

https://dspace.org/

ADSL Uptake and Regulatory Intervention in South

Ruplal, Praneel Haricharan

2011-06-10
http://hdl.handle.net/10539/10077

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

ADSL Uptake and Regulatory Intervention in South Africa

Praneel Haricharan Ruplal

A Research Report submitted to Graduate School of Public and Development Management, University of Witwatersrand in partial fulfilment of the requirements for the degree of Master of Management in Information Communications Technology, Policy and Regulation

May 2008

Abstract

‘ADSL is an important broadband technology for South Africa that has the ability to have a significant positive impact on the socio-economic environment of the country. As ADSL uses existing network infrastructure, it also maximises on an operator’s investment. These benefits of ADSL have not been fully realised in South Africa because of a comparatively poor uptake of the service due to several reasons. The purpose of this exploratory study was to determine whether regulatory intervention was required to increase the uptake of ADSL in South Africa. Some of the main findings of this research are that regulatory intervention is required to stimulate the uptake of ADSL by introducing measures such as local loop unbundling and by introducing greater competition in the broadband environment in general.’ (126 words)

Declaration

I declare that this report is my own, unaided work. It is submitted in partial fulfilment of the requirements of the degree of Master of Management (in the field of Information Communications Technology, Policy and Regulation) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Praneel Haricharan Ruplal

_____

30 May 2008

Dedication

To Suchithra, Shravan and Sunaina Ruplal. Thank you for your support, love and understanding.

Acknowledgements

I am grateful to my supervisor, Charley Lewis, for his guidance and assistance throughout the research process.

Table of Contents

ABSTRACT **2**

DECLARATION **3**

DEDICATION **4**

ACKNOWLEDGEMENTS **5**

1. INTRODUCTION AND BACKGROUND **13**

2. LITERATURE REVIEW **18**

2.1 Why Regulate? **19**

2.1.1 Monopolies and natural monopolies 19

2.1.2 Information Inadequacies 20

2.1.3 Anti-competitive behaviour and Predatory Pricing 20

2.1.4 Scarcity and Rationing 20

2.1.5 Distributional Justice and Social Policy 21

2.2 Regulation promotes broadband uptake **22**

2.3 Regulation does not promote broadband uptake **25**

2.4 Light regulation promotes broadband uptake **27**

2.5 Other factors that may affect the uptake of broadband **31**

2.5.1 Broadband and Competition 32

2.5.2 Pricing 33

2.5.3 Non-regulatory factors 34

2.6 Summary **35**

3. RESEARCH QUESTIONS 36

4. METHODOLOGY 38

4.1 Research Instrument 39

4.1.1 The Interview Pilot 39

4.1.2 Data Collection Procedure 40

4.1.3 Data Recording Procedure 40

4.2 Sampling Methodology 41

4.3 Data Analysis 42

4.4 Setting 43

4.5 Definition of Broadband 43

4.6 Limits of the Research 44

4.7 Significance 44

4.8 The Role of the Researcher 45

5. RESEARCH RESULTS 46

5.1 Introduction 46

5.2 Introductory Questions and Definitions 47

5.3 Uptake 51

5.4 Regulatory Intervention 54

5.5 Policy 66

5.6 Miscellaneous 72

5.7 General 78

6. ANALYSIS 80

6.1 The Importance of ADSL 80

6.1.1 ADSL and Copper Penetration 81

6.1.2 ADSL- important only to some? 82

6.1.3 Maximising Available Infrastructure 83

6.1.4 The Definition of ADSL 84

6.1.5 Moving Targets 84

6.1.6 Setting Speeds-Dangerous? 86

6.1.7 Fixed Line Operators Agree 87

6.1.8 Is ADSL Broadband? 88

6.1.9 Official Definition of Broadband 89

6.2 The Uptake of ADSL 90

6.2.1 Fixed Line Penetration of ADSL 91

6.2.2 OECD Comparisons 93

6.3 Policy and Regulatory Factors 95

6.3.1 Affordability 96

6.3.2 Introducing Competition by Local Loop Unbundling 98

6.3.3 Undersea cables and essential facilities 100

6.3.4 Quality of Service 100

6.3.5 No policy or Regulatory factors required..... 101

6.4 Regulatory Intervention..... 101

6.4.1 Is the broadband market competitive? 103

6.5 The need for regulatory intervention..... 107

6.5.1 The focus of the regulatory intervention 110

6.5.2 The degree of regulatory intervention..... 111

6.5.3 Who should intervene? 115

6.5.4 Types of Regulatory intervention 117

Local Loop Unbundling..... 119

Price Regulation and Affordability..... 123

Competition 124

Quality of Service 127

6.6 What factors would Regulatory intervention affect? 129

6.7 Regulations and Uptake 130

6.8 Policy Initiatives..... 131

6.9 Price Regulation 133

6.10 ICASA's ADSL regulation..... 135

Introduction..... 135

Background 135

Public reaction..... 136

The Findings Document 137

Line Rental Issues..... 139

Policy imperatives suggested at the ADSL hearings..... 140

Consumer Protection Issues..... 146

The Final Regulation 149

7. CONCLUSION 151

7.1.1 Regulatory intervention and the uptake of ADSL 151

7.1.2 Factors that affect and the uptake of ADSL 152

7.1.3 Policy initiatives and regulatory intervention 153

7.1.4 Technology Neutral Regulations 153

7.2 Recommendations 153

7.2.1 Definitions 153

7.2.2 Uptake 154

7.2.3 Regulatory Intervention 154

7.2.4 Policy 154

7.3 Further Research 154

7.3.1 Market Research 155

7.3.2 Service Specific Regulations 155

7.3.3 Competition 156

7.3.4 Enforcement 156

7.3.5 Regulating Speed 156

7.4 Conclusion 157

8. REFERENCES 158

APPENDIX A: INTERVIEW QUESTIONS 166

APPENDIX B: RESEARCH STRATEGY 170

List of Tables

Table 1.1: Models of Industry Regulation 29

Table 4.1: List of Stakeholders 42

Table 5.1: ADSL as an important broadband technology 47

Table 5.2: The definition of broadband 48

Table 5.3: Is ADSL broadband? 49

Table 5.4: Is it important to have an official definition of broadband? 50

Table 5.5: Is the ADSL uptake sufficient? 51

Table 5.6: The key policy and regulatory factors that influence the uptake of ADSL 52

Table 5.7: Is the broadband market sufficiently competitive? 54

Table 5.8: Is regulatory intervention required? 55

Table 5.9: Focus of the regulatory intervention 56

Table 5.10: The degree of intervention 58

Table 5.11: Who should intervene? 59

Table 5.12: Should there be specific intervention? 60

Table 5.13: What should these measures be? 61

Table 5.14: How should they be implemented? 63

Table 5.15: Should intervention address specific factors? 64

Table 5.16: How regulation makes a positive impact on the uptake of ADSL 65

Table 5.17: Policy initiatives 66

Table 5.18: How does policy influence the uptake of ADSL? 68

Table 5.19: How does policy affect the regulatory environment 69

Table 5.20: Should one process wait for the other? 70

Table 5.21: Non-regulatory options to increase ADSL uptake 72

Table 5.22: Is regulating price an option? 73

Table 5.23: How could prices be regulated? 75

Table 5.24: How important is it to regulate prices? 76

Table 5.25: Further Comments 78

Table 6.1: Top 15 Countries by Internet Penetration 86

Table 6.2: Regional Broadband Penetration overview 92

Table 6.3: Regional Fixed line Penetration Overview 93

Table 6.4: Differences between a Competition Authority and a Sector Specific Regulator 116

List of Figures

Figure 1.1: OECD broadband subscribers per 100 inhabitants in June 2006 16

Figure 6.1: OCED broadband penetration figures June 2007 94

Figure 6.2: International Price of Bandwidth 96

Figure 6.3: Telkom's ADSL prices 105

Figure 6.4: OECD Broadband Subscriptions 138

Figure 6.5: Services available for a flat fee in 30 OECD countries 140

Figure 6.6: International Comparison of ADSL 512kbit/s 143

1. Introduction and Background

Asymmetrical Digital Subscriber Line (ADSL) is a broadband technology that uses existing copper infrastructure to transmit data. 'It allows high-speed data services to be delivered over twisted pair copper cable, typically with a download speed in excess of 256 kilobits per second (kbits/s), but with a lower upload speed' (ITU 2006:215)[1] - hence the term 'Asymmetric'. The ADSL subscriber is able to be connected to the Internet and make telephone calls at the same time. The connection to the Internet Service Provider (ISP) is constant as opposed to dial-up Internet access. It is thus referred to as an 'always-on' technology.

ADSL was rolled out as a commercial service by Telkom South Africa in August 2002 (Telkom 2006:1). There was general consumer unhappiness on several aspects of this service (ICASA, 2005:5) and this was brought to the attention of the Independent Communications Authority of South Africa. ICASA then conducted a Section 27 inquiry[2] on 17 December 2004 into the ADSL service provided by Telkom South Africa. Four hundred and forty six submissions were received by the regulator (ICASA, 2005:5).

This study examines the uptake of ADSL in South Africa and explores the role that ICASA might play in facilitating this technology. ADSL was specifically chosen as it is the most popular broadband technology available in South Africa[3] (Goldstuck, 2005:7) as well as the fact that it was topical as it generated a large number of complaints as seen by the submissions received by the regulator. The regulator is tasked in terms of the objectives of the Electronic Communications Act (ECA) to encourage investment and innovation in the communications sector (RSA, 2005:13) as well as to promote the interests of consumers with regard to the price, quality and variety of electronic communications services (RSA, 2005:14).

[1] There are several differing speeds quoted for ADSL with no 'official' standard. The ITU definition is generally regarded as the universal standard for regulators.
[2] A Section 27 inquiry conducted in terms of the Telecommunications Act (RSA 1996:18) deals with any matter that relates to the achievement of the objects of the above Act.
[3] Wireless broadband overtook ADSL as the most popular broadband technology in South Africa in 2007 Goldstuck (2008:6).

Broadband technology can be argued as an enabler in creating economic growth as shown by Lehr *et al* (2005) and Crandall and Jackson (2001). As economic growth is important to a developing country like South Africa, the tools that enable such growth are also important.

ADSL dominated the broadband technologies available in South Africa with approximately 66% of the market share in 2005 (Goldstuck, 2005:7)[4]. This trend is also seen worldwide with 60% of worldwide home broadband connectivity being dominated by ADSL (ITU, 2005). This points to the fact that ADSL is universally seen as a very important broadband technology.

ADSL is currently the only technology capable of providing broadband over the existing twisted pair local loop in South Africa. This makes it an important resource to provide broadband access over existing infrastructure. As very few additional network elements are required to ensure a rapid roll out of the service (DSL Forum, 2006:1), ADSL is seen as a cost-effective way to roll out broadband services to consumers (Wilsdon and Stedman-Jones, 2002:20). Wilsdon and Stedman-Jones (2002:20) found that the local loop would remain the most effective means through which broadband can be delivered to the population. These factors mean that ADSL could theoretically be available to all fixed line telephone subscribers at little additional infrastructure cost, thus giving it the potential to grow rapidly. The only current technological limitation of ADSL in terms of distance is that the subscriber would have to be within roughly a 5 km radius of the local exchange (DSL Forum, 2006:1). This limitation does not exclude subscribers that are outside this radius, these subscribers may still access the service at reduced throughput speeds (DSL Forum, 2006:1).

This study investigates the regulatory mechanisms that would be most appropriate to increase the uptake of ADSL in South Africa. One may wonder why the need to encourage the growth of broadband when the number of ADSL subscribers in South Africa trebled from 2003 to 2004 and then doubled from 2004 to 2005 (Goldstuck, 2005:13)? There were about 120 000 ADSL subscribers by the end of 2005

[4] The number of wireless broadband subscribers overtook the number of ADSL subscribers for the first time by the end of 2007 (Goldstuck, 2007:6).

(Goldstuck, 2005:11) and about 378 000 ADSL subscribers by the end of 2007 (Goldstuck, 2007:6) in South Africa. By contrast, the UK has about 7 million ADSL subscribers (Mueller, 2006).

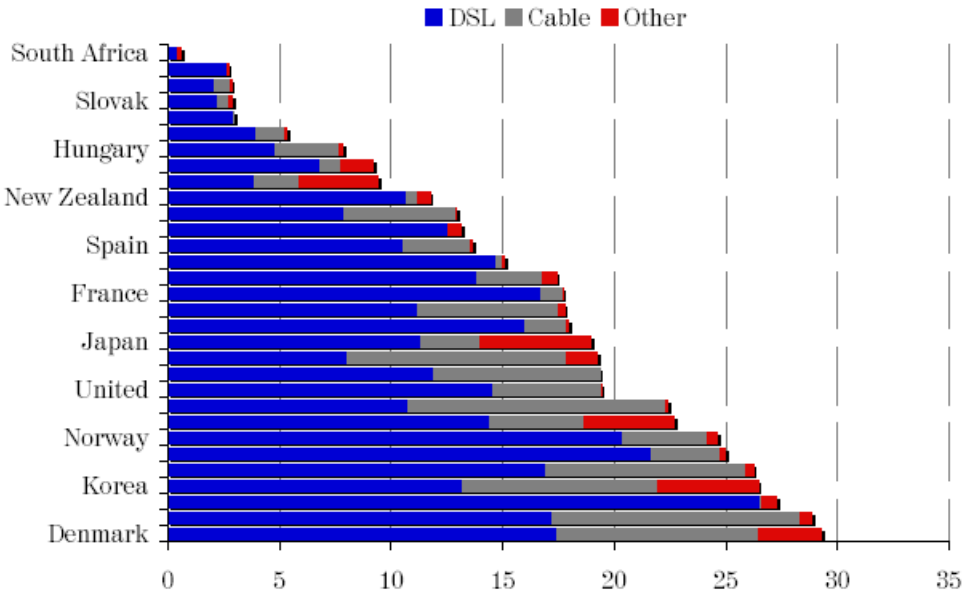

Figure 1.1: OECD broadband subscribers per 100 inhabitants in June 2006 (Gillwald *et al* 2006:52)

When one compares South Africa's broadband figures with the rest of the world (as seen in Figure 1.1), we are most certainly falling behind. This assertion is supported by Gillwald *et a*l (2004), who found that ADSL in South Africa was lagging far behind countries at similar stages of economic development, e.g. Argentina, Mexico and Chile. They also found that South Africa's broadband penetration as a percentage of residential lines in 2004 was 0,8%, significantly behind the average of 1,96% in other comparable countries in the lower-middle-income index (Gillwald *et al,* 2004:12). These views are echoed by Christian (2006:12) who stated that in terms of ADSL, South Africa is some way behind the rest of the world. Figure 1.1 illustrates this clearly.

There is certainly a problem of uptake of ADSL in South Africa and the importance of broadband services such as ADSL in facilitating socio-economic upliftment cannot be ignored. It is thus important to research the effect of regulatory initiatives on the uptake of ADSL in South Africa in order to facilitate the uptake of ADSL. The debate around the type of regulatory intervention was investigated by putting forward semi-

structured questions on regulatory intervention and ADSL uptake in South Africa to a predetermined group of interviewees. The responses of the interviewees as well as examples of regulatory intervention around the world were then evaluated in terms of their effectiveness and applicability to the South African environment. These responses enabled one to evaluate whether regulatory intervention is required to increase ADSL uptake and the manner in which such intervention could be implemented.

2. Literature Review

The telecommunications environment has changed appreciably in South Africa in the last three years. The introduction of Neotel, the second network operator in South Africa, as well as Sentech being awarded a carrier of carriers and a multimedia telecommunications licence effective from 1 February 2005 (Sentech, 2008:1) should have increased the uptake of broadband connections appreciably, as Sentech launched a wireless broadband offering thus competing with Telkom's ADSL offering. In 2005, there were about 150 000 broadband[5] users in South Africa and, taking into account predicted growth rates until the end of 2008, this figure will still only represent 31% of the Internet user base (Goldstuck, 2007:5). These figures point to a lack of uptake of broadband services in spite of the fact that there have been significant changes in the market that would ordinarily have led to a greater uptake of broadband services. As this study looks at the relationship between regulatory intervention and ADSL uptake, it is important to look at the literature that relates these two concepts.

The literature surveyed that relates to broadband uptake and regulation can be categorised into three distinct threads. These are:

a) Arguments that support the view that regulation promotes broadband uptake;

b) Arguments that support the view that regulation does not necessarily promote broadband and may actual hinder broadband uptake;

c) Arguments that support the view that light regulation is conducive to broadband uptake;

While it may seem that light regulation could be seen as a sub-set of promoting regulation in general, there are distinct differences. Regulatory intervention in this context is may be seen as 'heavy-handed' structural intervention with explicit rules and regulations. Light touch regulation is much less onerous and generally less intrusive.

[5] This is the total number of broadband users, including the 120 000 ADSL users.

2.1 Why Regulate?

The research investigates at the relationship between ADSL and the need for regulation, and so the question may be asked 'Why Regulate?' in the first place. There are several reasons that can be found in the literature that compel a regulator to intervene in a particular sector and make regulations (Melody, 1997; Baldwin and Cave, 1999; Bourreau and Doğan, 2000; Jordana and Levi-Faur, 2004). Bourreau and Doğan (2000:4) stated that:

> *'One of the main objectives of sector-specific regulation is to ensure an evolution to a self-sustaining pro-competitive market structure in which the firms behave in a competitive manner so that benefits from competition, in terms of lower prices, better quality and extended variety of product choice, are attained'*.

In the ADSL environment in South Africa, no competition exists, with high prices (ICASA, 2005:10) and limited choice in terms of alternative products. This environment thus lends itself to be a prime candidate for regulatory intervention.

Bourreau and Doğan (2000:4) further state that another important objective of regulation is to attain the maximal market growth in terms of both volume and value so that markets achieve both lower costs and new products. Baldwin and Cave (1999) also lists some of their reasons for regulating. Those that are applicable to the South African environment are listed and discussed.

2.1.1 Monopolies and natural monopolies

Baldwin and Cave (1999) further list three factors that facilitate and sustain monopoly pricing:

a) 'When a single seller occupies the entire market' (Baldwin and Cave, 1999:10). There is currently a single ADSL operator in South Africa which renders the ADSL market a monopoly market.
b) 'The product being sold cannot be substituted and used by another product' (Baldwin and Cave, 1999:10). It can be argued that ADSL can be substituted by several other wireless broadband offerings-although no

other fixed line substitute exists which supports the case for regulating in South Africa.

c) 'Sufficient barriers to entry that prevent other firms from entering and exiting the industry' (Baldwin and Cave, 1999:10). As local loop unbundling has not yet occurred in South Africa, reaching the end-user would prove a challenge to any new entrant.

