly contracts that include the BlackBerry device to reduce their cell phone bills. This is done by taking out specific BlackBerry enterprise service (BES) or BlackBerry internet service (BIS) contracts for fixed monthly fees of less than R100.00 as they allow users to use unlimited internet and data services. Respondents were of the view that these services were only available for contract (post-paid subscribers) and that pre-paid subscribers are very heavily charged for data and voice calls.

Some of the respondents mentioned that reduced interconnection fees will only give cell phone users a false sense of reduced bills due to so-called cheaper calls but

they may actually make overall cell phone usage higher which, in turn, will cause higher bills.

The respondents were of the view that reduced interconnection fees will not have an impact on individual cell phone users because of the lower amount of calls that individual subscribers make. On the other hand, reduced interconnection fees will have bigger and noticeable impact on corporate customers mainly because the number of calls made to other networks would be much higher.

Some of the respondents mentioned that reducing interconnection fees would not really make a big difference in the actual affordability for South African cell phone consumers and that the only way to increase the affordability for normal subscribers was for all operators to reduce the actual cost of the air time.

Very few of the interview respondents were of the view that if calls made between the different operators are cheaper, cell phone services would ultimately be cheaper and more affordable for the South African masses.

4.6 LIMITED DEPLOYMENT OF CONVERGED NETWORKS DUE TO DELAYS IN FREQUENCY SPECTRUM ALLOCATIONS BY ICASA

Except for a few respondents on the Vodacom network, all the interviews conducted with respondents using cell phone services from different network providers agreed that this proposition that ICASA, being part of the government, has not managed to convince government bodies like the police, the military and other organisations that are occupying frequency bands illegally, to free up the frequency bands for commercial use for either new market players or existing network providers in order to improve the overall quality of the networks.

Respondents mentioned that ICASA, by not opening up frequency allocation, has definitely caused delays in developments in the telecommunications industry in South Africa. Not with standing this, the cell phone services available have far outnumbered the number of Telkom landlines in this country. This has been

achieved by the quick deployment of their network as wireless services can be implemented much faster than wire line network services.

The respondents on the Vodacom network mentioned that it is not necessarily the delay in spectrum allocation that has led to limited cellular network growth. Rather, it is a combination of delayed spectrum allocations as well as allocations made to government controlled companies. One respondent gave an example of spectrum allocated to Sentec which is not in use. In essence, respondents were of the opinion that spectrum allocation has resulted in limiting network growth and the economy as whole. Spectrum needs to be allocated with care and once licenses are allocated, ICASA must ensure that they are being used to build the network to benefit the South African economy and the consumers.

Respondents often mentioned that ICASA's delayed action permitting cellular operators to build their own transmission networks shows that cellular service providers are able to roll out an optic fibre network that is capable of achieving much higher data transmission speeds than that of copper transmission networks used by Telkom. This aggressive fibre transmission network rollout by cellular operators and Neotel has forced Telkom to upgrade its own transmission network in order to be able to compete with opponents and provide good quality service to consumers.

The respondents also said that Telkom has never in the past upgraded its network infrastructure in the way it is doing so currently with built in redundancy at each and every route in order to reduce service disruptions in case of one network failure. So, in essence, the fact that ICASA did not open up spectrum for new players has resulted in poor infrastructure developments in South Africa.

4.7 INTRODUCTION OF SERVICE LEVEL AGREEMENTS BY ICASA

To begin with, none of the interviewees from any of the cell phone service providers were aware of the regulation that ICASA had passed which required cell phone operators to solve customer problems within fifteen days. Respondents were surprised to hear about this regulation but felt that ICASA lacked leverage to force cell phone service providers to fix problems of individual subscribers in that time

frame. They agreed, however, that ICASA should be able to penalise operators for not meeting certain contractual license allocation obligations.

Except for the interviewees at 8.ta and, to certain extent, Cell C, all the other respondents using services from Vodacom and MTN rejected the proposition that ICASA is in a position to get customer complaints resolved by network providers. The respondents using services from Vodacom and MTN claimed that they have been having problems in various places in and around Johannesburg for years and that all their complaints have gone unnoticed by ICASA and the cell phone service providers.

They claimed that ICASA could potentially force their obligatory license allocation terms and conditions of providing coverage everywhere in South Africa on any or, at least, on Vodacom and MTN as both operators have been operating in the market for over 10 years. Most of the respondents felt that ICASA does not really have the capability to enforce its regulations and terms and conditions on service providers because of a lack of manpower or logistics.

Respondents mentioned that if they experience serious problems to the extent that they are simply unable to work or make and receive calls, they would rather call the operator's call centres for help to resolve the billing and coverage related queries then lodging official complaints with ICASA.

Further probing questions put forward by the researcher regarding operators who did not resolve their problems revealed that the respondents would rather go to South African consumer protection bodies or to various media channels to complain. A few of the respondents mentioned that independent complaint websites like "hellopeter" or Talk Radio 702 as well as social media were very effective ways to get urgent attention to their problems.

There was a difference of opinion between the respondents who used cell phones provided by their employers and individuals who owned businesses. Respondents who were provided with cell phones by their employers said that they were not concerned if they dropped a call as their employers paid the bills. Individual business

owners were of the opinion that because they now know of the regulations, they would use them if they had network problems that resulted in losses to their businesses.

Some of the respondents insisted that best way to get their problems resolved was to follow the processes given by the network operators by calling their national helpline call centres to give them a chance to fix the issues before going to ICASA.A few respondents felt that contacting ICASA would simply be just a waste of their time and effort.

4.8 COMPETITION IN THE RETAIL CELLULAR MARKET IN SOUTH AFRICA DUE TO MVNOs

In interviews conducted with all of the twenty respondents using cell phone services from all different network providers, all partially confirmed the proposition that MVNO's entry in to South African market has increased competition in the retail market. Respondents said that because the business model of MVNOs does not include huge capital investments to start their own networks as compared to network providers who invest billions of rands in creating the network, MVNOs require less capital to start engaging the main network providers. MVNOs use the power of bulk buying to purchase airtime and interconnections from the network operators at discounted prices. They pass part of the discount on to their subscribers so, in an indirect way, MVNOs have introduced competition into the South African retail market and the proof of this is the number of subscribers that they bill.

The respondents were of the view that MVNOs provide better deals for subscribers than the network providers causing competition among the MVNOs themselves who play a major role in the South African cell phone industry.

Respondents mentioned that MVNOs are providing actual air time at much cheaper rates per minute and making cellular communication more affordable for the South African public than Vodacom or MTN. MVNOs are driving the actual usage of the cell phone network to higher levels. However, they may not be providing good quality service mainly because they use various devices to compress the actual bandwidth

required. These compression devices might be introducing delays as well as jitters in speech quality.