The current ADSL environment in South Africa seems to support some of the criteria set out by Baldwin and Cave (1999) as sufficient justification for regulating the ADSL market. There are further examples in the current South African ADSL market that could be considered as a rationale for regulation.

2.1.2 Information Inadequacies

'Information inadequacies occur when customers are not sufficiently well informed to evaluate competing products' (Baldwin-Cave 1999:12). It could be argued that due to the incumbent ADSL operator's billing mechanism of splitting the access portion of ADSL and the Internet portion[6], it would be difficult for the end-user to make a valid comparison with international DSL charges.

2.1.3 Anti-competitive behaviour and Predatory Pricing

Baldwin and Cave (1999:12) stated that markets need not be deficient only because of a lack of competition. Anti-competitive behaviour, i.e. behaviour that is not conducive to competition, is also grounds for regulation. Anti-competitive behaviour and predatory pricing can be seen as credible risks for South Africa in the monopoly operated ADSL market.

2.1.4 Scarcity and Rationing

Baldwin and Cave state that the use of regulatory mechanisms may be justified rather than market mechanisms when a resource is in short supply (1999:14). Several presenters at the ICASA ADSL hearings pointed out that although

[6] As of 1 August 2007, Telkom is offering a single charge DSL package at wholesale and retail levels.

international bandwidth prices have dropped considerably from 2000 until 2005, this price drop was not reflected in South Africa's bandwidth costs (ICASA, 2005:8). As Telkom had the monopoly[7] on the SAT3 cable which provides South Africa with its international connectivity to Europe, one would consider bandwidth a scarce resource currently in South Africa. Telkom seems to have deliberately rationed the supply of bandwidth in South Africa. Telkom currently utilises only 40 Gbs of a possible total capacity of 120 Gbs (South Africa Foundation 2005:31) and they are the only entity that has exclusive rights to landing stations within the borders of South Africa (South Africa Foundation 2005:31), which prevents operators from buying bandwidth from other providers.

2.1.5 Distributional Justice and Social Policy

Baldwin and Cave further pointed out that it is up to the regulator to regulate in the public interest when it is necessary to protect the public interest (Baldwin and Cave, 1999:14). There are significant socio-economic advantages that are enabled by broadband technology and the importance of broadband has been identified by the governments around the world as a key enabler to economic growth (Lehr *et al,* 2005:7). Broadband can contribute to this by improving and enabling education, information, and increased efficiency. It can reduce costs, overcome distance, open up markets, enhance understanding and create employment (ITU, 2004:2). Thus access to broadband can be regarded as a matter of national importance and it could be argued that it should thus be regulated.

The five reasons for regulating listed above forms a basic guideline that is applicable to the South African environment. Baldwin and Cave list five further possible reasons for which the use regulation could be justified. They further point out that one has to compare the market and all its failings to regulation and all its failings (Baldwin and Cave, 1999:16). These reasons for regulation are not exhaustive and there are other commentators that argue the case for regulatory intervention (Melody, 1997; Jordana and Levi-Faur, 2004). Baldwin and Cave as well as Bourreau and Doğan are cited as typical examples of the body of literature

[7] Telkom's exclusivity to the SAT3 cable ended in April 2007.

that exists for the justification of regulatory intervention. Ultimately, a decision would have to be made based on the circumstances of a particular country as to whether regulatory intervention in a market is justifiable or not.

2.2 Regulation promotes broadband uptake

Several countries around the world use regulation as a tool to promote the uptake of broadband services. For example, OFCOM in the United Kingdom reviews the market periodically to ensure that the 'appropriate regulatory framework is in place' in order to sustain and encourage growth of the broadband sector (OFCOM, 2005:5). This is one of OFCOM's specific objectives which they achieve by reviewing their broadband regulations on an ongoing basis to ensure that they are consistent with the current market. These broadband regulations include regulations dealing with wireless broadband access as well as regulations dealing with local loop unbundling (amongst others) (OFCOM, 2005:5).

The International Telecommunications Union (ITU) is an example of an international organisation that promotes the use of regulations as a tool to increase broadband access. In 2004, the ITU developed recommendations regarding broadband access which stated that countries should develop regulatory initiatives that should be directed at improving broadband access which are in the best interests of its citizens (ITU, 2004:2). The ITU clearly sees regulation as an enabling factor for broadband access and has actively encouraged its member states to develop broadband regulations.

There are other examples where it is shown that regulation promotes broadband uptake. Marcus (2005) analyses the forms that regulation can take by which it can support broadband uptake. These are regulations that:

- Call for the full unbundling of lines where the incumbent 'rents' (Marcus, 2005:2) a copper pair to another operator for its exclusive use;

- Call for the 'shared access' (Marcus, 2005:2) of lines where the incumbent continues to provide telephony service but should make the line available to other operators;
- Call for 'bitstream access' (Marcus, 2005:2) where the incumbent deploys a high-speed access link to the customer premises and then uses the transmission capacity of that link to provide a wholesale product that enables new entrants to offer their own high-speed broadband services to their clients;
- Call for a simple 'resale mechanism' (Marcus, 2005:2) where the new entrant buys capacity from the incumbent and resells to end users.

These regulatory induced initiatives cited by Marcus are credited for being responsible for one quarter of the 12 million new broadband connections in the European Union during the period July 2003 to July 2004 (Marcus, 2005:2). This can be considered as credible evidence that regulatory measures do increase broadband uptake.

The local loop can be considered as an essential facility that cannot be easily or economically replicated and this puts the incumbent operator in a dominant position. The OECD (2002) has noted this and has highlighted the importance of 'fair and non-discriminatory' access to network elements in a country's broadband infrastructure. Local Loop unbundling was thus seen as a major regulatory initiative that should be undertaken by regulators (OECD 2002:4). Local Loop Unbundling (LLU), however, should be approached with caution according to Gilbert & Tobin (2001). They found that the success or failure of LLU depended on a variety of issues that were unique to a particular country. For example:

a) LLU in the US was found to be fairly successful based on the high level of its utilisation, with the FCC taking a very 'activist' role in driving the implementation of LLU by engaging their own experts who designed and tested the incumbents LLU systems (Gilbert & Tobin, 2001:6). It should be borne in mind the US has the longest history of implementing LLU (Gilbert & Tobin, 2001:6). Some criticism that Gilbert & Tobin (2001) direct at the FCC is that they imposed overly stringent obligations on incumbents, which in turn led

to a delay in the competitive benefits of LLU being passed onto the consumers (Gilbert & Tobin, 2001:7).

b) The Hong Kong approach was different from the US, although LLU was implemented in both countries at around the same time. The regulator, OFTA, adopted a 'hands-off' approach in implementing LLU and relied more on bilateral commercial negotiations with the regulator facilitating the negotiations (Gilbert & Tobin, 2001:8). Another unique factor for the success of LLU in Hong Kong was that it has very high population densities which necessitated the need for LLU as alternate network deployment was not possible (Gilbert & Tobin, 2001:8).

c) The third of the 'top three LLU successes' as identified by Gilbert & Tobin (2001) was Australia. Australia's success was attributed to its well-developed industry self-regulatory process which led to LLU being implemented in that country in a relatively short timeframe with comparatively little controversy (Gilbert & Tobin, 2001:9).

Both the Australian and Hong Kong experiences, although unique in their circumstances, would point to the notion that regulation would be the ideal mechanism to be used for LLU. As stressed above, the particular circumstances of the country would have to be taken into account. South Africa does not have high population densities throughout the country similar to that of Hong Kong, or a well-developed industry self-regulatory process. South Africa would also have to bear in mind the myriad of problems faced with LLU, some which have been identified by Gilbert & Tobin (2001) are listed below:

a) *Under estimation of the complexity of the technical and operational difficulties of LLU* (Gilbert & Tobin, 2001:11)*;*
b) *Under estimation of the competitive implications of the technical and operational issues of LLU* (Gilbert & Tobin, 2001:11)*;*
c) *Over estimation of the capacity of industry self-regulatory processes to address technical and operational issues* (Gilbert & Tobin, 2001:11)*.*

Other commentators like Bar *et al* (1999) go as far as to say that 'When doing nothing is doing harm' when describing a regulator's approach to broadband. They analyse the success of United States (US) in promoting the Internet revolution by regulatory practices that supported network openness and interconnection and state that such regulations are required to address issues around broadband network infrastructure.

The US model is also discussed by Faulhaber (2002) who investigated the notion that regulation did not increase broadband uptake found just the opposite, i.e. that regulation had a profound effect on the uptake of broadband and that it is one of the key drivers of the uptake of broadband in the US. He also sets out to investigate the claims that the FCC regulations were the cause of slow deployment in the US and that these regulations actually reduce the broadband investment incentives of operators. He found that there was no empirical evidence to suggest that the FCC regulations were hindering the growth of broadband (Faulhaber, 2002:7). The FCC regulations are discussed further under the 'light regulation' thread later on, but from this study at least, it can be seen that regulations did have a positive effect on the uptake of broadband.

Looking closer to home, we can look at regional examples which show a positive link between regulations and broadband uptake. For example, Cohen (2008:1) reported that studies have shown that infrastructure sharing (facilitated by local loop unbundling) can reduce cost and capital expenditure components by as much as 40%. She pointed out that in countries like Bahrain, Egypt, Morocco and Saudi Arabia, growth and success relied extensively on sharing the incumbent's local loop based on the fact that rolling out alternate local loop infrastructures can be prohibitively expensive (2008:1). Cohen further states that market reports have indicated that since LLU was enforced in Morocco in 2007, the broadband market had grown by 19% within six months and she attributed these successes to policy and regulatory interventions (2008:1). Cohen therefore clearly attributes the uptake of broadband services to LLU brought about by regulatory intervention.

2.3 Regulation does not promote broadband uptake

While certain commentators see regulatory intervention as being important to encouraging growth of ADSL and broadband in general, there are other differing views. Howell (2003:3) contends that regulatory intervention is not a 'solution' to low levels of broadband uptake and that the low uptake could possibility be attributed to a paucity of broadband applications.

Local research by Gillwald *et al* (2005) has investigated South Africa's well developed communications sector and attributed the success of this sector to a better infrastructure and a higher GDP per capita compared to other developing countries in Africa, rather than the policy and regulatory reform initiatives that have occurred. In fairness to Gillwald, she does argue that regulation is required for a working market, but that regulatory failure can do more damage. Her research does not suggest that future regulation would not be necessary to drive broadband growth.

According to some commentators, regulation aimed at increasing broadband uptake may actually have an inverse effect. Hazlett (2002:4) shows that unbundling regulations imposed by the FCC in the United States have had the effect of reducing broadband investment incentives and thus in turn reduced broadband penetration. Operators would rather use an incumbent's network than building their own, leading to very little expansion of the infrastructure. This view would have to be put in a South African perspective where there is currently no broadband policy, no broadband regulation and no competition in the fixed line ADSL market.

The telecommunications regulator of Hong Kong (OFTA) is also cognisant of the risk involved when the telecommunications operator has little incentive to invest in infrastructure. OFTA recognises that investment in a broadband network is a risky investment 'because of the uncertainty in future demand' (OFTA, 1997:2). When a rival operator requests access to an incumbent broadband operator's network immediately after the incumbent had invested in new broadband infrastructure, it places the incumbent in a position where it would bear the complete risk of the installation (OFTA, 1997:2). The competitor does not bear any risk and only seeks access to the broadband infrastructure when customer demand exists (OFTA, 1997:2). This type of arrangement did not seem to be equitable to OFTA as it would 'seriously undermine the commercial incentive for the operator to take the

commercial risk of making an investment in the infrastructure for the broadband services' (OFTA, 1997:2). OFTA has tried to work around this problem by drafting regulations that would not allow access to a competing operator to an incumbent's network for certain types of infrastructure for broadband conveyance services within the first three years of commencement of operation of the incumbent's services. This example shows that even well meaning regulations can have negative consequences. While a certain objective like increasing competition may be met by drafting unbundling regulations, other objectives like investing in infrastructure for future growth may be severely curtailed.

2.4 Light regulation promotes broadband uptake

While heavy handed regulations have drawn both positive and negative support from commentators, a third strand can also be seen in the literature. This strand of literature looks at the effect of light regulatory intervention or 'light touch regulations'. New Zealand for example has one of the lightest telecommunications regulatory regimes in the world while also having some of the highest levels of broadband uptake amongst OECD countries (Howell, 2003:3). Similarly, Crandall (2004a) noted that, although Canada has lighter unbundling obligations than the US, its broadband penetration is 60% more. This may support the view that lighter touch regulation is required to stimulate broadband uptake, without actually over-regulating the market and causing more harm.

Crandall *et al* (2002) also looks at the US model where cable broadband providers are not subject to any regulations for the provision of broadband services while ADSL providers are subject to price regulation as well as unbundling regulations. Interestingly, it is the unregulated cable broadband market that is growing faster than the regulated ADSL market (Crandall 2002:14). Crandall suggests that this form of asymmetric regulation should not be practised and that telecoms operators should be defined in terms of whether they are dominant or non-dominant in the market (Crandall 2002:15). Using this method of differentiation, only dominant companies should be lightly regulated to prevent any anti-competitive practices and the non-dominant companies should be exempt from regulation. This model has worked in

the cable broadband service provision and there is no reason why it should not work for ADSL service provision.

The FCC defines a dominant carrier as a carrier possessing market power which depends upon the:

a) *market share;*
b) *demand elasticity;*
c) *supply elasticity; and*
d) *cost and size disparity.* (Crandall 2002:01).

Crandall does not explicitly suggest that regulation does not promote the uptake of broadband and has shown that increased broadband penetration can be credited to light regulatory intervention (Crandall *et al* 2004b). Using the FCC criteria or something similar for determining market power could be used to determine who should be regulated in South Africa and who should not.

Further investigation of the US market reveals that different regulatory models were adopted at different times during the past few decades. Theirer (2005b) drew up a table listing the models of electronic communications industry regulation in the US and stated the result of each model. A summary of his findings are listed in a Table 1.1. It is clear that different models of regulatory intervention have had different results. The models start from a highly regulated environment and eventually moves on to a light touch regulatory environment with little or no inhibiting regulations.

Model	Description	Result
Model No. 1: Regulated Monopoly/Public Interest Policy.	The traditional model of utility industry regulation employed throughout most of the 20th century.	No market competition, limited innovation and entrepreneurialism, poor service quality, limited choices, no price competition.
Model No. 2: Managed Competition/Deregulatory Industrial Policy.	Followed the 1984 AT&T divestiture, which was sparked by several important FCC and court decisions in the 1960s and 1970s	Limited deregulation in certain sectors and *status quo* in others, innovation and investment hindered by regulatory delays, limited price and entry competition, consumer choice limited to sectors with regulatory freedom.
Model No. 3: New Internet/Computer Industry Free-Market Principles.	During the past two decades, free-market principles have allowed the American computer industry to develop quickly and efficiently.	Vigorous competition, unparalleled innovation and entrepreneurialism, high-quality products and services, extensive choices, serious price competition.

Table 1.1: Models of Industry Regulation (Theirer, 2005b)

The model of limited or no regulation (Model 3 above) was seen by Theirer (2005b) as the most successful model. In this model, free market principles, open access to render services without regulatory oversight stimulated competition in this sector which resulted in lower prices, high quality products, better choice and facilitated competition. Applying this model to broadband access was seen by Theirer (2005b) as being the ideal solution to promote broadband access in the 21st century. He then went a step further and formulated a five step process to describe this model in greater detail.

Step 1: 'Deregulation and open markets'

Theirer (2005b:17) found that imposing extra regulatory steps onto emerging technologies could actual impede the development of the market and the technology associated with it. He found that regulators should resist the urge to 'micro-manage every facet of this complex industry' (Theirer, 2005b:17). A better approach would be to allow voluntary-market driven factors to govern the development. This approach is consistent with a light-touch regulatory approach.

Step 2: 'Legal simplicity and stability'

Theirer (2005b:17) found that complex, ever changing and sometimes contradictory regulatory regimes actually inhibit innovation and investment in the telecommunications sector rather that promote it. He advocates a re-evaluation of the current regimes and suggests an updated and simplified approach to regulation, giving further credence to the thread of literature that promotes a light touch approach to regulation.

Step 3: 'Regulatory parity and uniformity'

Theirer's (2005b:18) research suggests that in the US market, the same regulatory approach is not applied to operators. He further suggests that the US Congress should ensure all that companies in the industry are regulated equally and that 'archaic regulatory distinctions' (Theirer, 2005b:18) should be scrapped. This approach suggests a move from a highly regulated regime to one that follows a light touch approach.

Step 4: 'A single open market system'

Theirer (2005b:18) contends that consumers in the US should be free to purchase their broadband services from whomever they want without encountering 'conflicting state or local mandates' (Theirer, 2005b:18). He goes on to say that state and local regulations that interfere with interstate communications commerce must be prohibited. This approach again is a competition driven initiative that is coupled with minimal regulatory involvement.

Step 5: 'Agency constraint and downsizing'

Theirer (2005b:19) felt that regulatory reform alone 'will not solve Washington's propensity to expand agency missions and funding' (Theirer, 2005b:19). He advocated that a deregulated telecommunications market should also 'be free of constant federal micromanagement' (Theirer, 2005b:19). This approach involves intentionally restricting regulatory interference as this would to allow 'unfettered and dynamic' (Theirer, 2005b:19) market development. Theirer noted that the current regulatory system in the US could be described as 'hopelessly convoluted and ever-changing' (Theirer, 2005b:19) which did nothing to promote the development and deployment of broadband. This step is the final step that mandates a light touch approach to regulating broadband in the US using sound, market-oriented and proven principles.

South Africa has no broadband regulations and has an ADSL penetration of 0,8% (Gillwald *et al,* 2004:12). This figure has room for improvement and regulations governing ADSL may assist in growing this figure. There would always be evidence that supports a particular theory. What works in the US, Canada or New Zealand may not necessarily work in South Africa. The US, for example, is a far larger market than South Africa with 150 million Internet users (World Metrix, 2006:13) as compared to South Africa's 4.4 million users (Goldstuck, 2007). The size of the Internet market would possibility have an influence on the type pf regulatory intervention required. The unique circumstances of each country would dictate the best strategy.

2.5 Other factors that may affect the uptake of broadband

There are other factors that affect the uptake of ADSL and broadband services in general, that may not be able to be clearly classified as light touch or heavy handed regulatory intervention. The reason for the difficulty in classifying them lies with the fact that the actual method of implementation of these factors would determine how they would be classified. These factors are listed for the sake of completeness, although the level of regulatory intervention is not stated.