Respondents were also of the view that there are good chances that subscribers of the MVNOs could face delays in getting their problems resolved mainly because MVNOs have to escalate problems to their service providers. Main service providers may use the excuse that the customer is not directly connected to them and that they do not know what kind of compression devices the MVNOs are using. Subscribers on the MVNOs' networks may therefore not get quality network service. MVNOs have reduced the customer management fee for major network providers and have passed these savings on to their clients.

4.9 REVENUE LOSS FOR CELLULAR OPERATORS AND MVNOs

Most of the respondents agreed with the proposition partially except respondents from one of the network that MVNOs will still be able to survive after the interconnection fee reductions among the operators.

Respondents were of the view that for big operator's revenue loss would be of higher degree to than that of the smaller operators as most of the calls are made to subscribers on their networks. Also respondents mentioned that it will be encouraging for new operators to invest capital in developing their network infrastructure then that of paying to big network provider for call charges.

All interview respondents were also of the view that MVNOs will have a real revenue generation problems due to interconnect fee reductions as majority of MVNO's revenue was generated from bulk discount buying of interconnect links from main transmission providers like Telkom in the past.

Respondents were of the view that once the full staggered interconnection fee reduction comes in to effect, the MVNOs' business model may not be sustainable as the fees that they could charge would be very low. Some respondents felt that the bigger MVNOs will still be viable mainly due to the large number of subscriptions that they have. MVNOs will find new avenues to increase their businesses and will continue to pass benefits on to their subscribers as they have done in the past. The

MVNOs bring benefits to the main operators by relieving them of managing customers. The respondents mentioned that MVNOs brought variety to the market in terms of new and different products. They also charged cell phone users based on the actual usage of the services but, because of the reduction in cell phone charges, their margins will reduce. This is based on the fact that MVNOs are not providing any kind of additional value added services like personalised ringtones and music.

Respondents also mentioned that there is good possibility that MVNOs might get some low cost software applications developed in countries like India and host adult entertainment short video services as well as on demand movies direct to cell phones. These kinds of services would require a much higher bandwidth and capacity on the main network providers' transmission networks. Respondents who worked for main network providers said that market trends are indicating that video on demand is growing exponentially and if MVNOs can bring a substantial number of subscribers using high data volumes to the main network providers, then the operators may consider further network upgrades on the currently under-dimensioned network to capture the MVNO's growing data market.

Respondents from all service providers also mentioned that the voice segment of the cell phone services is at the maturity stage in South Africa and growth is now minimal. On the other hand, data growth is on the rise as more and more smart applications that can convert voice calls to data calls without introducing distortion of the quality are being launched in the market for all makes of handsets. These applications are, in fact, resulting in reduced amount of voice calls and an increase in the data demands.

Respondents also said that they believe that "it's all a numbers game". If the MVNOs have good numbers of subscribers on their networks, they will find new ways of revenue generation like getting cheaper deals from insurance companies in combination with cell phone services, getting reduced subscriptions for their subscribers from DStv for few selected channels as opposed to people paying full premium subscription fees.

4.10 COST OF OWNERSHIP FOR MOBILE COMMUNICATIONS IN SOUTH AFRICA

In all interviews conducted with all twenty respondents representing all 4 major network providers, all of the respondents rejected outright the proposition with the view that South Africa does not have enough main cell phone network providers to drive the cost of cell phone ownership down. They also mentioned that the South African market lacked multiplayer market competition such as that in most of the Asian countries.

Respondents further stressed that the South African cell phone market is dominated by Vodacom and MTN as other operators have either very small subscriber bases or do not have enough network coverage throughout South Africa. For cell phone users, it does not really make sense to change service providers mainly because subscribers do not want to go through the process of cancelling contracts and signing new contracts. Even if subscribers do go through these cumbersome processes, they do not really have much of a choice and would probably get very similar deals to the ones they have on another network. Changing network providers will basically be a costly exercise for them. Some of the respondents who are frequent travellers to the Middle East and Asia mentioned that there is fierce competition with eight to nine main cell phone operators operating in every country. One of them is bound to have some exceptional deals or differentiated services with similar pricing ranges in order to gain higher market shares.

A few of the respondents went on to say that in South Africa, high power costs, labour costs, limited transmission bandwidth availability demands and the high incidences of thefts are some of the reasons which will push up operational cost for cell phone operators. Operators will therefore be left with no choice but to keep their product prices higher in order to recover all operational and capital costs.

Respondents further argued that overseas operators use low costs and higher efficiency in providing systems to compete and to reduce their operational costs. They use infrastructure sharing among the operators in order to reduce the capital investment costs. These are some of the reasons that overseas cell phone operators

make their margins and stay afloat in highly competitive markets and make cell phone communication more affordable for the public.

Respondents blame the South African regulatory body for not being able to induce enough competition in the market by means of opening up new licenses for new market players in time, by not allocating frequency bandwidth to responsible and independent private companies with credible backgrounds and for not allowing all cell phone operators to build and maintain their own transmission network infrastructures in South Africa. However, they were of the view that the regulator has begun to take steps towards fixing these issues but it would most certainly take a few more years to correct the situation.

4.11 TRANSMISSION NETWORK INFRASTRUCTURE IN SOUTH AFRICA AND SMART DATA DEVICES

In all interviews conducted with the twenty respondents using cell phone services from different network providers, the respondents confirmed this proposition that booming data growth is highly dependent on high transmission bandwidth with high speed links as well as smart data supporting devices. Respondents mentioned that many smart data devices are available in the local market. South Africa needs to invest heavily in upgrading the transmission networks and once this has been accomplished, data supporting smart devices would come into the picture.

One of the respondents who went on a business trip recently to China said that;

> In South Africa we are going the wrong way around to address the problems. The right way to start would be to make significant improvements to the transmission network by putting more fibre cable to almost every business place including airports (international & domestic), shopping malls, cafes and households etc. Cell phone providers cannot and will not be able to provide wireless network of that high quality where every cell phone user is able to download, upload high definition movies and photos. Currently people battle to do any of these basic activities on cell phone networks any time of the day. I believe this is mainly due to problems on transmission networks and under dimensioning of cell phone providers networks.

Respondents mentioned that making high speed data devices available would further add to the on-going problems in South Africa and add to the users' frustrations. Business owners and individuals who travel frequently overseas to developed countries or to developing Asian countries, get the devices at much cheaper prices than in South Africa. The respondents further added that the requirements for additional transmission bandwidth will assist users with access to the internet because at the moment, poor transmission infrastructure is hindering the supply of this service. The respondents also said that they needed the latest technology in order to compete in the global market and that the lack of proper transmission networks is delaying the growth of the South African economy. Another point made by the respondents is that the transmission network in South Africa is not up to world standards. ICASA has begun to take steps in the right direction by allowing market players in the transmission area like Dark Fibre Africa, Moshabi Communications, Saab Grintek, MTN, Vodacom, Cell C and Neotel to lay optic fibre cables between cities and to many business hubs. This will take some time but will eventually benefit the South African cell phone users.