2.5.1 Broadband and Competition

There are some suggestions that competition regulation increases broadband penetration. Increased broadband penetration can thus be credited to regulatory intervention (Crandall *et al* 2004b, Fisher *et al* 2003:11). Gillwald *et al* (2005) felt that further competition in the fixed line sector with the introduction of the Second Network Operator (SNO) would cause Telkom 'aggressively' (Gillwald *et al,* 2005:133) to market ADSL. Aggressive marketing combined with lower prices brought about by competition would increase the number of connected broadband lines. Until Neotel rolls out an ADSL service, there is no direct competition to Telkom's ADSL service. It should be noted that competition in the broadband sector as a whole does exist - there are currently Sentech's MyWireless, WBS's iBurst, Vodacom 3G and MTN 3G[8].

There are also views contrary to the above; i.e. competition does not necessarily increase broadband penetration. Fisher *et al* (2003) reports that 46% of all broadband service providers in the competitive US and UK went bankrupt or were acquired by 2001. This attrition was attributed to questionable business plans and a market that could not sustain too many players. It is worth noting that broadband penetration did increase during this period, although the rate of adoption decreased by 25% (Fisher *et al* 2003:5). Although this may be a real threat in developed first world countries, it may not apply to a developing country like South Africa where investors are possibly hesitant to put money into IT infrastructure of the country. More competition in the South African ADSL environment could only lead to better service and pricing due to operators competing over customers.

There are further views that subscribe to the idea that competition does support broadband uptake, although the uptake is due to largely to competition in terms of the broadband access market rather than regulations around local loop unbundling. Lee (2006) found that the availability of different broadband platforms was the main driver of broadband diffusion in the United States. Her study implied that 'discussions

[8] Cell-C has not launched a commercial 3G service at the time of writing.

over broadband policy in the United States should be shifted from the effect of local loop unbundling regulation to the effects of platform competition in the broadband access market'. Lee (2006:21) found that facilities-based competition with a strong platform for competition brought choice for customers and thus exerted downward pressure on costs and prices. It also created incentives for service innovation and all these factors have led to an uptake of broadband in general.

Lee's findings were correlated by DotEcon (2003) who used the European market as a case study. They found that facilities-based competition using competing technologies was actually preferable to access-based competition as it led to greater competition over more aspects of an operator's activities. This led to real choice for the customer and again exerted downward pressure on prices and facilitated innovation (DotEcon, 2003:33).

2.5.2 Pricing

Pricing was identified in the current literature as a factor that is contributing to the slow uptake of broadband in South Africa. The South Africa Foundation found that 'Telkom's pricing structure is excessive and that some sort of intervention in the market is appropriate' (South Africa Foundation, 2005:15). Although this refers to Telkom's pricing in general, the pricing also includes the ADSL service. They further found that South African ADSL broadband is the most expensive of 15 comparison countries (despite the fact that a number of the international products sampled had a substantially higher product specification such as higher ADSL speeds than the Telkom ADSL offering), even if the ISP fee which is also necessary for ADSL connectivity is not included. They concluded that the high price of the South Africa's telecommunications services was hampering the uptake of the services in South Africa and acting 'as a tax on industry and a drag on economic growth' (South Africa Foundation, 2005:1) .

It is also important to note that there are also some commentators that have found no correlation between the price of ADSL services and the uptake of ADSL services. An example would be Thierer (2005a:2) who suggested that the price of the ADSL service could not be attributed as a factor hampering the uptake of ADSL.

It is a good possibility that regulators worldwide must have also noted the effect of price on the uptake of broadband and have tried to implement mechanisms to reduce such prices. There are real world examples of regulators decreasing prices in order to increase the uptake of ADSL. One example would be the Telecoms Regulatory Authority of India (TRAI) which found that Indians paid 60 times more for their broadband access than subscribers in Korea and hence drew up regulations aimed at decreasing the prices of broadband with the aim of increasing broadband penetration levels to up to 50 times of what is currently is (TRAI 2004:4). This initiative worked with India now boasting some of the cheapest broadband service prices in the world (TRAI 2004:5).

Price would probably always be a factor in determining the uptake of ADSL and using regulatory initiatives that would lower prices which would increase uptake is an option available to regulators. This causal chain of events can be demonstrated by OFCOM who implemented local loop unbundling in 2004 and saw a decrease of 70% in shared loop prices which in turn decreased the price of ADSL services in the United Kingdom (OFCOM 2005:2).

2.5.3 Non-regulatory factors

Other factors that affect broadband uptake are completely non-regulatory in nature. The South Africa Foundation (2005:15) suggested that the lack of availability of computers may be a factor in hampering access to the Internet and hence to broadband. Prieger (2003) felt that governments around the world should pursue policies to encourage IT infrastructure development through tax incentives, loan programmes, or other means. There are significant socio-economic advantages that are enabled by broadband technology (Lehr *et al*: 2005). These developmental and socio-economic issues are certainly important factors in encouraging broadband uptake, but this literature will not be reviewed in detail as it falls outside the scope of telecommunications regulatory intervention.

2.6 Summary

The literature studied above shows a wide variety of varying approaches to a common problem - the uptake of broadband. The arguments presented in the current literature can be summarised as follows:

- That regulation is essential in increasing the uptake of ADSL;
- That regulation does not necessarily increase the uptake of ADSL (and may actually hinder the uptake of ADSL); and,
- That appropriate light regulation increases the uptake of ADSL.

The literature researched provides differing views on the effect of regulatory intervention on the uptake of ADSL in different parts of the world. Regulatory intervention that has worked well in one part of the world did not work in others. The effect of regulatory intervention on the uptake of ADSL has not been researched with the South African market and regulatory environment in mind and provides scope for a valuable area of research.

This leads to the research question of whether any regulatory intervention is required to increase the uptake of ADSL in South Africa. If it proves to be the case that regulatory intervention is required, the type of such intervention will be identified, as well as how best the regulator should manage the sometimes opposing interests of the consumer, the Internet Service Providers and the Network Operators.

The literature studied also indicates that there are other, non-regulatory factors that affect the uptake of broadband, but these factors will not be included in this study.

3. Research Questions

The literature surveyed has clearly identified a link between regulatory intervention and the uptake of broadband services. The purpose of the research is to determine whether regulatory intervention is required to increase the uptake of ADSL in South Africa. If such intervention is required, the type(s) of intervention will be identified.

Following on from the literature review, the area of inquiry is focused upon the effect of regulatory intervention on the uptake of ADSL in South Africa. To that end, the following central research question and sub-questions are asked. The central question is:

Should there be regulatory intervention to simulate the uptake of ADSL in South Africa and, if so, what form should this intervention take?

Other sub—questions asked are:

- Should the regulatory intervention focus on ADSL or address broadband technologies as a whole?
- What are the key factors that can be identified that are hindering the uptake of ADSL and how can regulation address and mitigate these issues?
- What are the key factors that can be identified that are facilitating the uptake of ADSL and how can regulation support these issues?
- What (if any) policy initiatives should be in place before regulatory intervention can be effective?

The central question related to the specific qualitative strategy of inquiry is based upon the use or not of regulatory intervention to stimulate the uptake of broadband in South Africa. The literature reviewed identified three strands which describe the effect of regulation on the uptake of ADSL and the central question aims to determine which of these three strands are applicable to the South African ADSL market. The manner and form of this intervention (if required) is also identified and bench-marked against international experience.

The first sub question ‘Should the regulatory intervention focus on ADSL or address broadband technologies as a whole?’ investigates the need for a holistic broadband regulation that would or would not be technology neutral. The sub question addresses the effectiveness of an ADSL specific regulation. The literature surveyed points to facilities-based competition being preferable to platform based competition and this sub question would test the importance of having platform-based regulations or facilities-based regulations.

The next sub question ‘What are the key factors that can be identified that are hindering the uptake of ADSL and how can regulation address these issues?’ looks at the difference in the regulatory measures suggested by these two groups, and a decision will have to be reached on the best way forward based on the research conducted and by looking at international examples.

The third sub-question ‘What are the key factors that can be identified that are facilitating the uptake of ADSL and how can regulation address these issues?’ looks at what needs to be done to increase broadband penetration in South Africa by examining what is preventing this technology from growing at a faster rate. This question is limited in scope and only focuses on telecommunications regulatory intervention. Socio-economic factors do not form part of the scope of the discussion. The literature surveyed listed key factors that affect the uptake of broadband services generally and this sub-question would identify those factors that are applicable to the South African environment.

The final sub-question ‘What (if any) policy initiatives should be in place before regulatory intervention can be effective?’ focuses on the need for policy initiatives to support the regulatory process. This question is aimed at determining the need for policy and not to investigate the type of policy initiatives that are required.

This topic is relevant to public development and management as broadband is well documented as a key enabler for e-commerce, education, health, safety and a plethora of other applications (Lehr *et al*, 2005; Crandall and Jackson, 2001). These applications all relate directly to public development and management.

4. Methodology

The basic characteristic of this research proposal is a qualitative study regulatory intervention affecting the uptake of broadband technology in South Africa. Babbie describes a qualitative analysis as one that 'involves the non-numerical examination and interpretation of observations, for the purpose of discovering underlying meanings and patterns of relationship' (Babbie, 2004:370). The intent of a qualitative research paradigm is to understand a particular social situation via an investigative process where 'the researcher gradually makes sense of a social phenomenon by investigating the object of the study' (Cresswell, 2003:198). The social situation being investigated in this instance is the effect of regulatory intervention on the uptake of ADSL. This is achieved by contrasting, comparing, replicating, cataloguing and classifying the object of the study (Cresswell, 2003:198). The qualitative research methodology has several unique characteristics that distinguish it from other research methods. Cresswell (2003:199) describes these unique characteristics as follows:

a) *Qualitative Research occurs in natural settings where human behaviour and events occur.*
b) *Qualitative research is based on assumptions that are very different from quantitative designs. Theory or hypotheses are not established a priori.*
c) *The researcher is the primary instrument in data collection rather than some inanimate mechanism.*
d) *The data that emerge from a qualitative study are descriptive. That is, data is reported in words rather than in numbers*
e) *The focus of qualitative research is on participants' perceptions and experiences.*

The effect of regulatory intervention on the uptake of ADSL is not based on any hypotheses and the investigation occurs in a natural setting of the ADSL market. The researcher forms the primary instrument in data collection using a semi-structured interview protocol whose output data would be descriptive in nature. The interviews would be used to focus on the interviewees' perceptions and experiences dealing

with the ADSL market in South Africa. It would thus seem that this study fits the criteria for a qualitative research methodology and such a methodology was subsequently implemented.

4.1 Research Instrument

The method of data collection employed was a semi-structured interview protocol. Huysamen (1993:26) suggests that interviews should be used when a researcher attempts to elicit opinions. Babbie (2004:273) suggests that interviews should be used as the primary source of data collection for qualitative research methodologies as they generally produce fewer incomplete answers. The interview schedule contained a mix of questions that is predominantly open-ended questions with exhaustive response categories as well as a few mutually exclusive closed-ended questions. This approach ensures greater uniformity of the responses received and also allows for easier data analysis (Babbie 2004:25). The resultant interview schedule contains some 26 questions spread over seven sections taking approximately an hour to complete.

There were thirteen interviews conducted to target specific groups of stakeholders as outlined in Table 4.1. The names of the organisations have been changed to ensure confidentiality of the respondents and have been replaced by acronyms. The acronyms used in the research are explained in Table 4.1.

A regulation was published by the ADSL committee of ICASA and the responses to this regulation are also used to gauge stakeholder perception of ADSL in South Africa. The responses to this regulation (via written and oral representations) are the secondary source of data for the research and these responses are analysed as part of the data analysis process.

4.1.1 The Interview Pilot

A pilot was conducted to pre-test the interview questions. Babbie (2004) stated that 'no matter how carefully researchers design a data collection instrument such as interview questions, there is always the possibility of error'

(Babbie, 2004:256). In order to protect against such errors, a pilot was conducted to pre-test the interview questions for any errors and incoherence. The sample was tested on colleagues at work as Babbie (2004:256) suggests that it is not necessary to choose a representative sample to conduct the pilot. The main output of the pilot from the test subjects was that the order and grouping of the questions needed to be improved to enable better readability and flow of the questions. A secondary suggestion made was to provide sub-headings for the newly created groups of questions. These suggestions were implemented into the final interview schedule.

4.1.2 Data Collection Procedure

The data collection method as discussed earlier is based predominantly on interviews, with the aforementioned responses to the ADSL regulation forming the secondary source of data. The interview schedule gathered information on:

- Whether or not regulatory intervention is required;
- if required, what sort of intervention should be implemented;
- the level of such intervention;
- the manner of form of the intervention;
- perceived barriers that prevent the uptake of ADSL;
- policy and broadband;
- broadband and ADSL.

4.1.3 Data Recording Procedure

Creswell (2003:188) suggests that qualitative researchers 'plan their approach to data recording'. As interviews were identified as the data collection procedure, an interview protocol was used to record the information during the interviews. The following components as identified by Creswell (2003:190) were implemented in the interview questions:

- *A heading.*
- *Opening statements.*

- *Key research questions.*
- *Probes to follow key questions.*
- *Transition messages for the interviewer.*
- *Space for recording the interviewer's comments.*
- *Space for recording reflective notes.*

There was no transcriptionist used for the interviews and a recording device was used to record the information. Handwritten notes as suggested by Creswell (2003:190) were used as a back-up to the recording equipment.

4.2 Sampling Methodology

Creswell (2003:185) found that 'purposefully selected sites or individuals' would be able to best help the researcher understand the problem and research question. For this reason, the interviewed sample does not necessarily represent the general public as a whole and may thus present a skewed sample of the population. This sample of the population was purposely targeted as they were best able to contribute to understanding the research question at hand as they are stakeholders to ADSL in South Africa. Table 4.1 represents the list of the stakeholders that have been identified.

No.	Interview Date	Stakeholder and Acronym
1	04/02/2008	Fixed Line Operator 1 (FLO1)
2	08/11/2007	Fixed Line Operator 2 (FLO2)
3	24/08/2007	Cellular Operator 1 (CO1)
4	04/09/2007	Cellular Operator 2 (CO2)
5	12/09/2007	Cellular Operator 3 (CO3)
6	12/09/2007	Internet Service Provider 1 (ISP1)
7	07/11/2007	Internet Service Provider 2 (ISP2)
8	18/02/2008	Internet Service Provider 2 (ISP3)
9	08/02/2008	Wireless Broadband Operator 1 (WBO1)
10	18/02/2008	Wireless Broadband Operator 2 (WBO2)
11	07/11/2007	Regulator (REG)
12	31/08/2007	Consumer Activist Group (CAG)
13	29/11/2007	Internet Service Provider Group (ISPG)

Table 4.1: List of Stakeholders

4.3 Data Analysis

Lofland (cited in Babbie, 2004) suggests six different ways of qualitatively analysing patterns in a particular research topic. Lofland's ideas applied to this research topic are implemented as follows:

- Frequencies: How often to respondents coalesce around similar ideas?
- Magnitudes: What are the levels of opposition/support for regulatory intervention?
- Structures: What are the different types of regulatory intervention suggested? Are they related in particular manner?
- Process: Is there any order among the elements of structures?
- Causes: What are the identifiable reasons cited for the low uptake of broadband in South Africa. Are they regulatory in nature? Are they policy in nature? Is the root cause of low uptake applicable to broadband as a whole or ADSL in particular?

- Consequences: How does the effect of regulatory intervention (or lack thereof) affect the uptake of broadband in South Africa?

4.4 Setting

The study was limited to the South African experience. However, international precedents were studied to gain an insight to international best practice. This would be particularly true when studying the regulatory effects of broadband. Predominantly urban environments were researched due to the fact that this technology is largely rolled out in these areas only.

In terms of the setting of the interviews, Babbie (2004) suggests that qualitative research should occur 'in a natural setting' (Babbie, 2004:181), thus the interview questions were administered at the site of the participant where possible or conducted telephonically when a face to face interview was not possible.

4.5 Definition of Broadband

It was important that the definition of broadband was standardised before the interviews could be conducted in order to prevent any misunderstanding on the part of the interviewee. Several different definitions of broadband were considered to be the 'official definition' for the purposes of the research. The International Telecommunication Union defines broadband as 'transmission capacity that is faster than primary rate ISDN, at 1.5 or 2.0 Mbit/s' (ITU 2006:113). The OECD defines broadband as downstream access of at least 256 kbps and upstream access of at least 128 kbps (Wilsdon *et al*, 2002:20). This is further complicated by the FCC definition of 'high speed broadband' as 'transmitting greater than 200 kilobits of data per second in one direction' (Crandall, 2003:2) with the Canadians defining broadband '…as a connection capable of transmitting data at greater than 1.5 megabits of data per second (Mbps) in both directions '(Crandall, 2003:2).

Any definition of broadband should be considered temporary as technological developments are constantly increasing the speed of broadband. As Wilsdon *et al*

(2002) aptly phrased it: 'What is regarded as broadband now may well be seen as narrowband within a few years' (Wilsdon *et al*, 2002:20). For this reason, the definition of broadband was included as a question to the interviewees and formed part of the analysis.

4.6 Limits of the Research

The study was limited to the investigating only ADSL in South Africa. Other broadband technologies available such as 3G from the cellular operators, WBS's I-Burst and Sentech's MyWireless were discussed but not studied in detail.

The factors that are preventing the uptake of broadband are policy issues as well as regulatory. These policy issues were highlighted but it should be noted that study was confined to looking at the regulatory remedies that could be effected.

The sample chosen for the interviews also represent a limitation as the sample does not represent all ADSL stakeholders in South Africa. The interviewee sample was chosen based on key broadband stakeholders in the cellular, wireless and fixed broadband sectors. A representative from all these sectors was interviewed. The Internet Service Providers (ISPs) that submitted oral submissions at the ICASA ADSL hearings were chosen as interviewees to represent the Internet service providers in general. Of these ISP's, three had indicated a willingness to be interviewed and representatives from these ISP's were thus interviewed. A representative from all the cellular operators, fixed line operators and wireless broadband operators was also interviewed to cover all the key stakeholders. A representative from a Consumer Activist group as well as one from an Internet Service Provider Group was also included in the interviews.

4.7 Significance

A study of the uptake of ADSL in South Africa is important for several reasons. This compares South Africa with other similar developing countries. This would give a

clear indication of our progress in the international arena and the regulatory direction we may need to take. We can also learn from the mistakes of other countries in their pursuit of increasing the uptake of broadband as it is a goal that is by no means limited to South Africa. We could also avoid the pitfalls of over or under regulating by examining the views of the interviewees

4.8 The Role of the Researcher

The role of the researcher would be an impartial, objective assessor of the data being collected. No value judgments would be made. The interviewees were made aware that the interviews were conducted as part of the requirements for a Master of Management degree from the University of the Witwatersrand. It was further stated that the research was conducted entirely in the researcher's personal capacity for academic purposes only and did not in any way reflected an official ICASA position.