Chapter 5: Discussion of the results

The purpose of this chapter is to discuss and test the research results against the broad research questions of the study. The nine questions will be tested against the findings presented in chapter 4 and the literature reviewed in chapter 2.

The purpose of this report is to evaluate the impact of the recent Telco regulation changes in South Africa on the subscribers and also to understand that the regulatory body is attempting to make cellular communications more affordable for the cell phone users and assisting cell phone operators to improve their overall service reliability.

5.1 DEMOGRAPHIC PROFILE OF THE RESPONDENTS

Of the targeted twenty five interview respondents, twenty were available for interviews. All twenty interview respondents had knowledge of telecommunications sectors and the latest developments in the South African market and are actively involved in the South African economy. The respondents taking part in this study were aware of consumer protection acts and were frequent users of voice and internet (data) services from their cell phone providers. Most, if not all, users had active cell phone subscriptions from more than one network provider and were able therefore to compare the quality of network service received from different network providers. Respondents also had knowledge of the mobile virtual network providers and how they operated in the South African market. Eight of the respondents were busy with MBA degrees and had heightened awareness of the South African economy.

Overall, the researcher was confident that the interview respondents would provide insight into the topic of this research paper would be able to assess the impact on of the regulations changes in South Africa on cell phone users.

5.2 REGULATION CHANGES IN TERMS OF INTERCONNECTION FEES

From the literature reviewed in chapter 2, and the interviews conducted with the cell phone users using services from all different network providers in chapter 4, there was a strong correlation in the researcher's findings.

The literature reviewed pointed out that the set interconnection tariffs should reflect the true cost involved in connecting one subscriber to another subscriber on a different network. However, in practice, this is not necessarily the case because interested parties differ as to what the true cost of interconnection is and because these costs may change over time as the market matures. In the South African case, interconnection rates were set without the expectation that the total number of mobile subscribers would grow to be in excess of 40 million after just fifteen years after the launch of mobile services.

Respondents on all network providers agreed that interconnection fees were too high in the South African telecommunications industry. Respondents were also of the view that ICASA's intervention was only due to that fact that they received complaints from subscribers about these high fees. The researcher also discovered during the interviews that ICASA is lax about implementing regulations that would benefit the South African cell phone users. The majority of respondents who were using services from more than one network agreed that ICASA should be driving operators to provide the latest technology at an affordable price to South African cell phone users. However, this can only happen if ICASA acts proactively in the current telecommunications affairs and tracks international technology trends with various technology suppliers.

In conclusion, the researcher's findings relating to this proposition is that interconnection fees were too high and that ICASA, although it has taken steps to bring down costs with all operators on voice calls, needs to focus on data price reductions.

5.3 SLOW AND INEFFECTIVE TELCO REFORMS IN SOUTH AFRICA

The literature reviewed on telecommunications reforms in South Africa, in chapter 2, highlighted the very basic reasons for reforms (Ayogu and Hodge, 2002):

I. Fiscal crises or a lack of adequate capital to improve infrastructure;
II. The desire to acquire technology and managerial expertise;
III. The desire to improve service delivery;
IV. A combination of the above factors.

In the South African context, post-apartheid reforms were required for all the above-mentioned reasons garnered from the literature review. More importantly, they were required in order to uplift the conditions of the majority of South Africans who were disadvantaged due to apartheid government regulations.

From the interviews conducted, the researcher found that this proposition held true for all the respondents from the network providers who stated that reforms by the government or independent bodies such as ICASA in the telecommunication sectors have been very slow to be implemented and ineffective. All the respondents agreed that ICASA has not played a proactive role to regulate the market or to drive the technology growth in the South African market. Respondents also mentioned that it was the convenience of mobile technology that has driven the high mobile growth over the years.

A frequent business traveller to the subcontinent and China mentioned in the interview that

> the interconnection fee reduction saga wasn't ICASA's own initiative, it was rather learnt from different cellular markets from the rest of the developing nations like, India, China etc. that interconnection fees were very low in those economies and hence it was decided to introduce this in the South African market after 15 year of cellular operations.

In conclusion, the implementation of reforms in the South African telecommunications sectors has been very slow and ineffective which may be due to the apartheid legacy.

5.4 CELL PHONE AFFORDABILITY FOR THE SOUTH AFRICAN PUBLIC

Using the literature reviewed in chapter 2, and the interview findings in chapter 4 the researcher found agreement that telecommunications reforms in South Africa have not helped to improve cell phone affordability for cell phone consumers in South Africa.

From the literature reviewed, the researcher found that in markets where suppliers have little or no competitors, the suppliers will set high prices for their products in order to exploit the consumers to make good profit margins. For more than ten years (1993 -2003), the South African cellular industry was controlled by the duopoly of Vodacom and MTN leaving subscribers with very little or no choice to negotiate prices on products that they wanted.

From the interviews conducted, the researcher found that it was the convenience of the technology that made users subscribe or own cell phones. Owning cell phones was a status symbol in the early nineties. This, coupled with the operators' desire to capture market share, drove the mobile service accessibility for the public in South Africa. The operators made cellular communications affordable to the public in order to gain market share by means of innovative product deals.

In essence, it was not the changes in the regulations that made cell phone communications affordable to the South African cell phone users. The interviewees suggested that the cost of cell phones has dropped since they were launched in the early nineties which was due to operators putting pressure on handset manufacturers and handset suppliers becoming more cost efficient at handset production.

5.5 LIMITED DEPLOYMENT OF CONVERGED NETWORKS DUE TO DELAYS IN FREQUENCY SPECTRUM ALLOCATIONS BY ICASA

From the literature reviewed in chapter 2, and the interviews conducted with the respondents from all different network users in chapter 4, there was a strong correlation in the researcher`s findings. Literature reviewed pointed that developing

countries still face many challenges to ensure that they are able to fully reap the benefits of the next decade's changes in ICT provision and use (Hodge, 2004). These challenges are illustrated by the fact that, although the number of secure servers in low and middle income countries doubled between 2001 and 2004, reaching above 10,000, this has still left the developing world's share of secure servers at about 3% of the global total (Kenney, 2005).

From the interviews conducted, the researcher found that the fact that ICASA not opening up frequency allocation in time has definitely resulted in delayed developments in the South African market as well as in rollout of the new technologies like WIMAX and LTE. Technologies like WIMAX and LTE are playing major roll in developed countries in terms of internet connectivity with much higher data speeds. Respondents mentioned that cell phone operators had played a significant role in connecting rural South African population and schools to the rest of the world. This was mainly achieved by quick deployment of their network, as access part is wireless and can be deployed much faster than wire line network.

In conclusion, the researcher's findings relating to this proposition is that ICASA delaying the spectrum allocation to new market players and delayed opening up of new transmission network licenses have definitely hampered the growth in the telecommunication sectors. It was found during the interviews that the delay in spectrum allocation by ICASA was due to the fact that the South African Defence Force is using various bands which made it difficult for ICASA to allocate these bands.

5.6 INTRODUCTION OF SERVICE LEVEL AGREEMENTS BY ICASA

From the literature reviewed in chapter 2, and the interviews conducted with all the respondents from the different service providers in chapter 4, there was a partial acceptance of this proposition. The researcher's findings from the literature review strongly suggest that ICASA, based on the cellular operators' license conditions, have the legal rights to enforce the regulations on all cell phone service providers.

However, users need to follow certain procedures in order to lodge the complaints and must provide all the necessary details.

From the interviews, the researcher found that respondents were of the opinion that they would rather use different routes to get their complaints resolved than going via ICASA. Interviewees also mentioned that if they dropped a call or failed to setup, they would simply restart the call again would not complain. If their problems increased to the extent that they were unable to work and make or receive calls then they would rather call the operator's call centres for help as the operators have customer care centres that can help to resolve the billing and coverage related queries. Some of the respondents answered to further probing questions put forward by the researcher that if the operators still did not resolve their problems, they would rather go to South African consumer protection body or to various media channels to complain.

In conclusion, the researcher's findings in relation to this proposition are that ICASA does not implement the regulation governing complaints. The researcher also found that if cellular telephone bills are paid by the subscribers' companies then the subscribers are less likely to complain to the regulatory body. On the other hand, individual business owners will go to ICASA if they do not get timeously help from their service providers.

5.7 COMPETITION IN THE RETAIL CELLULAR MARKET IN SOUTH AFRICA DUE TO MVNOs

From the literature reviewed in chapter 2, and the interviews conducted with all the cell phone industry respondents in chapter 4, there was a strong correlation in the researcher's findings. The literature reviewed suggested that an increased number of operators at the retail level increases competition and reduces prices for end customers. MNOs might refuse to offer wholesale capacity to MVNOs for this reason. Yet, the threat of competition could create a scenario where the main operators host the MVNOs as they do not want to lose business and increase competition in the retail market (Kalmus and Wiethaus, 2010).

From the interviews that the researcher conducted, all respondents suggested that the mere fact that the MVNOs have been operating in the market for almost a decade and have customer bases does induce competition in the retail market. Respondents also mentioned during the interviews that MVNOs have better product offerings in the market than those of the main cell phone network providers for post-paid subscribers.

In conclusion, the researcher's findings for this proposition are that MVNOs have created competition in the retail cellular market arena of South Africa.

5.8 REVENUE LOSS FOR CELLULAR OPERATORS AND MVNOS

From the literature reviewed in chapter 2, and the interviews conducted with the respondents on all different networks in chapter 4, there was very little correlation in relation to this proposition. The literature reviewed suggested that Mobile Virtual Network Operators (MVNOs) offer mobile telecoms services to customers by purchasing bulk capacity or wholesale minutes from a Mobile Network Operator (MNO) and sell them under their own brand to end customers. In this way, MVNOs avoid the need to build, own and operate their own end-to-end mobile radio access networks. This could still be done by means of bulk buying power irrespective of low interconnectivity fees (Kalmus and Wiethaus, 2010).

Respondents from Vodacom, MTN and 8.ta were of the view that once the staggered interconnection fee reductions come into effect, the MVNO's business model may not be sustainable. Respondents from Cell C, however, believed that MVNOs will still be able to survive by using their existing relationships with current network service suppliers.

In conclusion, the researcher found no consensus between the literature review and the interview findings. However, interview respondents suggested that MVNOs will be able to survive in the market by adapting their business model to include value added services for their subscribers.

5.9 COST OF OWNERSHIP FOR MOBILE COMMUNICATIONS IN SOUTH AFRICA

From the literature reviewed in chapter 2, and the interviews conducted with all the respondents on all cell phone service providers chapter 4, there was a strong correlation in the researcher`s findings. The literature reviewed suggested that mobile communications in South Africa, in relative terms, offer very low cost SIM starter packs and highly subsidised handsets, even for pre-paid subscribers, which is a rare practice worldwide (Snead et al, 2010).

In all interviews conducted with all 20 respondents representing all 4 major network providers, the researcher found that all of the respondents rejected the proposition saying that the South African cellular industry does not have enough competition when it comes to the main cell phone network providers to drive the cost of cell phone ownership down. They also mentioned that the South African market lacked multiplayer market competition as in most Asian countries.

In conclusion, for this research proposition the researcher found that there is a strong correlation between the literature reviewed and the interview findings mainly due to the lack of competition in the market, the high cost of entry in to the market and high cost of serving the majority of subscribers who are pre-paid customers.

5.10 TRANSMISSION NETWORK INFRASTRUCTURE IN SOUTH AFRICA AND SMART DATA DEVICES

From the literature reviewed in chapter 2, and the interviews conducted with respondents from all different network providers in chapter 4, there was a strong correlation in the researcher’s findings. From the literature reviewed, thetelecommunications industry is in the midst of a disruptive technological development phase as various network operators race to upgrade their current network infrastructures to next generation networks (NGNs) in order for their networks to be capable of handling broadband and excessive data requirements as next generation networks (NGNs) will allow the increase of data transmission speeds in the local fixed network from the current 16 Mbit/s to, at least, 100 Mbit/s (Nitsche and Wiethaus, 2010).

High speed next generation data networks will enable new applications such as IP based high definition TV as well as interactive gaming. While the technology exists today, it is uncertain as to when and to what extent it will be deployed by operators (Nitsche and Wiethaus, 2010).

The researcher found that all respondents confirmed this proposition that the booming data growth is highly dependent on high speed next generation transmission networks as NGNs will provide bandwidth with high speed links. The researcher also found during the interviews that many smart data devices are available in the local market.

In conclusion, the researcher found that even though there is strong correlation between the literature reviewed and the researcher's findings, in South Africa all the cellular operators have to invest heavily in upgrading the transmission network and once the transmission network is ready to handle large volumes of data, then smart devices would come in to the picture.

Chapter 6: Conclusion and Recommendations

6.1 INTRODUCTION

In this chapter, the researcher summarises the main findings of the research conducted and presents recommendations based on the evaluations of the cell phone consumers of the recent regulation changes in the South African cellular market. The findings were based on the interviews conducted and should always be viewed together with the existing literature. In conclusion, possible future research topics are presented.