5. Research Results

5.1 Introduction

As discussed in the previous chapter, interviews were used as the data collection method to address the research question whether regulatory intervention was required to increase the uptake of ADSL in South Africa. This chapter will review the qualitative evidence obtained from these interviews and will report on the key findings of the evidence. The research results are presented in a question and result format based on the questions asked at the interviews. The questions are divided into six sub-sections which are linked to the research questions. The sub-sections were defined as follows:

a. **Introductory Questions and Definitions**

   These questions investigate the importance of ADSL as a broadband technology as well as investigate whether ADSL could be categorised as a broadband technology. The definition of ADSL is also discussed. The final part of this section looks at the importance of having an official definition of broadband in South Africa.

b. **Uptake**

   This section looks at the uptake of ADSL in South Africa when compared internationally and also looks at the positive and negative factors that influence the uptake of ADSL.

c. **Regulatory Intervention**

   This section forms the core of the research and looks at the competitiveness of the broadband market in general and then focuses specifically on ADSL by ascertaining whether regulatory intervention was required to increase the uptake of ADSL. The degree, manner and implementation of ADSL regulations required to increase the uptake of ADSL in South Africa is also discussed.

d. **Policy**

   These questions investigate the effect of policy on regulatory intervention and the effect of policy on the uptake of ADSL.

e. Miscellaneous

This section looks at other factors other than regulatory factors than may affect the uptake of ADSL in South Africa. Price regulation is also discussed here.

f. General

The final section is an open-ended section that allows the interviewees to make general comments on the research topic at hand.

5.2 Introductory Questions and Definitions

5.2.1 Do you regard ADSL as an important broadband technology for South Africa? Please elaborate.

Response	Value	Respondents
Yes	12	CO1,CO2, FLO2,WBO1,WBO2, REG,ISP1,ISP2, ISP3,CAG1, FLO1 ISPG1
No	0	
Qualified	1	CO3
% Yes	92%	
% No	0%	
% Qualified	8%	

Table 5.1: ADSL as an important broadband technology

The overwhelming majority of the respondents indicated that they regarded ADSL as an important broadband technology for South Africa. Only one respondent (CO2) disagreed with this statement and provided a qualified response. The argument used by CO2 centred on the fact that ADSL was a fairly old broadband technology that relied on older legacy infrastructure. This point of view was seen as a positive feature of ADSL by a number of other respondents (CO1, CO2, REG and CAG). They saw the fact that ADSL used existing infrastructure as a strong selling point of the technology and this increased its importance as a broadband technology. These respondents further saw ADSL as a technology that maximised the investment in existing infrastructure, which again added value to ADSL as a product offering and also added to the importance of ADSL as a broadband technology.

Although FLO1 agreed that ADSL could be regarded as an important broadband technology, FLO1 did not see it as being important to all people and stated that it was made seem important to all citizens by politicians. These comments were not captured as a qualified support for the importance of ADSL as a broadband technology as FLO1 agreed that it was important. It was thus captured as 'Yes' for the purposes of analysis.

5.2.2 What in your opinion should be the definition of broadband in South Africa?

Response	Value	Percentage	Respondents
<256 kbs	2	15%	ISP2,WBO2
256 kbs	5	38%	ISP1,REG,FLO1,FLO2,CAG
256-512 kbs	1	8%	WBO1
512-1024kbs	1	8%	CO3
>1024kbs	2	15%	CO1,ISP3
Do not Define	2	15%	CO2,ISPG

Table 5.2: The definition of broadband

The definition of broadband in South Africa drew a varied response from the interviewees. The largest percentage of the interviewees felt that a speed of 256 kbs should be regarded as the official speed of broadband in South Africa. This supports the current definition of ADSL in South Africa as defined by ICASA which states '…an always-on data connection that is able to support various interaction services, and has the capability off a minimum download speed of 256 Kbps.' (ICASA, 2005: 5).

It should be clearly stated that the question did not specifically ask for the minimum speed that should be included in the official definition of ADSL in South Africa. It simply asked for a definition of broadband in South Africa. All the interviewees understood the question as asking for a minimum speed in relation to ADSL and thus commented as such. WBO1 responded by adding that ADSL should be defined as 'Always on connectivity to the Internet offering speeds of 256kbps or more on the downlink, provided on a shared or best effort basis'.

WBO2 also attempted to add more to the definition of broadband in South Africa by stating that it should generally be associated with multimedia and high bandwidth content. WBO2 did not further clarify the definition and went on to describe speeds of broadband. The definition of broadband for South Africa based on speed being less than 256 kilo bits per second (kbs) was supported by 15% of the respondents. One of the respondents supported speeds of 256-512 kbs and a further respondent supported speeds of 512-1024 kbs. Interestingly, 15% of the respondents suggested that there should not be a restriction in the speed that should be included in the official definition of broadband in South Africa.

5.2.3 Would you classify ADSL into the broadband category?

Response	Value	Respondents
Yes	9	CO2,CO3,FLO1, FLO2,WBO1 REG,ISP1,ISP2,ISP3
No	1	WBO2
Qualified	3	CO1,CAG,ISPG
% Yes	69%	
% No	8%	
% Qualified	23%	

Table 5.3: Is ADSL broadband?

This question was aimed at determining whether the ADSL technology in general could be considered as a true broadband technology. 69% of the interviewees agreed that ADSL was a true broadband technology and could thus be classified in the broadband category. 8% of the interviewees did not consider ADSL to be a true broadband technology at all while 23% qualified their responses. The common thread among the 3 qualified responses received was that one could only answer this question if they were aware of the speed of the ADSL service in question. The speed of ADSL has been described earlier as being anything from less than 256 kbs right up to anything greater than 4096 kbs. These three qualified responses all saw ADSL as a technology which could be defined as broadband only if the advertised speed was greater than 1024 kbs. These qualified responses were not considered part of the 'yes' category for the

purposes of analysis and were captured under a separate category for 'qualified' responses.

5.2.4 Is it important to have an official definition of broadband? Please elaborate.

Response	Value	Respondents
Yes	9	CO1,CO3,FLO1, FLO2,WBO1,WBO2, REG,ISP3,CAG
No	2	ISP2,ISPG
Qualified	2	CO2,ISP1
% Yes	69%	
% No	15%	
% Qualified	15%	

Table 5.4: Is it important to have an official definition of broadband?

A substantial majority (69%) of the interviewees agreed that it was important for ICASA to have an official definition of broadband in South Africa. 15% disagreed with this statement, stating that it was not important to have an official definition of broadband in South Africa while a further 15% qualified their statements which precluded them from being categorised as an either 'yes' or 'no' answer. All of the 69% that agreed to having an official definition of broadband in South Africa elaborated by stating that the rationale for this would be in the interests of consumer protection.

The 15% that disagreed with the notion of having an official definition felt that it would be dangerous to have one as the speeds associated with ADSL are constantly increasing. These respondents added that setting a speed in an official definition would not be a good idea as it would become quickly obsolete. It should be noted that the question did not specify the setting a particular speed. It was an open ended question which elicited an official definition of ADSL. Another reason cited for not having an official definition was that ISP's should be allowed to sell ADSL services at any speed that they saw fit and this should be left entirely to consumer demand. The idea put forward was that there was a market for lower specification ADSL services that were cheap and still a better option than dial-up.

This type of service would have been excluded if an official definition of ADSL with a high specification existed.

5.3 Uptake

5.3.1 Is the current uptake of ADSL sufficient when compared internationally?

Response	Value	Respondents
Yes	0	
No	12	CO1,CO2,CO3,FLO2,ISP1,ISP2,ISP3,WBO1,WBO2,REG, ISPG,CAG
Qualified	1	FLO1
% Yes	0%	
% No	92%	
% Qualified	8%	

Table 5.5: Is the ADSL uptake sufficient?

There were no respondents that agreed that the uptake of ADSL in South Africa was sufficient when compared internationally. A single qualified response was the only reason that there was not a unanimous decision. The overwhelming majority (92%) of the respondents agreed that the uptake of ADSL in South Africa when compared internationally was not sufficient. The general consensus was the uptake was very poor when compared internationally.

Although not specifically asked by the question, several respondents elaborated on their answer by giving reasons regarding South Africa's ADSL uptake. CO1, FLO2, ISPG and ISP3 provided excessive pricing as the reason for the poor uptake of ADSL in South Africa.

WBO2, CO2 and ISP1 saw the poor fixed line teledensity in South Africa as one of the main reasons for the poor uptake of ADSL as the total market for ADSL subscribers is determined by the total number of fixed lines rolled out in the country.

It is also worth noting that FLO1 and FLO2 did not disagree that the uptake of ADSL in South Africa was poor. FLO1 contended that South Africa should be compared to similar developing countries and not first world countries when measuring the uptake of ADSL. It is for this reason that the response of FLO1 was categorised as a qualified response for the purpose of analysis.

5.3.2 What are the key policy and regulatory factors that can be identified which influence the uptake of ADSL? Please list the factors both positive and negative.

Response	Value	Respondents	%
LLU	9	WBO1,CO2,CO3, ISP1,FLO2,IPSG,FLO1,ISP3,CAG	69%
COMPETITION	7	CO1,CO2,ISP2,FLO2,ISPG,WBO2,CAG	54%
AFFORDABILITY	4	WBO1,CO2,REG,ISP3	31%
REGULATE PRICE	3	CO2,ISP1, ISP3	23%
INTERNATIONAL ACCESS	2	WBO1,IPS3	15%
OTHER	10	WBO1,CO1,CO3,ISP1,REG,ISP2,ISPG,FLO1,WBO2,CAG	77%

Table 5.6: The key policy and regulatory factors that influence the uptake of ADSL

This question was aimed at establishing key policy and regulatory factors that influence the uptake of ADSL. When a specific factor was identified by more than one respondent, it was included as a sub-section on its own post the interview. As there were several unique factors that were identified by the interviewees, these factors were categorised as 'Other'. The main factors identified were affordability, international access, local loop unbundling, regulating price and competition. The manner in which the information was analysed allowed each respondent to suggest more than one factor each. For e.g. WBO1 could suggest affordability as well as international access as part of their response. During the analysis of the information, each respondent would then have one opportunity to suggest a particular category, giving a maximum of 13 possible 'votes' per category[9] which was used for calculating the percentages.

[9] This is based on the fact that 13 interviews that were conducted.

Using this rationale, each respondent was also allocated a single 'vote' under the 'Other' category, which then also allowed for a maximum of 13 'votes'. This did not preclude the respondent from listing more than one factor in the 'other' category.

It should be noted that the question called for both positive and negative factors that influence the uptake of ADSL[10] in South Africa, but most of the specific categories identified listed only the positive factors that would increase the uptake of ADSL. Some of the negative factors were listed in the 'Other' category, although no single factor in this category is listed more than once. It can be argued that, as an example, regulating price is seen as a positive factor in this case, although it can be seen as a negative factor if one believes that such price regulation would adversely affect the uptake of ADSL. It could also be understood that should local loop unbundling be seen to increase uptake, a lack of local loop unbundling could be understood to decrease uptake. As this was implied and not categorically stated, it was not classified.

It was clear that the majority of interviewees (69%) saw local loop unbundling as the most popular factor that would influence the uptake of ADSL. This was followed closely by competition, which was suggested by 54% of the interviewees. 31% of the interviewees suggested affordability as the next factor which should be considered as affecting the uptake of ADSL followed by 23% for regulating price. It should be noted that the respondents closely related regulating price with affordability-the only reason for separating the two was that regulating price was identified specifically by three respondents and was thus accommodated as a sub-section on its own. International access was chosen by 15% of the respondents as a factor for increasing uptake.

77% of the interviewees were categorised under the 'Other' sub-section as their inputs could not be listed as part of the previous classifications. Several factors were chosen by the interviewees under this section. For example, WBO1 saw the

[10] Influence could either mean increase the uptake of ADSL or decrease it.

cost of computer equipment as limiting the uptake of ADSL in South Africa. CO1 felt that regulating to improve quality of service would affect the uptake positively. ISP3 saw the non availability of service licences and spectrum licences as a factor limiting the growth of competitive technologies to ADSL. ISP1 indicated that the lack of a proper broadband policy inhibited the growth of ADSL in South Africa.

5.4 Regulatory Intervention

5.4.1 Do you consider the broadband market sufficiently competitive?

Yes	No	Qualified	% Yes	% No	Qualified %
3	8	1	23%	62%	8%
WBO1,CO2,ISPG	WBO2,CO1, CO3,ISP1, ISP2,ISP3, REG,CAG	FLO1			

Table 5.7: Is the broadband market sufficiently competitive?

This question seeks to establish whether market failure has occurred in the broadband market by gauging the competitiveness of the market. The majority of the respondents (62%) felt that the broadband market in South Africa was not sufficiently competitive. 23% felt that the broadband market was competitive enough while 8% provided a qualified answer. The qualified answer did not fall into either a distinctly yes or distinctly no category and was thus afforded a category by itself. An interesting point that was noted was that the majority of the respondents who felt that the broadband market was not sufficiently competitive stated in their response that they did not feel that the wireless broadband operators provided competition to the ADSL service. All respondents who stated the broadband market was sufficiently competitive felt that the mobile broadband operators did provide sufficient competition to the ADSL service.

FLO1 responded by saying that the answer should only be analysed as part of a broadband review. FLO1 felt that ICASA should look at retail and wholesale markets of ADSL first before looking at the broadband market in general. FLO1 stated that it would be unfair to penalise the fixed line operator and ask it to offer its services at wholesale prices when the cellular operators are not obliged to do the same.

It should be noted that this question did not at this stage look into the mechanics of competition and only called for an opinion from the respondents to ascertain their views on the broadband market.

5.4.2 Do you believe that regulatory intervention is required to stimulate the uptake of ADSL in South Africa? Explain?

Response	Value	Respondents
Yes	11	WBO1,WBO2,CO1,CO2,CO3,REG,CAG,FLO2,ISP1,ISP2,ISP3
No	2	ISPG,FLO1
Qualified	0	
% Yes	85%	
% No	15%	
% Qualified	0%	

Table 5.8: Is regulatory intervention required?

85% of the respondents agreed that regulatory intervention is required to stimulate the uptake of ADSL in South Africa. 15% of the respondents disagreed with this statement. There were no qualified answers provided to this question. The regulatory intervention initiative suggested by majority the interviewees was local loop unbundling, although the question did not specifically ask for these factors to be listed as was the case with question 5.3.2. Local loop unbundling was suggested by WBO1, CO2, CO3 and FLO1. Other regulatory initiatives that were suggested include conducting a market review to identify market failure (FLO1) and regulating quality of service (CO1).

CO1 also stated categorically that retail price should not be regulated as that provides little incentive for operators to lower their prices. CO1 used the cellular market as an example where ICASA does not regulate the data tariffs. In this market, these prices have dropped from R45 per megabyte in 2004 years ago to 20 cents per megabyte currently. CO1 attributes these price decreases solely to competition in the wireless broadband market.

ISPG and FLO1 were the only two respondents that did not see regulatory intervention as being required to stimulate the uptake of ADSL in South Africa. ISPG saw regulatory intervention as a 'double edged-sword' that could actually hinder the uptake of ADSL in South Africa rather than assist it. ISPG felt that the lesser the regulatory intervention the better it was for the country. ISPG's views are consistent with the 'light regulation' strand identified in the literature. FLO1 was not convinced that regulatory intervention was required and called for a market review without giving specific reasons why regulatory intervention would not be required.

5.4.3 Should the regulatory intervention focus on ADSL only or address broadband technologies as a whole? Please justify your answer.

Response	Value	Respondents
BROADBAND TECHNOLOGIES AS A WHOLE	9	WBO1,CO1,CO2,CO3,FLO1,FLO2,ISPG,ISP2,ISP3
ADSL ONLY	2	WBO2,CAG
QUALIFIED	2	REG,ISP1
% Broadband	69%	
% ADSL	15%	
% Qualified	15%	

Table 5.9: Focus of the regulatory intervention

The majority (69%) of the interviewees supported the option of having regulatory intervention applicable to all broadband technologies as a whole. 15% were of the view that regulatory intervention should focus on ADSL only while a further 15% provide qualified answers that could not be classified in the former two categories.

Seven respondents (WBO1, CO1, CO2, CO3, ISP2, ISPG, and ISP3) stated specifically that regulations should be technology neutral and only concentrate on the service. FLO1 added that regulations governing ADSL only were asymmetrical regulation that had no justification in the South African market.

Two respondents (WBO2 and CAG) stated that regulations should be drafted that focus on ADSL only. The justification for such a suggestion from these respondents was quite similar, alluding to the fact that consumers have basically a choice between ADSL and wireless broadband technologies only. They stated that it would be important to separate ADSL from other broadband technologies since the copper used to transmit ADSL signals was already in the ground. This is not true for wireless broadband services which require only for the operator to be allocated spectrum for easy roll out of networks.

REG qualified its response by stating that regulatory intervention should focus on broadband technologies as a whole as well as being specifically focused on ADSL only. This could not be classified in one or the other category as it was specifically an either/or question aimed at producing a definitive result and the response was thus categorised in the 'qualified' category. ISP1 also provided a qualified response by stating that the issue was 'tricky' as there were several issues relating to ADSL that went beyond ADSL itself. An example cited was the cost of international bandwidth capacity. ISP1 went further by stating that it was important for the regulator to address some of the broader issues in the communications service market. ISP1 did not elaborate on these issues and did not state categorically whether regulatory issues should focus on broadband technologies as a whole or focus on ADSL only. ISP1's response is thus categorised under 'qualified'.

5.4.4 If at all, what degree of regulatory intervention is required?

Response	Value	Respondents	%
COMPETITION REGULATION	5	WBO1,CO2,ISP1,REG,FLO1	38%
LIGHT TOUCH REGULATION	4	ISP2,FLO1,CO1, CO3	31%
SPECIFIC REGULATION	4	FLO2,ISPG,ISP3,WBO2	31%
NO REGULATION	0		0%
OTHER	4	CO1, CO2,REG,ISP3	31%

Table 5.10: The degree of intervention

The question did not specify the degrees of regulation that could be possible and left it open ended for the interviewee to decide. Three distinct threads were observed, i.e. light touch regulation, specific regulation and competition regulation. This corresponds somewhat to the literature reviewed where three strands of regulatory intervention was identified - no regulation, 'light touch' regulation and 'heavy-handed' regulation. Although competition could be classified as either specific or light regulation and is not a degree of intervention in the context of the question, it was mentioned explicitly by several of the respondents and was thus categorised by itself. Specific regulation captured responses that alluded to stringent regulatory measures or a highly regulated environment. The category of 'no regulation' was added to highlight the fact that none of the interviewees chose this option.

It should be noted that the interviewees were not limited to the number of responses that they could provide and thus each interviewee could provide more than one response. Responses that could not be categorised under a specific section as they were unique were captured under the 'Other' category.

The responses were about equally split. 38% of the interviewees felt that regulating competition would be the best option while 31% felt that specific regulation should be introduced. 31% choose light touch regulations as their option. 31% was categorised as other. ISP1 stated that regulatory intervention should only be considered as a last resort in the situation of a market failure

where the regulator should regulate only where market failure exists. An example given by ISP1 was the leased lines market in the Internet service provision arena. In this arena, Internet Service Providers (ISPs) complete strongly with Telkom which has caused Telkom to structure ADSL in such a way so as to reduce competitive influences. ISP1 saw this as a clear abuse of market dominance which ICASA needed to look into.

CO2 and REG qualified their responses by both listing pricing mechanisms which should be implemented by the regulator. These interviewees did not elaborate as to the extent of the regulation and their inputs were thus classified as qualified. Although ISP3's response tended towards a highly regulated regime, ISP3's comments were focussed mainly on local loop unbundling as a mechanism of regulation. As this did not explicitly answer the question at hand, the response of ISP3 was also categorised as being qualified.

5.4.5 Who should intervene?

Response	Value	Respondents	%
ICASA	12	WBO1,CO1,CO2,ISP1,REG,ISP2, FLO2,ISPG,ISP2,CAG,WBO2,ISP3	92%
GOVERNMENT	5	WBO1,CO2,CO3, FLO2,WBO2	38%
COMPETITION COMMISSION	3	CO2,FLO2,WBO2	23%
QUALIFIED	3	FLO1,ISP1,CAG	23%

Table 5.11: Who should intervene?

The overwhelming majority (92%) of the interviews agreed that ICASA as the electronic communications regulator should be the authority that intervenes in the ADSL market in South Africa. 23% believed that it should be the competition commission that should conduct such an intervention while 38% saw the government as being the body responsible to intervene by drafting policy initiatives. 23% of the answers received were qualified answers that could not be categorised in the previous three categories. These categories are not mutually exclusive and the classifications were made post the interviews.

The question did not limit the respondent from choosing more than one option when responding and several interviewees did choose more than one. E.g. FLO2 and CO2 saw it best that ICASA, the competition commission and the government were all responsible to intervene. WBO1 choose both ICASA and the government.

The qualified responses from FLO1 and ISP1 were generally concerned about the roles of the different authorities. They saw ICASA being involved mainly with ex-ante regulation while the competition commission concentrated more on ex-post regulation and thus did not explicitly suggest a particular option.

5.4.6 Should there be specific regulatory measures or intervention?

Response	Value	Respondents
Yes	12	WBO1,CO1,CO2,ISP1,REG,ISP2,ISP3,FLO1,FLO2,WBO2, CAG,ISPG
No	0	
Qualified	1	CO3
% Yes	92%	
% No	0%	
% Qualified	8%	

Table 5.12: Should there be specific intervention?

This question looks at whether a specific regulatory measure or intervention was required to stimulate the uptake of ADSL. The question did not ask for the particular measure or intervention at this time. 92% of the interviewees agreed that a specific regulatory measure or intervention was required. There were no interviewees who disagreed with this statement.

There was one qualified response received (CO3) forming 8% of the total responses. CO3 felt that the word 'intervention' was too forceful and preferred the term 'consultation' rather than 'intervention'.

Although WBO1 agreed that the current legislation and regulatory framework provided a good base for regulatory intervention, WBO1 felt that the effectiveness of the regulator in clarifying grey areas and ensuring the rights of licensed operators needs to be improved. This was necessary, in WBO1's, view to ensure the viability of the broadband markets by ensuring that unlicensed operators/service providers do not erode the margins required to deliver obligations imposed on licensed operators, thereby protecting the consumers from receiving inferior services. This view is an important one as it highlights the dangers of introducing regulations aimed at stimulating uptake at the expense of current licence holders.

5.4.7 [If so,] What should these measures be?

Response	Value	Respondents	%
LLU	7	CO1, ISP1 ,ISP2 ,FLO1, ISP3, CAG, ISPG	54%
COMPETITION	5	CO1,CO2,ISP1, WBO2,CAG	38%
AFFORDABILITY	3	CO1,CAG,ISPG	23%
INTERNATIONAL ACCESS	2	WBO1, REG	15%
REGULATE PRICE	2	ISP1,ISPG	15%
QoS	2	CO1,CAG	15%
Other	5	WBO1,CO3,REG,FLO1,WBO2	38%

Table 5.13: What should these measures be?

The question asked the interviewees as to what regulatory measures could be imposed in order to increase the uptake of ADSL in South Africa. This question was specific to regulatory intervention as opposed to question 5.3.2 which looked at both policy and regulatory factors. There were several different responses from the interviewees and a response that was suggested by more than one interviewee was given a unique classification in the table above. Each respondent was able to list as many measures as they wished i.e. the respondent was not limited to suggesting a single specific measure. The measures listed by the respondents that were unique were classified under 'Other'.

Local loop unbundling again was the most popular measure suggested and was preferred by 54% of the interviewees. Introducing competition followed with 38%, affordability 23%, International access, quality of service and regulating prices were preferred by 15% of the respondents. From the responses given by the interviewees, it was clear that there was a certain amount of overlap between some of the different classifications. As an example, respondents who felt that local loop unbundling was required stated that this in turn would increase competition which would then increase the uptake of ADSL. The same sort of overlap was seen in the 'affordability' and 'regulate price' classifications where regulating price was seen as a key factor that would make the ADSL service more affordable and thus increase the uptake of ADSL in South Africa.

Although one respondent (FLO1) suggested Local loop unbundling as the recommended measure, FLO1's answer went into greater detail about the type of local loop unbundling that could be implemented. FLO1 suggested that the regulator choose 'the ladders of investment' in terms of companies wanting to invest into local loop unbundling. The shallowest according to FLO1 would be bitstream access, with share access forming the intermediate investment while full local loop unbundling would form the deepest level of investment. FLO1 argued that it may be too intensive for operators to do all three levels at once and hence the 'ladders of investment'.

CO3 reiterated its previous comments on consultation being the path that the regulator should follow and was thus classified under 'other'. WBO1 felt that the regulator should disconnect the networks of unlicensed operators / service providers and confiscate their infrastructure. This response did not fully address the question at hand and concentrated more on the enforcement side of the regulator's mandate-it was thus also classified under 'other'.

Quality of Service was another measure that was specifically mentioned by CAG and CO1. It was seen as a commonly ignored area of regulation by the two respondents who felt that it required urgent attention. Although CO1 did concede that the draft ICASA ADSL regulation concentrated on quality of service issues, CO1 felt that this was not adequate enough and should form part of the future

measures of regulatory intervention that should be undertaken by the regulator. CAG concurred with this view and added that specific service level agreements should be enforced by regulation in order to protect the consumer and to ensure that the quality of the ADSL service remains within reasonable quality targets as specified by regulation. CAG also added that the regulator should actively monitor and enforce compliance to such regulations or else they would not be effective at all.

5.4.8 What form(s) should this intervention take? How should the above intervention be implemented?

Response	Value	Respondents	%
REGULATIONS	7	CO2,ISP1,REG,FLO2,ISP2,FLO1,CAG	54%
POLICY	3	CO3,WBO2,FLO1	23%
RESOURCES	2	WBO1,ISP3	15%
NO COMMENT	1	ISPG	8%

Table 5.14: How should they be implemented?

The questions in this section solicited the form and method of implementation from the interviewees of any intervention aimed at increasing the uptake of ADSL in South Africa. The question does not require the respondent to list such intervention as in question 5.4.7; rather only the implementation mechanism was required. This question once again allowed the respondent to list more than one implementation method. A response supported by more than one interviewee was classified separately while unique responses were classified under 'Other'. There was a single respondent who did not comment and thus was also afforded a unique classification.

54% of the interviewees supported the intervention being implemented in the form of regulations. 23% of the respondents supported Policy while Resources was supported by 15%. A further 23% of the respondents were classified as 'Other'. 8% did not comment.

CO1 suggested that the regulator needed to ensure that the operators are given 'a push in the right direction' to promote competition and increase their level of service. CO1 did not specify how this would be done and the comment was thus classified under 'Other'.

5.4.9 Do you see the intervention addressing specific factors influencing the uptake of ADSL?

Response	Value	Respondents	%
YES	9	WBO1,CO1,CO2,ISP1, REG,ISP2,FLO2,ISP3,CAG	69%
NO	3	CO3,FLO2, WBO2	23%
PRICE	3	ISP1,FLO1,CAG	23%
MARKET	7	WBO1,CO1,ISP1,REG,FLO2,ISP3, CAG	54%

Table 5.15: Should intervention address specific factors?

This question looks at whether the interviewees saw regulatory intervention addressing any specific factors influencing the uptake of ADSL in South Africa. The question did not specifically ask for a yes or a no answer and allowed the respondent the opportunity to explain their answer. The respondents were not limited in the number of explanatory answers that they could provide, although just two clear strands were identified, i.e. Price and Market. Only those respondents that saw intervention as addressing specific factors had their further responses specifically categorised. Respondents that did not agree could not provide these specific factors and could thus not be categorised.

The majority (69%) of the interviewees agreed that they saw intervention as addressing specific factors influencing the uptake of ADSL in South Africa. 23% did not see this. The ADSL market was seen as the single largest area that would be influenced by regulatory intervention as it was identified by 54% of the interviewees. The next and only other factor identified was Price, with 23% of the interviewees seeing Price as being affected by regulatory intervention.

FLO2 stated that regulatory intervention would have wholesale implications on the upstream side. These regulations could include introducing price capping regulations and open access regulations at a network level. FLO2 gave the example of Multichoice offering better bouquets once new pay TV entrants were licensed.

5.4.10 Please explain how you see regulations making a positive impact on the uptake of ADSL?

Response	Value	Respondents	%
LOWER PRICE	6	CO2,REG,FLO2,ISP3,WBO2, CAG	46%
MORE COMPETITION	3	WBO1,CO3,ISP3	23%
BETTER SERVICE/VALUE	3	WBO1,CO3,REG	23%
OTHER	4	CO1,ISP2, FLO1,WBO2	31%

Table 5.16: How regulation makes a positive impact on the uptake of ADSL

The question formed the final part of the arc of questions aimed at establishing the impact and importance of ADSL regulations. The question called for a broad overview of the focus interviewee's views as to how they would see ADSL regulations making a positive impact on the uptake of ADSL in South Africa. The question did not have any predetermined categories which the respondents could choose from. Respondents could choose more than one category if required and only those categories supported more than one respondent was uniquely categorised. Responses that were unique were classified under 'Other'.

Three distinct threads were identified from the interviewee responses. The first was 'Lower Price' which was supported by 46% of the interviewees. The interviewees who supported this thread saw regulations as lowering the price of the ADSL service and thus increasing the uptake. The second was 'More Competition' which essentially also saw the ADSL regulations bringing in more competition to the market followed by 'Better Service/Value' which were both supported by 23% of the interviewees. 'Better Service/Value' saw the ADSL

regulations making a positive impact on the quality of service issues and customer service issues related to the ADSL service.

31% of the responses were classified under 'Other'. Comments received in this category were wide ranging and some did not specifically address the question at hand. For example, CO1 felt that structural intervention was required as more competitors would be created through the implementation of local loop undbundling which would result in lower prices and a better quality of service. As these types of comments did not relate directly to the question at hand, they were classified under 'Other'.

5.5 Policy

5.5.1 What (if any) policy initiatives should be in place before regulatory intervention can be effective?

Response	Value	Respondents	%
BROADBAND POLICY	5	REG,FLO2,ISP3WBO2,CAG	38%
NO POLICY	2	CO2, FLO1	15%
FACILITIES LEASING	2	CO1,ISP1	15%
COMPETITION POLICY	2	ISPG,CAG	15%
LLU	2	ISP1,CAG	15%
OTHER	5	WBO1,CO3,ISP1,ISP2,ISPG	38%

Table 5.17: Policy initiatives

This question looks at what policy initiatives should be in place before any regulatory intervention can be effective. This question formed the first part of the policy slew of questions aimed at establishing the importance and effect of policy on the uptake of ADSL in South Africa. The question, being opened ended, did not have any predetermined categories which the respondents could choose from. Respondents could suggest more than one category if required and only those categories supported by more than one respondent was be uniquely categorised. Responses that were unique were classified under 'Other'.

There were several different policy initiatives identified by the interviewees. The first of these were Broadband Policy which was supported by 38% of the interviewees. This was followed by Facilities Leasing, Local Loop Unbundling and Competition Policy which garnered 15% of the respondents support each. 15% of the interviewees also stated that no policy would be required to stimulate the uptake of broadband in South Africa.

The unique responses classified under 'Other' formed a total of 38%. One respondent (WBO1) felt that a policy aimed at the effective resourcing and authorisation of the regulator would be required to increase ADSL uptake while another respondent (ISP1) suggested several other unique policy interventions. These included updating current policy mechanisms that are already in place like facilities leasing as well as strengthening the independence of the regulator. ISP1 suggested that ICASA should not be dependent on treasury and should be able to keep its collected licence fees. Another policy issue that ISP1 voiced a concern about was the vacuum around the local loop unbundling policy even though there are dates already set by the Minister.

One respondent (ISP2) felt that a green paper and white paper process addressing broadband issues should be implemented by the Department of Communications. Any policy issues set forth by the Department should be technology neutral and should also identify problems and present possible solutions in advance.

Another respondent (ISPG) stated that it is critical that policy is supportive in order for a pro-competitive regulatory environment to flourish. This environment can be achieved with Government first removing itself from the industry it sets policy out for and indirectly regulates.

CO3 encourage the development of a broadband framework in terms of Electronic Communications Act. This framework could take the form of a policy directive issued by the Department of Communications which should focus particularly upon local loop unbundling policy as a start.

Two respondents (CO2 and FLO1) agreed that there should be no policy initiatives aimed at increasing the uptake of broadband in South Africa. CO2 felt that there is currently enough of a mandate from the current legislation that allows the regulator to regulate ADSL in South Africa without the need for any policy intervention. FLO1 stated that Government policy can backfire and cited the example of Telkom's experience in rolling out the additional 2.7 million telephone lines based on a policy directive. FLO1 suggested that policy focus on e-governance issues only.

5.5.2 How would you see these [policy] initiatives influencing the uptake of ADSL?

Response	Value	Respondents
POSITIVELY	12	WBO1,CO1,CO2,CO3,ISP1,ISP2,ISP3,REG,CAG,WBO2, ISPG, FLO1
NEGATIVELY	0	
QUALIFIED	1	FLO2
% POSITIVE	92%	
% NEGATIVE	0%	
% QUALIFIED	8%	

Table 5.18: How does policy influence the uptake of ADSL?

The question asked the interviewees as to how they viewed policy initiatives influencing the uptake of ADSL in South Africa. Although the question did not have prescribed options to choose from, most of the respondents answered either positively or negatively. The responses were thus categorised as either Positive or Negative with provision made for qualified answers.

An overwhelming majority (92%) of the interviewees felt that policy initiatives would have a positive influence on the uptake of ADSL in South Africa. There were no interviewees who felt that policy would have a negative influence. One of the respondents provided (FLO2) a qualified response. A qualified response was taken as one that cannot be categorised as either as positive response or a

negative response. A response that did not address the question at hand would have been classified as 'Other', although such a classification was not necessary for this question.

FLO2 provided the only qualified response by stating that the policy process was there to guide the regulatory process. FLO2 stated that there should be a policy to split Telkom and to create a separate local loop company. Other policy issues suggested by FLO2 included looking into encouraging broadband access in rural areas. These comments point to policy having the potential to have a positive impact on the uptake of ADSL, but this is not specifically stated and the response from FLO2 was classified as a qualified one.

5.5.3 How would policy affect the regulatory environment?

Response	Value	Respondents
POSITIVELY	6	WBO1,REG,ISP2,ISPG,ISP3,CAG
NEGATIVELY	3	CO1,ISP1,WBO2
QUALIFIED	4	CO2,CO3,FLO2,FLO1
% POSITIVE	46%	
% NEGATIVE	23%	
% QUALIFIED	31%	

Table 5.19: How does policy affect the regulatory environment

This question looks at the manner in which the policy initiatives would affect the regulatory environment. The previous question looked at how policy would affect the uptake of ADSL, while this question is subtly different and looks at how policy initiatives would affect the regulatory environment. Although the question did not have prescribed options to choose from, most of the respondents answered either positively or negatively. The responses were thus categorised as either 'Positive' or 'Negative' with provision made for qualified answers.

46% of the interviewees felt that policy would affect the regulatory environment positively while 23% felt that this effect would be negative. 31% of the respondents submitted a qualified answer to the question.

One respondent (FLO2) stated that there should be a 'golden thread' running through both policy and regulation initiatives and suggested that there is currently a 'disconnect' between the two. FLO2 felt that the Electronic Communications Act policy legislation was not robust enough and did not go far enough. FLO2 thus suggested a greater alignment between policy and regulations before policy can have a positive influence on the uptake of ADSL in South Africa.

Another respondent (WBO2) was not sure whether policy would affect the regulatory environment as the ideal regulatory environment would have to be more interactive with the industry that it regulates. WBO2 felt that the current environment did not lend itself to that interaction which in turn caused any policy directives to affect the regulatory environment negatively.

5.5.4 Should one process wait on the other?

Response	Value	Respondents	%
YES	7	CO3,REG, ISP1,FLO1,WBO2,CAG,ISP1	54%
NO	5	CO1,CO2,ISP3,FLO1,ISP2,ISPG	38%
POLICY BEFORE REGULATORY	6	CO3,ISP1,REG,FLO2,WBO2,CAG	86%
REGULATORY BEFORE POLICY	1	FLO1	14%
QUALIFIED	1	WBO1	8%

Table 5.20: Should one process wait for the other?

This is the final question in the Policy cluster of questions that looks at the interrelationship between policy and regulation. The question looks at whether policy initiatives should wait for regulatory intervention or vice-versa. Although the question did not have prescribed options to choose from, most of the respondents answered either yes or no. Only those interviewees who answered yes were then asked to further clarify their answer by stating whether policy should be implemented before regulatory intervention or whether regulatory intervention should precede any policy initiatives.

The majority (54%) of the interviewees felt that one process should wait on the other while 38% percent stated that the processes need not wait for each other. These 38% generally stated that it did not matter as to which process was implemented first or if both processes occurred concurrently.

Of the 54% of respondents that stated that one process should wait for another, 86% percent agreed that policy initiatives should be implemented before any regulatory intervention could take place. 14% felt that regulatory initiatives should occur first before any policy initiatives are implemented. There was one qualified answer received forming 8% of the total.

One respondent (CO1) stated that the regulator should not be found guilty of waiting as nothing gets done and cited the numbering plan as a case in point. The numbering plan according to CO1 was initiated since 2000 and was not finalised until 2004 since ICASA kept on waiting for a variety of reasons and nothing was done. CO1 was of the opinion that it would be in the best interests of the country to facilitate the regulatory process and put out regulations and amend them later if necessary.