6.2 CONCLUSION OF THE STUDY

An analysis of the results from the interviews conducted with subscribers from all network providers in this research reveals some potentially useful information regarding the customer impact due to the reduction in interconnection fees, the opening up of the South African cellular market for new players and the regulations allowing existing cellular operators to start building their transmission network infrastructure in order to promote data growth. Also, it sheds light on the enforcement of service level agreements by ICASA with regards to the resolutions of longstanding problems that customers have been having on their networks.

Since the research is based on a small sample, the information must be viewed with a degree of caution. The research findings, however, were not unexpected and reinforced the research found in the literature review.

The researcher found a few underlying factors that have had a negative effect on the affordability of cell phone services in the South African cellular industry. They are:

- High Interconnection fees between the operators;
- Slow and ineffective reforms in South African telecommunications industry;
- Regulations failing to bring the overall cost of cellular services down;
- Little or no competition in the cell phone market in the pastas it was controlled by two industry players;

- Regulations that resulted in the poor network infrastructure developments;
- Under investments made by the operators in infrastructure;
- Delayed spectrum and license opening by the industry regulator;
- The independence of the regulator is in question due to the fact that it is part of a governmental body and therefore open to political influences on decision making.

The research findings were:

Proposition 1: Interconnection fees in South African telecommunications industry are too high.

Under the literature review on high interconnection fees, the findings were that cellular operators have kept the interconnection fees very high. This was partly due to that fact that, in the beginning of cellular operations in South Africa (1993-2009), the operators as well as the regulatory body did not expect such a high growth of the industry. This growth also served as barrier to entry for new operators into the market as new operators were faced with high interconnection fees to the existing operators due to the majority of calls being made to subscribers on the existing networks.

From the interviews conducted with the respondents from all network service users, this proposition held true. All respondents were of the view that ICASA is more of a reactive body that only introduced new regulations to bring the interconnection prices down once customers started to complain that these prices were too high based on various studies conducted on interconnection fees across developing countries that indicated that interconnection fees were very high in South Africa as compared to other developing countries.

Proposition 2: The telecommunications sector reforms in South African industry have been slow and ineffective.

From the literature reviewed, the findings were that the main reasons for reforms in any economy are fiscal crises, raising funds for new developments, promoting new developments in terms of technology rollouts and improvements of service delivery.

Reforms in the South African telecommunications sectors have been slow due to the lack of supporting infrastructure, political influence in decision making and/or the lack independence of the regulatory body.

This proposition held true for all the respondents from all the cellular network services. The interviewer found that the interconnection fee reduction process was not initiated by ICASA but was garnered from cellular markets in developing nations such as India and China. ICASA simply reacted to customer complaints which forced it to reduce these fees.

In conclusion, this study has found that the reforms in the South African telecommunications sectors have been very slow and ineffective. One of the main reasons behind slow reforms was the delicate political situation in South Africa. The emphasis placed on issues deemed more important than telecommunications regulations, such as BEE drivers, have furthermore resulted in slow and ineffective growth.

Proposition 3: Telecommunications reforms in the South African industry have made mobile communications affordable to the masses of the country.

The literature reviewed on telecommunications reforms that were intended to make cellular communications more affordable to South African cell phone consumers highlighted the fact that the reforms have, in fact, done very little to make cellular communications in South Africa cheaper for cellular communications users. The main reason for this is that these reforms have failed to create competition in the market and in so doing, have given subscribers very little choice of services or products.

The researcher's findings, from the interviews conducted with all respondents, found that, in the past, the operators made their products and services more attractive for post-paid customers in order to gain market share. The function of driving the cellular communications costs down should have been proactively initiated by the regulator but this was never done. Therefore it became clear that the regulation changes were

not the catalyst to make cell phone communications affordable to the public of South Africa.

The researcher also found that even though the regulator did not play an active role in bringing the prices down in the past, it has begun to do so for the cellular data market because this is part of its function. It is advised that this process should to be done in consultation with the cell phone service providers to ensure transparency and to benefit the cell phone users.

Proposition 4: Delayed frequency spectrum allocations by ICASA in South Africa have resulted in inefficient frequency utilisation and restricted cellular network growth.

In the South African context, the literature points out that the issues surrounding the taxation of ICTs were still continued concerns about the extent and quality of backbones (transmission network), and perhaps most importantly, attention to the broader business environment. The literature highlighted that, by delaying the spectrum allocations in South Africa, ICASA has hindered the rollout into the South African market of new technology such as the 4G network that is capable of achieving higher data speeds and throughputs. This has inhibited the growth of the sector.

The researcher also found that the failure to open up frequency allocation by ICASA has resulted in delayed developments in the South African market as well as hindered the rollout of new technologies in South Africa. However, these delays could be coupled with current legislation requirements relating to economic wealth redistribution as market players, looking for the new spectrum, may not have the required BBBEE credentials. Hence ICASA may be forced by the government to delay the allocations until tenders met the required levels on BBBEE.

In conclusion, the researcher's findings relating to this proposition are that, because ICASA has delayed allocating the spectrum to new market players and the opening up of new transmission network licenses; this has hampered the growth in the telecommunication sectors.

Proposition 5: ICASA will help customers in getting repeated cell phone related problems resolved that go unnoticed by the service providers.

The researcher's findings relating to this proposition was that ICASA could enforce the fifteen day service level regulation onto cell phone operators based on the licensing conditions issued for operating in South Africa. However, ICASA may not have the capacity and the manpower to implement the logistics required to do this.

The researcher found that respondents felt that the best way to get their problems resolved was to call the network operators' centralised call centres. Also, that individual who are given cell phones by their employers tend to ignore network problems compared to business owners who are responsible for their own cell phone costs.

This has created the perception that the regulatory body has the power to enforce the regulations on cell phone network providers with the threat of penalties for non-compliance.

Proposition 6: The entry of MVNOs into the South African telecommunications sector induced competition in the retail market.

The researcher's findings based on the literature reviewed and interviews conducted with all respondents on all network providers in relation to this proposition is that MVNOs have created competition in the South African retail market by using their bulk negotiating powers and providing subscribers with better service and product ranges than those offered by the main network service providers. To a certain extent, the main operators have supported the MVNOs because they are relieved of the cost of customer management.

However, based on the interview findings, the researcher is of the view that even though MVNOs have created competition in the retail market, they may not be providing comparable service to their subscribers to that provided by the main operators. This is mainly due to the network devices that the MVNOs use to compress the bandwidth and also the exploitation of the loopholes in terms of customer complaints and accountability of service to their subscribers.

Proposition 7: Will MVNOs be able to afford further tariff discounts for their subscribers as the MVNOs' revenue generation margins reduce because of Telco regulation changes?

The researcher's findings from the literature and the interviews conducted were that the current business models that the MVNOs have adopted will not ensure that the MVNOs will be able retain subscribers once the staggered interconnection fee reductions are implemented in the South African cellular industry. This will reduce the margins earned by the MVNOs and will affect their ability to give discounts on cell phone package deals to their subscriber bases. The fibre network rollout will further hamper the viability of the MVNOs.