This view is supported by ISP3 who pointed out that ICASA was well within its mandate in terms of the Electronic Communications Act to publish regulations and did not need to wait for any policy directives. ISP3 saw the two processes of policy and regulatory to be complementary to each other and did not see any reason for one process to wait for the other. ISPG concurred with ISP3 and stated that ICASA had done a good job in several instances without any policy directives being in place and ISPG did not see a reason for this not to continue. ISPG did not specifically list any instances where the regulatory initiatives were implemented without a policy framework being first put into place.

ISP1 was of the view that the policy environment should be in place before regulatory initiatives are put forward, otherwise a conflict situation may arise if the two processes contradict each other. This would lead to a situation where there is a great amount of wasted time and resources. This view is supported by CO3 who saw it as important that policy should take a firm leading stance and set

deliverable dates before the regulatory environment could quantify these deliverables.

One respondent (WBO1) provided the only qualified answer by stating that the two processes being referred to needs to be defined more clearly before any decision as to the order of the processes can be made. WBO1 alluded to policy directives being implemented before any regulatory initiatives are implemented, although this was not explicitly stated and WBO1's response was thus classified as being qualified.

5.6 Miscellaneous

5.6.1 In your opinion, are there other non-regulatory options available to increase the uptake of ADSL?

Response	Value	Respondents	%
NO	6	CO1,CO3,ISP1,ISP3,WBO2,CAG	46%
ACCESS TO ICT SERVICES	4	WBO1,CO1, ISPG,FLO1	31%
COMPETITION/AFFORDABILITY	2	CO2,ISP3	15%
OTHER	3	CO3,FLO2, FLO1	23%

Table 5.21: Non-regulatory options to increase ADSL uptake

These questions mark the beginning of the miscellaneous arc of questions that explore price regulations as well as other non-regulatory factors that may increase the uptake of ADSL. These factors done not form the core of the research but cannot be totally discarded. These questions set out to simply identify other options that may increase the uptake of ADSL. The first question starts by determining from the interviewees whether there are other non-regulatory factors available to be explored that would increase the uptake of ADSL in South Africa. Respondents could suggest more than one category if required and only those categories supported by more than one respondent would be uniquely categorised. Responses that were unique were classified under 'Other'.

Three unique streams could be identified from the responses received. The first was Access to ICT Services that was the choice of 31% of the interviewees. These respondents saw access to computers and other ICT services as being a factor that could increase the uptake of ADSL. The second stream looks at Competition and Affordability and was supported by 15% of the interviewees. These respondents were going back to issues discussed previously as competition and affordability were shown to be related to regulatory intervention. 46% of the respondents felt that there were no other options that they could identify (non-regulatory in nature) that could increase the uptake of ADSL in South Africa.

5.6.2 Is regulating the price of ADSL a viable option?

Response	Value	Respondents
Yes	6	CO2,REG,FLO2,ISP3,WBO2,CAG
No	5	WBO1,CO1,CO3,ISP2,ISPG
Qualified	2	ISP1,FLO1
% Yes	46%	
% No	38%	
% Qualified	15%	

Table 5.22: Is regulating price an option?

The actual questions in the interview protocol were all phrased as 'regulating the cost' of ADSL in error. This error however was not picked up by any of the interviewees and price regulation was assumed as the focus of the question.

This question investigated whether regulating price of ADSL would be a viable option. Although the question did not have prescribed options to choose from, most of the respondents answered either yes or no as this would be an intuitive response to such a question. The responses were thus classified as either Yes or No and provision was made for qualified answers that did not explicitly state either.

46% of the respondents agreed that regulating the price of ADSL would be a viable option for South Africa. 38% disagreed with that statement and 15% of the responses were qualified.

Several respondents (CO2, REG, FLO2, ISP3, WBO2 and CAG) all agreed that regulating prices was a viable option for South Africa. The common thread evident from all their submission was that some sort of price regulation is required in a monopoly market. ISP3 saw any initiative that was aimed at reducing prices of ADSL as worth trying since the current monopoly market allowed the incumbent to dictate prices.

Although ISP1 agreed that price could be regulated, it did warn that this should always be a last resort as regulating retail prices may prove to be dangerous. ISP1 further added that the regulation of price should only occur in a natural monopoly or in a market failure environment. ISP1 did not elaborate on the dangers of regulating prices and its response was classified as a qualified one. FLO1 suggested that price regulation hinders network growth and does not provide sufficient incentive for the operator to expand its network.

The majority of the respondents who felt that regulating the prices of ADSL could be a viable option stated clearly that this would only apply to the regulation of wholesale prices and not the regulation of retail prices. ISPG specifically did not support price regulation at all because of the ‘dangers’ of retail price regulation. ISPG felt that regulating retail prices has the opposite effect of having competition since consumers would not ‘vote with their wallets’. ISPG went on to add that even when regulating wholesale prices, the regulator has to make sure that the regulations stipulate that prices are offered fairly to all consumers. ISPG did not elaborate on how such a mechanism could be implemented and the comments from ISPG were classified as not supporting the regulation of price.

ISP1 saw any type of price regulation as ‘a bad idea’ as it would prevent innovation in the industry. ISP1 was of the opinion that operators in a price regulated market would set prices as close to the maximum price as allowed as

they were legally entitled to do so. ISP1 felt that this limited the effect of competition even when the market was a competitive one.

5.6.3 If so, how could prices be regulated?

Response	Value	Respondents	%
WHOLESALE PRICE REGULATION	6	C02,ISP1,REG,FLO1,ISP3,WBO2	75%
FACILITIES LEVEL	3	ISP1,ISP3,CAG	38%
COMPETITION	3	ISP1,REG,CAG	38%
OTHER	1	FLO2	13%

Table 5.23: How could prices be regulated?

This question is a follow up to the previous question and explores in greater detail how prices could be regulated. Only those interviewees who answered yes were then asked to further clarify their answer by stating how price could be regulated. Respondents could suggest more than one category if required and only those categories supported by more than one respondent was uniquely categorised. Responses that were unique were classified under 'Other'.

Three distinct strands were identified. These were 'Wholesale Price Regulation', 'Facilities Level' and 'Competition'. The majority (75%) of the interviewees felt that 'Wholesale Price Regulation' was the best option to implement when regulating prices. 38% argued that introducing 'Facilities Level' regulations where essential facilities are identified and regulated to reduce the price of the service. A further 38% felt that competition was the solution to indirectly regulate the price of the ADSL service.

CO2 advocated for price orientation to be applied and suggested Long Run Incremental Costs as an option as the copper required to run ADSL services has been already laid into the ground. CO2 further suggested that price separation needs to be implemented in terms of the modem as well. FLO1 differed with CO2 and saw Long Run Incremental Costs (LRIC) as a flawed model that did not take

into account several factors. FLO1 did not list these factors. FLO1 suggested that Fully Allocated Cost model rather be used.

5.6.4 How important is it to regulate prices?

Response	Value	Respondents	%
IMPORTANT	4	CO2,FLO2,WBO2,CAG	31%
NOT IMPORTANT	6	WBO1,CO1,ISP2,ISPG,FLO1,ISP3	46%
QUALIFIED	3	CO1,ISP1,REG	23%

Table 5.24: How important is it to regulate prices?

This question concludes the set of questions around price regulation and is a follow up to the previous questions. It explores in greater detail the importance of price regulation. All the interviewees were given an opportunity to comment, even if they did not agree with price regulation in previous questions. The responses were thus classified as either as 'Important' or 'Not Important' and provision was made for qualified answers that did not implicitly state either.

The majority (56%) of the interviewees felt that regulating prices was not important. 31% stated that regulating prices was important while 23% of the responses were classified as qualified.

A respondent (CO1) stated that ICASA had been trying to regulate mobile data prices for a long while and their attempts have been unsuccessful. The argument provided by CO1 was that operators would generally fight to set the minimum call price as high as possible and that the only way to ensure lower prices would be to introduce a healthy level of competitive forces. Another example of competitive forces lowering call prices as cited by CO1 was Vodafone's entrance into the Czech Republic. Vodafone was appointed as the last cellular entrant and came in with a 45% price reduction and established themselves as the price leader in the minds of the people. Vodafone, according to CO1, now has a subscriber base of high value post paid customers and has slowly increased prices to market levels.

CO1 also added that the Czech Republic does not have a requirement for a service licence as the only regulatory requirement was to notify the regulator before commencing service. CO1 advocated this approach as it ensured that there were no barriers to entry in a converged market place.

Another respondent (FLO2) held an opposite view to CO1 and stated that it was critical to regulate prices as South Africa is a comparatively small country. FLO2 cited an example of Transtel where Transtel was doing the business case for Neotel and calculated that the total telecommunications spend for South Africa equalled the telecommunications spend of a city in the United States like Atlanta. To further highlight the comparative market size of South Africa, FLO2 stated that Atlanta was only just within the top 50 cities in terms of total telecommunications spend in the United States. It was for that reason that FLO2 felt it critical to regulate prices. WBO2 supported the view of FLO2 by stating the ADSL market is currently a monopoly market in South Africa and that the impact of high telecommunications prices due to monopoly pricing could put a damper on the growth of the economy. WBO2 felt that it was the mandate of the regulator to look at the social good of the country in general and lower prices via regulation of the telecommunications services.

Other respondents (CAG and CO2) concurred that it is extremely important to regulate prices in the South African ADSL market as it is a monopoly environment. CO2 listed key sectors of the economy such as transport, telecoms, electricity etc. which are monopoly markets that are critical to the growth of the country. CO2 stated that it is imperative that these sectors are tightly regulated for the greater good of the country. CO2 also advocated the use of price regulation even if the ADSL market is not a monopoly market in the future, but where a single operator has significant market power and is still able to dictate prices. CO2 saw this as being just as dangerous as a monopoly market as the end results would be the same, i.e. high telecommunications prices that would hamper the growth of the economy.

5.7 General

5.7.1 Is there anything else that you would like to add that could assist with this study?

Response	Value	Respondents	%
NO	5	WBO1,CO3,REG,ISP2,ISP3	38%
YES	7	CO1,CO2,ISP1,FLO2,ISPG,WBO2,CAG	54%
QUALIFIED	0		0%

Table 5.25: Further Comments

This question investigated whether the interviewees had any other information that they would like to add that was not covered during the focus interview. The responses were classified as either 'Yes' or 'No' and provision was made for qualified answers that did not implicitly state either. The views of those respondents who answered 'Yes' were further recorded but was not specifically classified due to the unique nature of the responses received.

A respondent (CO1) advised the regulator to 'follow the money' and regulate at the source, not at the retail level. Another respondent (CO2) stated that ADSL is not the only DSL technology and advised the regulator to start looking into regulations around other DSL technologies. A further respondent (ISP1) considered it important that the regulator find mechanisms that will drive competition as this would lead to better products and better prices. ISP1 felt that telecommunications operators have not passed on the benefits of scale to the customer as higher uptake of services should have led to lower prices.

ISPG saw the allocation of frequencies as an important consideration for the regulator. ISPG stated that in South Africa the price of wireless broadband is comparable to fixed broadband and this made the WiMax frequency band very important. ISPG felt that equitable access to frequency spectrum was critical for the rollout of wireless broadband and encouraged the regulator to implement such access proactively and transparently.

FLO1 suggested that the correct next step for the regulator would be to conduct a proper broadband review in order to understand how the telecommunications market worked. FLO1 saw it pointless for the regulator to introduce ADSL regulations without conducting this broadband review first.

WBO2 suggested that the regulator investigate the international bottlenecks which are partially responsible for the high price of ADSL in South Africa. WBO1 pointed out that the regulator could draw up regulations allowing equitable access to international bandwidth to all Internet service providers at wholesale rates without have to rely on the incumbent fixed network operator.

This chapter has set out the responses received to the interviews that were conducted as part of the qualitative analysis. The analysis of this information against the backdrop of the research questions will form the next chapter.

6. Analysis

In determining whether regulatory intervention would be required to stimulate the uptake of ADSL in South Africa, the analysis of the responses received to the interviews focuses on the research questions of the study. I.e.:

- Should there be regulatory intervention to simulate the uptake of ADSL in South Africa and, if so, what form should this intervention take?
- Should the regulatory intervention focus on ADSL or address broadband technologies as a whole?
- What are the key factors that can be identified that are hindering the uptake of ADSL and how can regulation address these issues?
- What are the key factors that can be identified that are facilitating the uptake of ADSL and how can regulation address these issues?
- What (if any) policy initiatives should be in place before regulatory intervention can be effective?

The interpretation and analysis of the interviewee responses would seek to answer the research questions above in determining the need for regulatory intervention in the ADSL market of South Africa. The analysis is done in a thematic manner, following the broad themes identified in the focus questions and analysing the interviewee responses within these broad themes. These themes are also further categorised based on the types of responses received to provide further analysis and classification of the responses.

6.1 The Importance of ADSL

During the interviews the importance of ADSL as a broadband technology in South Africa was put to the targeted respondents. This question was asked as part of a suite of introductory questions aimed at establishing a background of ADSL in the South African context by soliciting the views of key stakeholders associated with ADSL. The purpose of establishing the importance of ADSL in the South African environment was to create a platform on which the need for regulatory intervention could be evaluated. If ADSL was seen as an important broadband technology for

South Africa, it would then raise expectations for the regulator to ensure such a technology is properly managed (whether via regulations or other means) to ensure its sustained growth. The regulator is mandated in terms of Section 2 of the Electronic Communications Act (RSA, 2005:17) to promote the efficient use of technology and to ensure the provision of a variety of quality electronic communications services at reasonable prices. This mandate could be used to argue the need for regulatory intervention based upon the perceived importance of ADSL in South Africa.

The general overall response was that ADSL was an important broadband technology for South Africa, although this importance was perceived for different reasons by different interviewees. Goldstuck (2005) has established that ADSL is the most popular broadband technology available in South Africa. ADSL dominates the broadband technologies available in South Africa with approximately 66% of the market share (Goldstuck, 2005:7). This trend is also seen worldwide with 60% of worldwide home broadband connectivity being dominated by ADSL (ITU, 2005:35). This is supported by WBO1 who confirmed that ADSL globally accounts for a large percentage of broadband penetration and is a stable and mature technology[11]. WBO1 further reinforced ADSL's dominance (and thus importance) in South Africa by stating that it accounts more than 50% (66% according to Goldstuck 2005:7) of the broadband market and that DSL type technology is proven to achieve to true convergence across broadcasting, voice and data services.

6.1.1 ADSL and Copper Penetration

Another important aspect of ADSL was highlighted by WBO2[12] who stated that although important, ADSL is limited by copper penetration. Their figure points to a copper penetration in South Africa of only about 12% of the population. WBO2's experience put the copper penetration of Europe at 99% coverage in certain areas which makes ADSL the quickest and easiest broadband option in these countries. The view on the limited importance of ADSL is also supported by CO3[13] who stated

[11] WBO1 interview 08/02/08.
[12] WBO2 interview date 18/02/08.
[13] CO3 Interview date 04/09/07.

that there are certain limitations in terms of usefulness of the ADSL technology. The most important of these would be that the copper cable in South Africa is generally old and has a limited life span[14]. It would not be a sound argument to base an importance of a technology purely on the physical limitations of that technology. The fact the millions of people are connected via copper to a local exchange makes them an attractive target market for ADSL as they could be served using the existing infrastructure. It is true that the total market would be determined by the total number of physical lines to the customer, although demand for ADSL services could lead to an increase in the number of physical lines installed.

6.1.2 ADSL- important only to some?

A respondent (FLO1)[15] suggested that although ADSL is important in South Africa, it is only important to a small number of people. FLO1 contended that the lower LSM groups needed only voice and that politicians have made it seem like broadband is essential to all. Another respondent (WBO2), although conceding that ADSL will have a market in South Africa, further states that it was not a technology intended for the majority of the population. This statement is supported by a third respondent (CO3) who stated that ADSL could be seen as a progressive classification which is only relevant to specific sectors of the population and economy in general. It would seem that there is support for the case that ADSL may not necessarily be as important to the socio-economic growth of South Africa as made out to be. Whether or not this is particularly true is unimportant to focus of the research, although there is certainly literature that proves otherwise. As an example, Lehr *et al* (2005) showed that communities that have access to broadband technologies received higher wages than similar communities that did not. Lehr's study points out that there is a definite correlation between broadband access and economic growth and performance (Lehr *et al,* 2005:3). As broadband affects the base growth of the economy, i.e. people's salaries, it most certainly affects their lives positively. It stands to reason that although (arguably) broadband may not have been intended for the majority of the people, it is these very people that rely on broadband for their economic growth. It

[14] CO3 Interview date 04/09/07.
[15] FLO1 Interview date 04/02/08.

would thus be very difficult to support the assertions made by FLO1, CO3 and WBO2 and conclude that broadband is not important to all levels of the community.

6.1.3 Maximising Available Infrastructure

Generally, the majority of the other focus interview respondents agreed that ADSL was an important broadband technology for South Africa. CO1[16] stated that South Africans live in a knowledge economy and require high speed access to facilitate access to information, therefore ADSL was a good choice as copper is already available in the ground. This view is supported by the Regulator[17] and CO2[18] who stated that the inherent nature of ADSL for use over existing infrastructure makes it an excellent choice for Internet access, and that it also made good economic sense to maximise the return from a sunk cost[19].

This view is reiterated by CAG[20] who rated ADSL as the most important broadband technology that we currently have in South Africa. This is due to the fact that South Africa only has a copper infrastructure to the end-user and no cable infrastructure like other countries. CAG stated that the only way to deliver broadband using existing infrastructure currently is via DSL. CAG did state that, although wireless technologies are improving dramatically, the only suitable technology to deliver high speed services is currently the DSL technology. This statement is debatable as wireless broadband services now outnumber ADSL (Goldstuck, 2007:6).

In any business model, it is a prerogative of the business operator to maximise their return on their investment. In the case of ADSL, most of the copper cable has been installed to the customer premises and the cost of this investment should have already been recouped through years of line rental fees paid by the customer. Hence ADSL provides a very attractive business model to fixed line operators as they are able to extract further revenue out of a sunk cost with very little additional expenditure in comparison to the cost of installing new infrastructure.

[16] CO1 Interview date 24/08/07.
[17] REG Interview date 07/11/07.
[18] CO2 Interview date 12/09/07
[19] The sunk cost being the copper that has already been deployed.
[20] CAG Interview date 31/08/07.

6.1.4 The Definition of ADSL

Getting consensus among the interviewees on the definition of ADSL with regards to its minimum speed was not possible. WBO1 defined ADSL as 'Always on connectivity to the Internet offering speeds of 256kbps or more on the downlink provided on a shared or best effort basis'. CO1 suggested that this minimum speed should be at least 2 Mega-bit per second (Mbit/s) or greater. ICASA's current definition of ADSL is based on the ITU definition of broadband- I.e. '…an always-on data connection that is able to support various interaction services, and has the capability off a minimum download speed of 256 Kbps.' Hence in terms of throughput speed, broadband should encompass all speeds greater than 256 Kb/s.

It is important for a regulated definition of ADSL in order to standardise the service offerings and to ensure that customers are not tricked into buying inferior products with lower throughput speeds that are being advertised as ADSL. There seems to be not much debate in the literature around speeds of ADSL services and the ITU definition seems to be the most widely accepted 'official definition'. It would not be amiss for South Africa to adopt the ITU definition of ADSL.

6.1.5 Moving Targets

Regulating broadband speeds may prove more difficult to implement than first meets the eye, as broadband speeds can be described as a moving target. CO2 suggests that ICASA does not give a threshold in terms of Mbit/s and should rather let the services define what is broadband in SA. As an example, broadband in Europe may be defined with a minimum speed of 10 Mbit/s which may not necessarily be applicable to SA. Another concern is the way that broadband is being advertised. CO3 contends that broadband is being advertised in an unspecified fashion and compares it to the way the output power of a hi-fi system is advertised. This can be either in RMS or PMPO. Likewise, a 512 Kilo-bit per second (Kbit/s) ADSL connection may only achieve an end to end data thorough-put of 128 kbit/s. The through-put is from the customer's premises and the ADSL exchange may allow the advertised 128 kbit/s, although the speed attainable after this point is not within the

control of the ADSL provider. The Internet, being a collection of network elements, could only be as fast as the slowest connection. This means that even a fast 4Mbit/s connection would be slowed down to the rate of the slowest connection in that link. ICASA would then need to ensure that its regulations when dealing with speed reflect only the portion that is controlled and operated by the ADSL service provider, i.e. that portion from the local exchange to the customer's premises.

Another issue when looking at the definition of broadband would be the rapid advances in technology which increase the speeds of the ADSL connection. CO3 stated that the 128 kbit/s was the slowest broadband connection in South Africa. This service was then scrapped and the 384 kbit/s connection has become the slowest connection. CO3 states that broadband speeds should be an enabler for customer experiences like downloading videos and sound clips. As industry drives those experiences, the bandwidth requirement would increase proportionately. A 512 kbit/s ADSL connection would currently be considered broadband, but that may not be sufficient at a specific point in the future. The pace of the US markets in general (as the US is currently the largest online community-see Table 6.1 below) dictates the broadband experience and would thus in turn dictate the South African broadband definition.

Top 15 Countries by Internet Penetration January 2007 vs. January 2006			
	Jan-06 (000)	**Jan-07 (000)**	**Percentage Change**
Worldwide	*676,878*	*746,934*	*10%*
United States	150,897	153,447	2%
China	72,408	86,757	20%
Japan	51,450	53,670	4%
Germany	31,209	32,192	3%
United Kingdom	29,773	30,072	1%
South Korea	24,297	26,350	8%
France	23,712	24,560	4%
India	15,867	21,107	33%
Canada	18,332	20,392	11%
Italy	15,987	18,106	13%
Brazil	12,845	14,964	16%
Spain	12,206	12,710	4%
Russian Federation	10,471	12,707	21%
Netherlands	10,772	11,077	3%
Mexico	8,624	10,149	18%

Table 6.1: Top 15 Countries by Internet Penetration (World Metrix, 2006:13)

This view is supported by ISP1 who agrees that the minimum speed of broadband is a moving target and to peg ADSL's minimum speed at a fixed bit-rate at any given time is not a good idea as this speed would not be applicable in the future. ISP1 did not see having an official definition of ADSL as a critical definition to have and felt that the regulator should rather concentrate on licensing spectrum to enable new technologies. ISP1 also further noted that ADSL overseas ranges drastically from minimum speeds of 1.5Mbit/s up to 24 Mbit/s.

6.1.6 Setting Speeds-Dangerous?

From the focus interviews, REG also sees the current definition of ADSL as being limiting and concedes that it is something that would have to be revised on a

continual basis. ISP2 however has taken a completely different view and did not see the importance of having a minimum speed set for ADSL at all. ISP2 argued that the definition of ADSL should not be limiting and that ISP's should be able to sell lower speeds even if it does not conform to the official definition of broadband. ISPG[21] went as far as to say that it is actually dangerous to set service speeds. ISPG also questioned the point at which this speed would be measured. ISPG would rather see a regulation that relates to types of services and the access technology than one that sets speeds at which high capacity services operate. This view was supported by WBO2 who urged ICASA to rather concentrate on developing web browsing and access to info first and not specify speeds of broadband but rather what it is intended for.

CAG insisted on South African following the ITU definition in order for us to align with international standards, but also cautioned that this definition has to be adapted as technologies evolve and services are upgraded. CAG also supported the concept of broadband speeds being led by the type of service that is being offered E.g. Video streaming. It is clear that the regulator would have to balance the pitfalls of setting speeds with the dangers of operators passing of sub-par services as broadband services. It is important for the regulator to keep up with international standards and ensure that any definition that South Africa adopts is constantly revised with changes in technology.

6.1.7 Fixed Line Operators Agree

The fixed line operators agreed that the minimum speed of ADSL should be regulated at 256 kbit/s. The general consensus was that the definition of ADSL is more a service level definition rather than a regulatory issue. The definition of ADSL requires more thought from the regulator since broadband when simply described is an access technology which is greater than narrowband. The current definition by ICASA only addresses the lower limit of ADSL speed and makes no reference to the upper limit. The fixed operators were also at pains to point out that the regulator's

[21] ISPG interview date 29/11/07.

current definition of broadband should also refer to access and not the end to end service since they are not able to control the end to end speed. This view was contested by CO1 who stated that it was possible for operators to control the end to end speed of an ADSL line. ICASA would need to carefully weigh up the decisions it takes based on the cost benefit of such decisions. Setting a high minimum speed of ADSL may assist with consumer protection issues such as preventing consumers from being sold inferior ADSL connections which are being touted as ADSL. The other side to such as regulation would be that it would inadvertently prevent ISP's from selling slower ADSL connections to consumers who may not necessarily require ultra-high speed connections. Allowing slower speed connections would then actually assist the regulator in achieving its mandate of increase the uptake of ADSL in South Africa.

6.1.8 Is ADSL Broadband?

Most interviewees agreed that ADSL could be considered as broadband, although this depended on which ADSL available in South Africa was being considered. CO1 and CAG noted that only the 4Mbit/s offering should be considered as true broadband while CO2 felt that it should be the 384 kbit/s offering. WBO2 felt that none of the ADSL offerings could be considered as a true broadband technology.

The objective of this question was to determine whether ADSL could be considered as a true broadband technology and not to determine what the minimum speed should be. Based on the overall consensus, it can be safely assumed for the purposes of this research that ADSL is a true broadband technology irrespective of the speeds involved, i.e. the technology itself is broadband and thus can be compared alongside other broadband technologies.

6.1.9 Official Definition of Broadband

This section is aimed at establishing the importance of having an official definition of broadband i.e. a definition that is regulated by ICASA. Most operators agreed that it was important for ICASA to have an official definition of broadband. The most common reason cited for this importance was the fact that broadband could be falsely advertised, leading to inferior products being touted as broadband products. This consumer protection reason was stated by WBO1, CO1, CO2 and the regulator as being the most important reason for having an official definition. It is ICASA's mandate is terms of Section 2 (n) of the Electronic Communications Act[22] to 'promote the interests of consumers with regard to the price, quality and the variety of electronic communications services'. Having an official definition of broadband would make it possible for ICASA to institute legal action against providers who tout a service as broadband when it is not. This would protect consumers who are not technically savvy enough to differentiate between the different offerings available and prevent them from being misled. This is not to preclude these operators from offering lower, non-broadband speeds that should be advertised as such. CO1 also noted that even the 3G offerings that consumers pay for revert to GPRS speeds when 3G is not available or when the operators 3G network is at peak capacity. This could be construed as false advertising unless it is clearly stated in the terms of use of the service. CO2 also pointed out that the speeds of the 3G service also depends on the number of users connected to the service and that the speeds may typically drop when the network is at full capacity. This is also true of the ADSL service and is confirmed by FLO1 who stated that ADSL is technology which operates on contention ratios and is considered a 'best effort' shared service.

The ISP's and the ISPG were the only interviewees who were not convinced that an official ADSL definition was required. ISP1 felt that having an on demand connection rather than dial up should be the only distinction between broadband and narrowband while ISP2 upheld their previous comments that ISPs should be able to sell lower speeds to customers and not be hindered by the definition of broadband. ISPG also further re-iterated their comments that it is dangerous to peg something specifically as broadband and that minimum speeds dangerous. This is because they

[22] Act No 36 of 2005.

can become quickly out of date. FLO1 main objection to an official definition of broadband was that it should include all technologies and not look at ADSL only. FLO1 suggested that a broadband market review would be essential to correct this type of asymmetrical regulation.

An official definition of broadband would be required in order to prevent any consumer issues that may arise through false advertising. The regulator should publish such a definition within a regulation to make it a legally enforceable definition. The issue of the ever-changing speeds of broadband services would have to be considered and the regulator would have to ensure that it constantly updates the published definition of broadband. There is nothing that precludes operators from offering other high speed Internet services that are faster than dial-up access but slower than an officially defined broadband service. These types of services should be allowed to exist as they fill a niche market. It is the regulator's duty to ensure that these types of services are advertised honestly and are not meant to mislead the public. The issue of regulating the actually speed as opposed to the advertised speed is an issue that needs further studies. The differing view of whether an end-to-end speed of a broadband service can be guaranteed is an unresolved issue. The regulator would need to conduct studies into this issue to provide a definitive answer and this is most certainly an area for further study.

6.2 The Uptake of ADSL

The main focus of investigation in this section was to determine whether the uptake of ADSL in South Africa was sufficient when compared internationally. 92% of the interviewees agreed that the uptake of ADSL in South Africa when compared to international benchmarks was low. Various contributing factors for this low uptake were identified, although this was not the focus of the investigation. If it can be established that the uptake of broadband in South Africa was low compared to international standards, it would provide a greater impetus towards the call for greater regulatory intervention to remedy the situation. Likewise if it had been the opposite, i.e. South Africa's ADSL uptake compared favourably with the rest of the world, it would provide a greater impetus to the call for lesser or no regulatory intervention in the ADSL market.

Two very distinct trends were identified during the interviews which impact substantially to the uptake of ADSL in South Africa, the first being the penetration of ADSL as a function of fixed line teledensity. Although this trend was identified in the previous section in terms of the importance of ADSL based on technical parameters, this section concentrates more upon the uptake as a factor of copper penetration. The second trend was the debate around the international markets that were being used to compare South Africa in terms of ADSL uptake.

6.2.1 Fixed Line Penetration of ADSL

WBO1 noted that the ADSL penetration in South Africa is low compared to most first world markets and some developing markets; however the growth of the technology is rapid. WBO1 and CO2 also noted that the overall broadband penetration as a percentage of population is low. South Africa's total roll out of fixed lines by the end of 2006 was 4.675 million and its broadband penetration was 0.9 % (BMI, 2006:19). FLO1 stated that to compare South Africa with countries like Korea is incorrect. According to FLO1, these countries have government subsidies to promote the use of ADSL and a large majority of the population live in high-rise buildings with shorter loop lengths. FLO1 contends that these shorter copper loop lengths make it much easier for their Telecommunications Operators to provide ADSL services. FLO1 also stated that countries in Europe in general have shorter loop lengths and thus their telecommunications operators would experience the same benefits as experienced by their Korean counterparts. FLO1 went further to add that comparing us to the US is also incorrect as they have greater buying power due to economies of scale and would natural benefit from lower prices. FLO1 suggested that we compare ourselves to Latin American countries as this should be a fairer comparison. FLO1 did concede that there is however room for improvement in terms of South Africa's broadband penetration.

Using the argument of FLO1 above, one can compare South Africa with than other middle income countries such as Argentina, Mexico and Sri Lanka. Using a comparison of the cost of broadband as a percentage of monthly income, one can

rank the countries in terms of broadband affordability. Out of the 61 countries listed, South Africa is at 48th position with broadband prices (1st being most affordable and 61st least affordable) making up 7,95% of monthly income compared to Argentina (3,98%), Mexico (4,56%) and Sri Lanka (4,81%) (ITU, 2003:1). Even when we compare ourselves with regional countries, South Africa does not fare well. Of a total of 11 countries surveyed. South Africa was ranked seventh (BMI, 2005:8).

It is possible to 'cherry pick' other developing countries and rank South Africa among them, and a different ranking may emerge. This does not detract from the fact that when compared to regional countries, South Africa does rank poorly. While FLO1's argument can be used to explain South Africa's poor showing when compared to OECD countries (i.e. comparing to first world countries), it does not justify South Africa's poor showing when compared to developing countries like Mexico, Sri Lanka and Argentina. South Africa's broadband penetration is poor no matter what countries are used for benchmarking, which gives greater impetus for the call to address the poor uptake of broadband services.

Table: Regional Broadband Penetration Overview

Country	Broadband Penetration 2005 (%)	Regional Rank 2005
Israel	17.5	1
Bahrain	9.1	2
UAE	4.3	3
Turkey	1.6	4
Kuwait	1.4	5
Saudi Arabia	1.0	6
South Africa	**0.9**	**7**
Iran	0.6	8
Oman	0.4	9
Egypt	0.1	10
Nigeria	0.1	10
Regional Average	3.4	

Source: BMI Research

Table 6.2: Regional Broadband Penetration overview (BMI, 2005:8)

The low broadband penetration can somewhat be explained by South Africa's relatively low fixed line teledensity as the number of ADSL lines would be dependent solely on the fixed line teledensity. If one had to exclude the wireless broadband connections, South Africa would probably fall even further down the list in terms of regional broadband penetration as wireless connections account for 44% of all South African broadband connections (Goldstuck, 2005:7).

Fixed line teledensity puts South Africa at 9th out of eleven regional countries surveyed (BMI, 2005:10).

Table: Regional Fixed-Line Penetration Overview

Country	Fixed-Line Penetration 2005 (%)	Regional Rank 2005
Israel	44.3	1
Iran	28.1	2
Turkey	26.9	3
UAE	25.8	4
Bahrain	24.5	5
Kuwait	21.2	6
Saudi Arabia	15.1	7
Egypt	13.4	8
South Africa	**10.6**	**9**
Oman	8.8	10
Nigeria	0.9	11
Regional Average	20.0	

Source: BMI Research

Table 6.3: Regional Fixed line Penetration Overview (BMI, 2005:10)

6.2.2 OECD Comparisons

Comparing South Africa with OECD countries paints a grim picture. South Africa would rate last among the thirty countries surveyed if the broadband penetration figures were compared with OECD countries. South Africa's broadband penetration figures increased to 1.79% by June 2007 with 215 000 users (MyADSL, 2007:1). Using a 2007 broadband penetration figure for South Africa, South Africa still rates

last. The lowest rated OECD country in terms of broadband penetration is Mexico with a broadband penetration of 4.6%. Topping the list is Denmark with a broadband penetration figure of 34.3%.

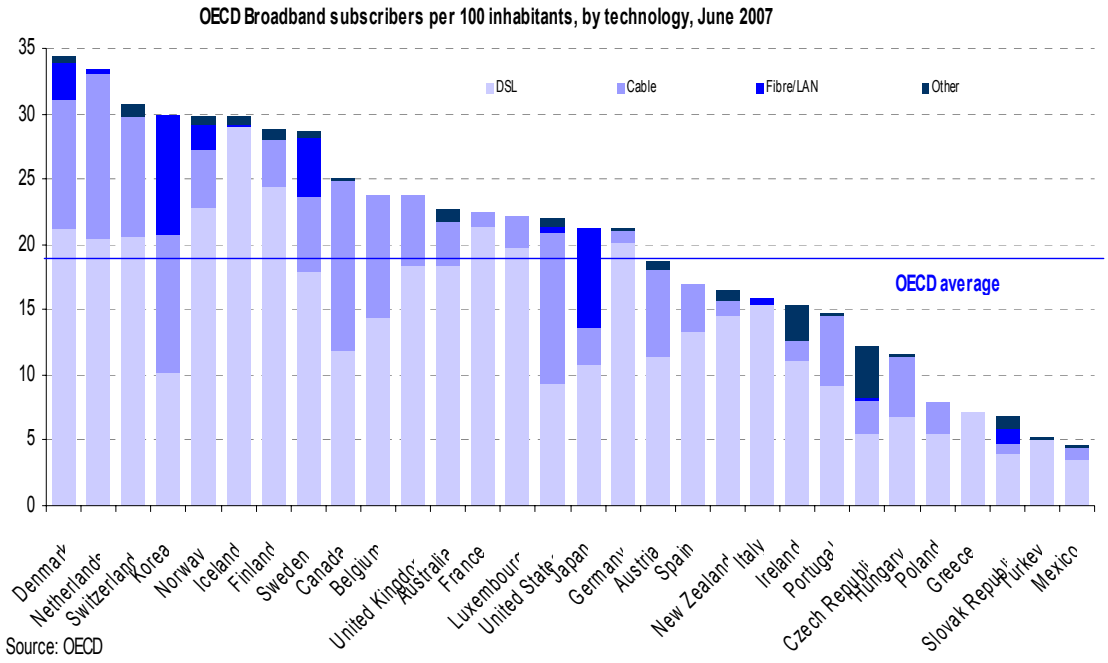

Figure 6.1: OCED broadband penetration figures June 2007 (BMI, 2005:12)

Although not specifically asked for at this point in the interviews, several respondents felt it necessary to include their thoughts on why the ADSL uptake in South Africa was so low. It is included here for completeness.

Price and affordability was the key factor identified as the reason behind the low uptake of ADSL in South Africa. Telkom's poor management of ADSL was also seen as key factor as the initial introduction was done anti-competitively[23]. Poor consumer response to Telkom's management of ADSL was also attributed to discouraging the uptake[24].

[23] ISP1 interview.
[24] ISP2 interview.

6.3 Policy and Regulatory Factors

The aim of this section is to establish any key policy and regulatory factors that could be identified which influence the uptake of ADSL in South Africa. Both positive and negative factors were considered. This section does not investigate the mechanisms involved in implementing the policy or regulatory factors identified as this would be covered later in the research, it merely lists these factors as stated by the interviewees. The first step in deciding whether regulatory intervention is required to boost the uptake of ADSL would be to first identify the various ways in which regulation and policy could affect the ADSL environment.