The researcher also found that if MVNOs are to survive, they will have to adapt their business model by means of adding value added services to their current service offerings to their cell phone service users.

Proposition 8: Cost of ownership for mobile communications in South Africa is very high as compared to the other developing countries.

The researcher's findings in relation to this proposition from the literature reviewed and the interviews conducted with all twenty respondents representing all 4 major network providers, were that there is no correlation between the literature reviewed and the findings from the interviews carried out.

The researcher's findings from the interviews conducted are that the main reason for the high cost of mobile communications in South Africa is the lack of competition and product choices for customers. Operators have not given cell phone service users choices on predefined products which are introduced into the South African market with no consideration of their affordability.

The respondents interviewed attributed the high cost of mobile communications to the lack of regulations governing the South African market. It was further mentioned that the timing of the release of new licenses for operations in South African market by ICASA was inappropriate as the cell phone market was already at maturity levels in terms of voice usage.

In addition, researcher also found from the interviews that customers tended to stay with the same network service operators that they already had rather than signing twenty four month contracts with new supplier.

Proposition 9: High data growth is dependent on high data speed transmission network and smart data device availability.

The researcher's findings in relation to this proposition were that the high data growth was dependent on both the high speed transmission network and the smart data device availability. In order for this to take place, the high speed transmission network needs to be put in place before the influx of smart data devices into the market is allowed.

The high speed next generation data network will enable new applications such as IP based high definition TV as well as interactive gaming. The researcher found from the interviews that, because the wireless operators are in the process of rolling out their fibre networks to their hub sites, this will improve the quality of the service provided to users. Unfortunately cell phone technology has limitations and signal penetration into buildings will always be limited and dependent on the user distance to the cell phone towers. Also, capacities on the wireless systems are limited and high usage on a tower will provide poor service.

To provide world class next generation networks that will support the high data growth in South Africa, high capital investment in fibre network development run directly into homes will free the wireless services to be used by subscribers when they are mobile.

6.3 RECOMMENDATIONS

Following the literature reviewed and the findings from the interviews conducted, the researcher's recommendation is to ensure that cell phone services are made more affordable to the South African public and to improve the quality of service for subscribers. The requirements from the mobile operators' perspective are to kick-start the market for high data growth in the South African mobile industry.

The staggered reductions in interconnection fees have, to a certain extent, increased the affordability of cell phone services for the customers in the South African market. However, the overall affordability of cell phone services can only be improved by reducing the actual air time rates charged by the operators. This can be done by ICASA introducing new market players and inducing actual competition in the market thereby providing cell phone users with more bargaining power with suppliers. ICASA must get actively involved in price determinations by cell phone operators before services are launched into the commercial market.

MVNOs may exploit their existing relations with main network providers to stay afloat during current regulation changes but if MVNOs are to survive in the longer term then they will have to adapt their business models by means of adding value added services to the services offered to their subscribers. The long term viability of MVNOs stay depends on their competitiveness in the market. More competition in retail markets benefits the customers.

It is recommended that ICASA needs to monitor international technology trends when it comes to future technology implementations and assess the requirements of the local market in terms of infrastructure developments and the frequency spectrum available for the market players. It must also introduce realistic pricing in accord with the international market by taking into account the economic conditions and business requirements in this country. It must establish a pricing model that is affordable for the public and makes business sense from the operators' perspective for the South African market.

High speed transmission network need to be put in place before the influx of smart data devices into the market are allowed as this would create more problems for the network providers.

Cell phone technology has its own limitations and signal penetration into buildings will always be limited and, at times, not possible on underground floors unless indoor systems are installed. The indoor service may still be severely limited depending on position of towers relative to the buildings. Also, capacities on the wireless systems are limited. If the demand for service is high then the user experience will be poor.

So, in essence, to provide a world class next generation network that will support the high data growth in South Africa, high capital investments in fibre optic network development that runs directly to the homes and businesses must be made. This will free the wireless services to be used by subscribers when they are mobile.

6.4 RECOMMENDATIONS FOR FUTURE RESEARCH

In this chapter, a summary of the scope of the research was discussed in order to understand the recommendations made. The recommendations were based on the research findings from the interviews and the literary review. A quantitative study involving a greater sample size will shed more light on the actual impact on the costs of cellular communications to see whether the reduction in intercommunication fees makes a difference. This study will need to take the costs of the calls made by cell phone users to users on other networks for at least six months prior to the introduction of the regulations and for six months after they were introduced. This will give an indication whether the amount charged by the operators had reduced or whether the number of voice calls had gone up.

Other areas for investigation will be to gauge whether the fibre network rollout by operators has resulted in an improvement in data speeds compared to transmission provided by Telkom. Also, research can be done to find out whether there have been any reductions in data rates as new market players like Cell C and 8.ta entered the market towards the end of 2010.

Researchers could also look at quantifying the amount of smart data devices that are available in South African market and whether operators have made them affordable to the majority of cell phone users or whether they are only available for high end users.

Another area that can be pursued for further research study is the actual quantitative impact on the revenue of MVNOs due to interconnection fee reductions and optic fibre networks. If this is the case, it could possibly lead to free connectivity thus increasing the overall cell phone communication affordability for users.

It is also recommended that a study of whether the implementation of the fifteen day customer fault resolution period by ICASA has succeeded with different cell phone network providers or whether customers were still of the opinion that they would rather use other channels to get their problems fixed.

References

Ayogu, M. and Hodge, J. (2002) Understanding the nature of reforms in the telecom sector in South Africa: A political economy perspective, *Journal of Contemporary African Studies*, 20(2).

Barendse, A. (2004) Innovative regulatory and policy initiatives at increasing ICT connectivity in South Africa, *Telematics and Informatics* 21(1), pp. 49-66.

Blackman, C. (2007) The public interest and the global, future telecommunications landscape, *Information*, 9(2/3), pp. 6-16.

Cave, M. (2006) Encouraging infrastructure competition via the ladder of investment, *Telecommunications Policy*, 30(3-4), pp. 223-237.

Cisco-Vni (2011) Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2010–2015, (Last updated on 01st Feb, 2011), accessed 10 Feb, 2011, from http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html.

Coldwell, D. and Herbst, F. J. (2004) *Business research*, Juta & Co Ltd, Landsdowne, Capetown.

Coyne, I. T. (1997) Sampling in qualitative research. Purposeful and theoretical sampling; merging or clear boundaries? *Journal of advanced nursing*, 26(3), pp. 623-630.

Creswell, J. W. (2009) *Research design: Qualitative, quantitative, and mixed methods approaches*, Sage Publications, Inc, University of Nebraska, Lincoln.

Davies, R. and Van Seventer, D. (2006) The economy-wide effects of price reducing reforms in infrastructure services in South Africa, EGDI working paper, Pretoria: Human Sciences Research Council (February).

Dodd, M., Jung, A., Mitchell, B., Paterson, P. and Reynolds, P. (2009) Bill-and-keep and the economics of interconnection in next-generation networks, *Telecommunications Policy*, 33(5-6), pp. 324-337.

Eeden, J. V. (2009) The Economics of mobile interconnection rates in South Africa, (Last updated on 15 Nov 2009), accessed 15th Feb 2011, from http://www.econex.co.za/index.php?option=com_docman&task=doc...

EC (2003) Commission recommendation C 497 of 11 February 2003 on relevant product and service markets within the electronic communication sector susceptible to ex ante regulation.

EC (2007) Commission acts to reduce telecoms regulation by 50% to focus on broadband competition. Press Release IP/07/1678. European Regulator Group (2006). Mobile access and competition effects. ERG (06) 45.

European Commission (2009) Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU. C 3359 final, 7 May.

European Commission (2009) Draft Recommendation on regulated access to Next Generation Access Networks (NGA), Draft 12 June 2009 for 2nd public consultation.

Gillwald, A. (2005) Good intentions, poor outcomes: telecommunications reform in South Africa, *Telecommunications Policy*, 29(7), pp. 469-491.

Gillwald, A. and Kane S. (2003) Sector performance review, LINK Public Policy Research Paper No. 4, pp. 2-63.

Hay, K. (2005) *Expanding broadband access in rural India: The role of alternate telecommunications networks*, mimeo, GICT Department, World Bank, Washington.

Healy, M. and Perry, C. (2000) Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm, *Qualitative market research*, 3(3), pp. 118-126.

Hill, J. and McGowan, P. (1999) Small business and enterprise development: questions about research methodology, *International Journal of Entrepreneurial Behaviour & Research*, 5(1), pp. 5-18.

Hodge, J. (2004) Universal service through roll-out targets and licence conditions: lessons from telecommunications in South Africa, *Development Southern Africa*, 21(1), pp. 205-225.

Horwitz, R. B. and Currie, W. (2007) Another instance where privatization trumped liberalization: The politics of telecommunications reform in South Africa: A ten-year retrospective, *Telecommunications Policy*, 31(8-9), pp. 445-462.

Hyde, K. F. (2000) Recognising deductive processes in qualitative research, *Qualitative market research: an international journal*, 3(2), pp. 82-90.

ITU, (1998) *General Trends in Telecommunication Restructuring 1998: World. Volume 1*, Geneva: ITU.

IWS (2011) World internet statistics (Last updated on 31st March 2011), accessed 7th Apr, 2011, from http://www.internetworldstats.com/stats1.htm#africa.

Jabbari, B., Pickholtz, R. and Norton, M. (2010) Dynamic spectrum access and management [Dynamic Spectrum Management], *Wireless Communications*, IEEE, 17(4), pp. 6-15.

James, J. and Versteeg, M. (2007) Mobile phones in Africa: how much do we really know?, *Social indicators research*, 84(1), pp. 117-126.

Kalmus, P. and Wiethaus, L. (2010) On the competitive effects of mobile virtual network operators, *Telecommunications Policy*, 34(5-6), pp. 262-269.

Kenney, C. (2005) Financing Information and Communication Infrastructure Needs in the Developing World: Public and Private Roles (Draft), World Bank, Washington, DC.

Khalil, M. and Kenny, C. (2008) The next decade of ICT development: Access, applications, and the forces of convergence, *Information Technologies and International Development*, 4(3), pp. 1-6.

Kruger, H. (2009) *RICA implemented in South Africa* (Last updated on 7 July 2009), accessed 29 Nov 2011, from http://rwrant.co.za/2009/07/07/rica-implemented-in-south-africa/.

Leedy, P. D. and Ormrod, J. E. (2001) *Practical Research: Planning & Design*, 7th ed., Upper Saddle River, N.J.: Merrill Prentice Hall.

Leedy, P. D. and Ormrod, J. E. (2005) *Practical research: Planning and design*, 8th ed., Upper Saddle River, NJ. : Merrill Prentice Hall.

Leedy, P. D. and Ormrod, J. E. (2009) *Practical research: Planning and design*, 8th ed., Upper Saddle River, NJ. : Merrill Prentice Hall.

Limi, A. (2007) Price structure and network externalities in the telecommunications industry: evidence from Sub-Saharan Africa, Vol. 4200, World Bank Publications, Washington.

Littlechild, S. (2006) Mobile termination charges: calling party pays versus receiving party pays, *Telecommunications Policy*, 30(5-6), pp. 242-277.

Mabulu, L. (2011) Rules and Regulations of complaint and compliance procedures, (Last updated on 22nd Jan, 2011), accessed 21st Feb, 2011, from http://www.icasa.org.za/LegislationandRegulations/CCC/tabid/296/ctl/ItemDetails/mid/1070/ItemID/242/Default.aspx.

Makhakhe, T. (2011) Statement to support the release of wholesale call termination regulations (Last updated on 28 Feb 2011), accessed 31st March, 2011, from http://www.icasa.org.za/tabid/404/Default.aspx

Makhaya, G. and Roberts, S. (2003) Telecommunications in developing countries: reflections from the South African experience, *Telecommunications Policy*, 27(1-2), pp. 41-59.

Manche, J. B. (2005) ICASA annual report 2005 CEO's review, (Last updated on 01-March-2005), accessed 15 Jun 2011, from http://www.icasa.org.za/AboutUs/AnnualReports/tabid/290/Default.aspx.

Mijares, J. E. A. (2001) Low cost call routing system for telecommunications unit, *Patent*, 1(1), p. 18.

MTN, (2010) MTN Annual Report, integrated business report for the year ended 31st March 2010, MTN Group limited, Johannesburg.

Mwanza, C. (2006) ICASA Failing, (Last updated on 20-September-2006), accessed 15-Jun, 2011, from http://mybroadband.co.za/nephp/4292.html.

Nitsche, R. and Wiethaus, L. (2010) Access regulation and investment in next generation networks: A ranking of regulatory regimes, *International Journal of Industrial Organization*, 29(2), pp. 263-272.

Porter, M. E. (2004) Building the microeconomic foundations of prosperity: findings from the business competitiveness index, World Competitiveness Report, 2005.

Porter, M., Schwab, K., Martin, H. and Lopez-Claros, A. (2004) Building the microeconomic foundations of prosperity: Findings from the business competitiveness index: The Global Competitiveness Report., New York: Palgrave.

Powell, R. R. (1999) Recent trends in research: A methodological essay, *Library & Information Science Research*, 21(1), pp. 91-119.

SA – INFO. (2011) SA-Info reporter, (Last updated on 2nd Feb), accessed 15th Feb, 2011, from http://www.southafrica.info/business/economy/infrastructure/telecoms.htm

Shaw, E. (1999) A guide to the qualitative research process: evidence from a small firm study, *Qualitative market research: an international journal*, 2(2), pp. 59-70.

Snead, A., Whyman, T. and Sousa, J. (2010) South African Telecoms in 2010: High stakes for the big winners (Last updated on 31st May 2010), accessed 10th Feb, 2011, from http://www.deltapartnersgroup.com/asset/download/215/WP-2010-SOUTH_AFRICAN_TELECOMS_IN_2010.pdf.

Snyman, J. (2007) Emerging Markets Equity Research: South African Telecoms Market, (Last updated on 14th August 2007), accessed 15th Feb, 2011, from http://www.hugegroup.com/FileAssets/NewsCast/228/JP%20Morgan%20CLCR%20Research%20Report.pdf.

Sterling, C. H., Bernt, P. and Weiss, M. B. H. (2006) *Shaping American telecommunications: a history of technology, policy, and economics,* Lawrence Erlbaum associates, Mahwah, NJ.

Stork, C. (2011) Mobile termination benchmarking: the case of Namibia, *Info*, 13(3), pp. 5-31.

Teljeur, E., Gillwald, A., Steyn, G., & Storer, D. (2003) Regulatory frameworks: impacts and efficacy. Report prepared for the South African Presidency, for 10-year Review of Government on Telecommunications, Electricity and Transport Sectors, Presented at Trade and Industrial Policy Strategy (TIPS) DPRU Annual Forum, Pretoria, http://www.tips.org.za or http://link.wits.ac.za/papers/rfie2003.pdf,

Telkom, (2010) Annual Reports 2010, Annual reports for year ended 31st March 2010, Financial review, Telkom SA Limited, Johannesburg

Vodacom, (2010) Group annual report for the year ended 31st March 2010, Vodacom Group limited, Johannesburg

Vogelsang, I. (2006) Abrechnungssysteme und Zusammenschaltungsregime aus ökonomischer Sicht. Study prepared for the Bundes netzagentur fur Elektrizitat, Gas,Telekommunikation, Post und Eisenbahnen, 28 April.

Waverman, L., Meschi, M. and Fuss, M. (2005) The impact of telecoms on economic growth in developing countries, *Africa: the impact of mobile phones*, 2.

World Bank, (2005) Financing information and communication infrastructure needs in the developing world: Public and private roles, World Bank Working Paper 65.

Appendix A: List of interview respondents

Number	Date of interview	Name of respondent	Main network provider	Additional network provider	Interview conducted
1	15-12-2011	Ajeeth Rampall	Vodacom		Yes
2	09-12-2011	Andre Pillay	Vodacom		Yes
3	05-01-2012	Anshul Malhotra	MTN		Yes
4	27-10-2011	Bhekezela Ndhlovu	Cell C		Yes
5	10-11-2011	Graham Cusack	Vodacom	MTN	Yes
6	11-11-2011	Harshik Budhia	Vodacom	MTN	Yes
7	18-11-2011	Kevin Yang	Vodacom		Yes
8	02-11-2011	Mrunal Bhugwan	MTN		Yes
9	04-11-2011	Nikesh Prabhoo	MTN		Yes
10	23-12-2011	Nishalan Pillay	Vodacom	Cell C	Yes
11	31-10-2011	Quewin Reddy	MTN		Yes
12	31-10-2011	Niveshan Reddy	MTN		Yes
13	10-10-2011	Ruben Katia	MTN	Vodacom	Yes
14	31-10-2011	Ruwaida Reddy	Cell C		Yes
15	09-10-2011	Sanesh Bodasing	Vodacom	Cell C	Yes
16	16-12-2011	Shane Narasoo	8TA	Vodacom	Yes
17	13-12-2011	Siyabulela Matinise	MTN	Vodacom	Yes
18	07-10-2011	Sundesh Jaggurnath	Cell C		Yes
19	12-12-2011	Brett Nash	8TA	Vodacom	Yes
20	17-11-2011	Zaheer coovadia	Vodacom	MTN	Yes
21	07-11-2011	Sanderan Govender	MTN		No
22	08-11-2011	Hemant Sewnarain	Vodacom		No
23	04-11-2011	Kirchlin Simdhari	MTN		No
24	10-11-2011	Anthony Appolis	MTN		No
25	03-11-2011	Vishal Singh	Vodacom		No

Appendix B: List of abbreviations

ADSL:	Asymmetric Digital Subscriber Line
ARPU:	Average Revenue per User
BAK:	Bill and Keep
BEE:	Black Economic Empowerment
BBBEE:	Broad Based Black Economic Empowerment
CEO:	Chief Operating Officer
CIB:	Corporate Incentive Bonus
CLCR:	Cellular Least Cost Router
DoC:	Department of Communications
EBITDA:	Earnings before Interest, Taxes, Depreciation and Amortisation
EC:	European Commission
FDI:	Foreign Direct Investment
GDP:	Gross Domestic Product
GSM:	Group Special Mobile
ICASA:	Independent Communication Authority of South Africa
ICT:	Information Communications and Technology
IP:	Internet Protocol
IPNP:	Initiating Party Network Pays

ISP:	Internet Service Provider
IWS:	Internet World Statistics
LCR:	Low Cost Router
LSM:	Lower Segment Market
MNOs:	Mobile Network Operators
MVNOs:	Mobile Virtual Network Operators
MSP:	Mobile Service Provider
NGN:	Next Generation Network
RICA:	Regulation of interception of communication act
SA-INFO:	South African Information reporter
SIM:	Subscriber Identity Module
SNO:	Second National Operator
SoE:	State owned Enterprise
SP:	Service Provider
VANS:	Value Added Network Services
VoIP:	Voice over Internet Protocol

Appendix C: Questionnaire

- What is your main phone application? Personnel voice / data or business voice and data?
- How quickly do you upgrade your phone to latest available in market?
- Have you noticed any change in your cell phone bills over past year?
- How would you describe your service experience with your current network provider?
- Have the reforms in South African telecommunication industry been slow and ineffective despite telecommunication being one of the fastest growing sectors?
- Do you think lower interconnection fee would make cellular communications more affordable for masses in South Africa?
- How have the earlier telecommunications regulations for Telkom to be sole transmission network provider in South Africa for all cell phone operators resulted in limited transmission infrastructure developments in the country?
- Do you think MVNs in South Africa has resulted in increased competition in retail market?
- In your view,will ICASA opening up spectrum allocation for new market players in last two years inthe telecommunications sector increase competition and infrastructure developments?
- How will the low transmission bandwidth availability and device availability impact the data growth?
- Have you been receiving calls from cell phone operators for saving money on the bills?
- Have you ever officially lodged a complaint against your network provider with ICASA?