It emerged that several common threads were apparent from the responses received from the interviewees. These threads centred primarily on affordability, local loop undbundling, undersea cable, competition and quality of service. These threads also overlapped as well, with competition issues affecting affordability and quality of service. Each thread could also be examined further and broken down into its composite parts. For example, competition issues consisted of local loop unbundling and the determination of essential facilities while affordability issues consisted of international access and wholesale models. From this inter-relationship between competition and affordability, it became apparent that most of the interviewees were focused primarily on introducing competition in the ADSL market and that this should be done on the wholesale level. This can be deduced from the fact that more than 90% of the inputs received concentrated upon competition issues.

It was clear the interviewees did not make specific differentiation between the policy and regulatory initiatives that could be effected. This interrelationship was highlighted by CAG who stated that it would be difficult to separate policy and regulatory issues and this is due to the monopolistic nature of the market. CAG stated further that it was actually policy initiatives that did not allowed the market to be liberalised.

Most emphasis was placed on the required initiative without classing it as a particular regulatory initiative or policy one. It was clear from the discussions with the interviewees that they expected these initiatives would be effected by the regulator, although the originator of such an initiative was not specifically mentioned in their

formal response. This is interesting as the question clearly asked for a breakdown between positive and negative policy and regulatory initiatives. One could deduce from the type of answers that were received from the interviewees that it was not particularly important to the ADSL stakeholders as to whom the originator of a particular initiative was, only that the initiative was implemented. Alternatively, one could deduce that the interviewees did not fully understand the difference between positive and negative policy imperatives.

Some of the comments made by FLO1 and others which are contrary to the majority of the views held by most of the interviewees is discussed in a policy section of the research report.

6.3.1 Affordability

As stated earlier, affordability was identified as one of the key threads during the interviews. WBO2 stated that affordability is a barrier to entry for most people who require ADSL access. Further investigation of the interviewee responses showed that this partly due to the high price of international Internet access that the Internet service providers are subject to. Figure 6.2 showed that the price of international bandwidth[25] has decreased from 1998 until 2002. There is also no indication that this trend would diminish.

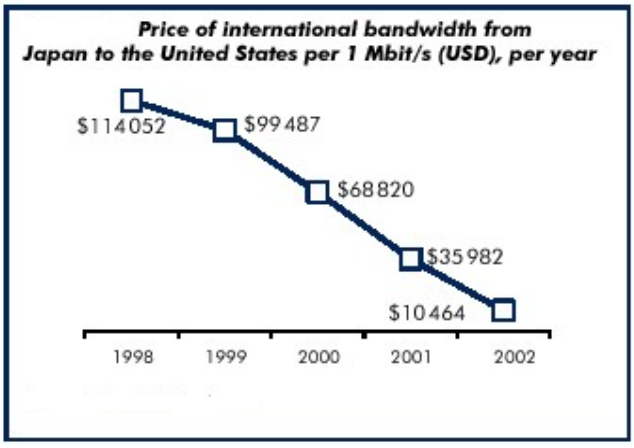

Figure 6.2: International Price of Bandwidth (ITU, 2005:22)

[25] The example shows the price of bandwidth between Japan and the US which is illustrative of the price of international bandwidth.

This decrease in international bandwidth prices should have been passed onto the ISPs, but this seems not to have happened. Prior to the introduction of Neotel, Telkom was the only provider of international bandwidth and thus ISPs had no option but to accept Telkom's monopoly pricing.[26] The effect of the monopoly pricing was passed onto the consumer by the ISP's resulting in higher ADSL prices according to WBO2.

This poses the question about the appropriateness and effectiveness of the regulation of price. Although the regulation of price will be dealt with later on in this report, it is interesting to note that several interviewees (CO1, CO3, FLO2 and the Regulator) noted that wholesale price regulation would be more effective than ICASA's current attempt to regulate retail prices. An option for the regulator would be to use cost orientation for an operator like Telkom. The regulator would have to proceed cautiously as it was noted that it would be unjust to regulate price of ADSL services when one finds other broadband technologies like HSDPA not being subjected to the same regulations. Another common thread that emerged from the interviews was that all the ISP's viewed price regulation, either wholesale or retail, as unnecessary when there is sufficient competitive forces in the market. ISP3 blamed the fact that the current regulatory framework on broadband in the country has not been liberalised as the reason South Africa has such high ADSL prices. The ISP's in general felt that there were no positive steps from the regulator that made broadband more accessible in South Africa. These are viewpoints that the regulator needs to consider as it has been drafting several regulations that has been aiming for just that[27]- i.e. making broadband more accessible to all South Africans. ISP3 suggest that the regulator look into drafting regulations around LLU, significant market power for higher players and resale of products at wholesale prices.

Another common point raised was that the regulator did not have the resources to regulate prices and that this capacity issue would seriously hamper any regulatory intervention attempted by the regulator. CO1 disagreed with the ISP's who were of

[26] Neotel began offering services to Business customers and ISPs in November 2007.
[27] An example would be ICASA's draft facilities leasing regulation.

the opinion that no price regulation should be implemented. CO1 contended that only wholesale price regulation should be adopted by the regulator.

The environment was also blamed for the state of ADSL as it stands. ADSL was introduced in terms of the Telecommunications Act which had no requirement for Telkom to provide facilities on a wholesale basis. According to ISP1, Telkom was then able to dictate prices vertically and thus apply price squeeze to other operators. ISP1 saw no reason why current policy and regulatory initiatives could not remedy the ADSL uptake situation as the incumbent was created by the policy and regulatory regime at that time.

6.3.2 Introducing Competition by Local Loop Unbundling

Introducing competition by unbundling the local loop was seen as the best policy and regulatory initiative that could be implemented by ICASA. The Minister of Communications, Dr Ivy Matsepe-Casaburri has already drafted a policy initiative that mandates ICASA to complete the process of local loop unbundling before 2011 (Department of Communications, 2007:1). The policy recommendations include having a combination of three unbundling models i.e. :

- Full unbundling;
- line sharing and
- bitstream (wholesale) access.

Further recommendations include:

- That a new facilities and services management entity be formed by the incumbent if full unbundling model is to be considered (Department of Communications, 2007:1).
- That the pricing levied by the incumbent for access to the local loop be regulated (Department of Communications, 2007:1).
- Regardless of who owns the local loop, any operator appropriately licensed by Independent Communications Authority of South Africa (ICASA) should have access to the local loop to deliver voice and/or broadband services (Department of Communications, 2007:1).

- The regulator should implement carrier pre-selection as soon as possible so that customers would have a choice on who would transmit voice and data on the local loop infrastructure to their premises regardless of who owns the local loop (Department of Communications, 2007:1).

It would seem that the general consensus among those interviewees that supported local loop unbundling was that unbundling of the local loop will stimulate competition by making it viable for smaller service providers to compete against the monopoly operator in this space. This should be a full unbundling of the local loop. Two policy and regulatory issues were identified that address this process, i.e. local loop unbundling and competition.

Other respondents (CO2, CO1) saw the unbundling the local loop as the biggest obstacle preventing the uptake of ADSL in South Africa. A larger number of players in the access provision market would increase competition, lower prices and thus increase the uptake of ADSL. This cause and effect cycle is what the intention of the regulator would ideally be as a consequence of local loop unbundling. This cause and effect cycle is however not guaranteed and other externalities which could affect local loop unbundling are discussed in greater detail later on.

CO1 reiterated the cause and effect position by contending that only competition would reduce prices in the ADSL market as Telkom is currently the only ADSL provider thus far. CO1 related this to the cellular industry and warned that ICASA should guard against a scenario where there is a superficial level of competition. This is not real competition as the products that were offered by the different providers were similar and thus similarly priced.

CO3 and ISPG also saw local loop unbundling as a viable policy and regulatory option to increase ADSL uptake in South Africa as it would result in more competitive offers being brought into the market place. The current scenario where the infrastructure is owned and operated by Telkom resulted in a situation where there is no competition in the wholesale model of ADSL access.

ISP1 felt that is important to introduce some sort of structural mechanism (either regulatory or policy) to address the bottlenecks controlled by the incumbent ADSL operator. The most important bottleneck was identified as access to the local loop. It was suggested that it would be important to develop a broadband policy with a clear and desirable 'end game' in mind. E.g. If increased competition was the 'end-game', then introducing market structure mechanisms like Local Loop Unbundling should be used to arrive at a desired 'end game'.

Other respondents saw full local loop unbundling as an evolutionary process with shared access as an intermediary step, followed by Bitstream access for ISPs before full local loop unbundling was implemented. The may well be the process that should be followed in South Africa as lessons learned in the intermediate steps could prove invaluable when full local loop unbundling is implemented.

6.3.3 Undersea cables and essential facilities

Further suggestions from the interviewees included deregulating access to SAT-3 cable and provision of additional undersea cables. These cables should also be declared as essential facilities along with the classification of international gateway access as essential services. This would have the effect of stimulating competition and should drive down the price of International Access which was described earlier as a limiting factor to the uptake of ADSL in South Africa. WBO2 added to this by stating that the cost of computer equipment limits the number of potential Internet users and hence the number of potential ADSL users. This factor shall not be discussed in detail as it falls outside the scope of inquiry of this research report, but a brief investigation of these factors is covered later on in this research report.

6.3.4 Quality of Service

There was a suggestion from the respondents that the regulator should only enforce quality of service regulations by setting minimum standards and ensuring these standards are enforced. These quality of Service standards should also apply to ISP's. This view was shared by the regulator who stated that regulations would be

required in terms of Service Level Agreements that would be imposed upon ISP's and other ADSL operators. These measures would help increase uptake. The regulator also indicated a need to define the speed and pricing model as well. The regulator felt that policy initiatives were long overdue as the broadband policy framework was announced a while ago. These comments are interesting as it indicates the regulators view of regulations as being driven by policy initiatives. The regulatory vs. policy debate is discussed later on in this report.

6.3.5 No policy or Regulatory factors required

Some respondents stated that no policy or regulatory factors actually affect broadband. A particular respondent (FLO1) stated that the South African market is not big enough to support several broadband operators and felt that voice is more important.

Some of the ISPs agreed that the government should not regulate broadband, but for different reasons. One respondent (ISP2) stated that historically, a monopolistic licence was granted to Telkom-a company in which government has had a share in. This represents a conflict of interest as Government is profiteering in an industry which it regulates through ICASA.

It is clear from the focus responses that some sort of policy or regulatory initiative needs to be implemented to tackle the affordability issues that surround the ADSL technology. It is unclear whether policy around competition should be developed first, which would then as a desired effect, reduce the prices of ADSL making it more affordable to all. What is very clear is that the current policy and regulatory initiatives that have been thus far attempted by the regulator and the government have fallen far short of the industry expectations based on the industry sample interviewed during the interviews.

6.4 Regulatory Intervention

This section focuses on the central research question, 'Should there be regulatory intervention to simulate the uptake of ADSL in South Africa and if so, what form should this intervention take?' The question is broken up into several sub-parts to build a background to the central question before addressing it. The method of inquiry via supporting questions starts with determining whether the broadband market in South Africa is sufficiently competitive in terms of the interviewees' opinion. This question sets the platform upon which the need for regulatory intervention is assessed. Competition is a central issue that is discussed. Although a competitive market may nullify the need for regulatory intervention, it is possible that there is a need to regulate the industry should it this be in the best interests of the country. Baldwin and Cave point out that it is up to the regulator to regulate in the public interest when it is necessary to protect the public interest (1999:14). This could thus still provide a motivation via which the regulator could argue that regulation is required in the ADSL market. Should the market not be competitive enough, the call for regulation intervention would gain much more momentum as competition is seen as the driver of broadband uptake (Crandall *et al* 2004b, Fisher *et al* 2003:11). The second question in this section asked at the interviews tackles the central question of whether regulation intervention is required to stimulate the uptake of broadband in South Africa and explores the reasons for and against regulatory intervention. The area to be regulated is then investigated, with the focus questions looking at whether regulatory intervention should focus on ADSL only or look at broadband technologies as a whole. This question assumes that regulatory intervention is required in the first place and tries to focus the area to be regulated.

The next set of focus questions addresses the core of regulatory intervention and ADSL by investigating the level of regulation, type of regulation, forms and implementation of such regulations. There are a myriad of ways regulations can be implemented and the best way for such regulations to be implemented in South Africa is investigated. The financial, political and socio-economic climate of South Africa is unique from the rest of the world and it would stand to reason that the type of regulatory intervention and the manner in which is implemented may also be unique.

6.4.1 Is the broadband market competitive?

The first sub-question looks at whether the broadband market is sufficiently competitive or not. It was interesting to note that most of the interviewees felt that the broadband market was not competitive enough, even though the question did not limit the market to ADSL only. The broadband market in South Africa is made up of predominantly Telkom, the cellular network operators, iBurst and Sentech. There are other smaller players operating broadband services on a trial basis for municipalities, although these services have not been approved by ICASA for commercial operation. This means that there are theoretically at least six broadband service providers who can provide broadband services on their own networks[28]. This would suggest a competitive market in the broadband arena, but this seems not to be the case as FLO2 argued that wireless broadband service being offered in South Africa cannot be constituted as a sufficient substitute for ADSL. The reasons given for such as claim were that wireless services cannot generally match ADSL in terms of overall capacity as ADSL can support triple-play (voice, video and data). FLO2 stated that there are also several quality of service issues associated with wireless broadband Internet access. These claims support the theory that ADSL is an important broadband technology for South Africa and as such, would require regulation as the regulator has a mandate to regulate in terms of the bests interest of the country (Baldwin & Cave, 1999:14).

CO1 did feel that the data connectivity broadband market using wireless technologies was a competitive market, but felt that the quality of service available to consumers using this service was very poor. Consumers were paying for a 3G fast broadband service and they did not receive this service at all times. It was for this reason that CO1 felt that a true continuous broadband service could only be achieved by using an ADSL service. CO1 went further to state that it is certainly possible from a technical point of view to control the throughput of ADSL, although it is a shared

[28] These are Vodacom, Cell-C, MTN, Telkom, I-Burst and Sentech.

service, to ensure that it retains its broadband nature at all times. This is unlike a 3G service which drops to a GPRS speed (akin to a dial-up connection) when the 3G coverage is not available. It is for this reason that CO1 maintains that the broadband market is not competitive as there are no equal alternatives to compete with the fixed line. This point of view is supported by ISP3 who felt that only the top two companies in the broadband market are actually the strongest operators who drive the pricing and services market-this indicates that although there are several operators providing broadband services, the smaller operators are not able to properly compete in this market in order for the market to be declared as a properly competitive one. Fisher *et al* (2003) reported that 46% of all broadband service providers in the competitive US and UK went bankrupt or were acquired by 2001. This could be seen as the market adjusting to ensure that the strongest players survive, but could also be an indication of the size of the market and the number of operators that it can accommodate. Fisher's study shows that in mature markets like the US and UK, the number of operators is not necessarily a reflection of the competitive nature of that market as only the strongest operators survive and dictate pricing and services. This view is reinforced by Ferguson (2002) who studied the US broadband market and found that the dominant Local Exchange Carriers (LEC) who provided ADSL services to the public largely did not compete directly with each other and sought to protect their dominant positions. This can be related to the South African environment where the dominant cellular companies do not aggressively compete with each other on issues around price. For the South African broadband market to be truly competitive, it would require several dominant operators who competed on price at an inter-modal as well as intra-modal level.

ICASA agreed that that broadband market was not sufficient enough and stated that further competition is required in this market (ICASA, 2005: 32). More interestingly, ICASA was of the opinion that even the prospect of increased regulatory intervention in the broadband arena was enough to ensure that prices decrease and uptake increases. Telkom has been dropping its prices for the ADSL service since ICASA had started investigated the ADSL service, although whether this is due to regulatory intervention is questionable at best.

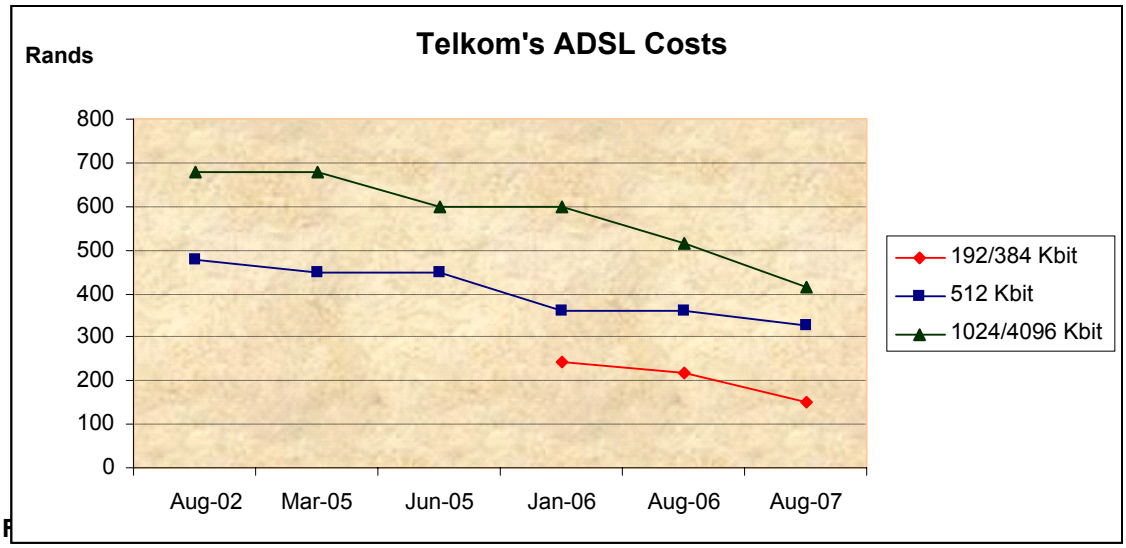

Figure 6.3 above shows Telkom's prices of the ADSL line rental for the 192/384, 512 and 1024/4096 Kbit/s circuits. There is a clear trend of decreasing prices from March 2005 until August 2007 for all circuit speeds. Since August 2002 until August 2007, the 192/384 kbit/s circuit speed decreased by 62%, 512 kbit/s circuit speed decreased by 68% and 1024/4096 kbit/s circuit speed decreased by 61%. ICASA began its inquiry into Telkom's ADSL service in December 2004 with hearings being held in the following year. This, coincidentally or not, corresponds to the time at which Telkom had begun decreasing prices for its ADSL service. Telkom stated that by March 2005, 50 000 customers had signed on to their ADSL service and economies of scale dictated that a decrease in the price was possible (Goldstuck, 2005:13).

Three respondents (ISP1, CAG1 and CO2) concurred that there should be more operators allowed to provide broadband services to increase the level of competition in the market. These respondents agree that any broadband service, whether fixed line or not would be classified as a competitor to Telkom's ADSL service. This is in direct contradiction to the views held by CO1 and FLO2 who felt that wireless broadband could not be seen as a competitor to ADSL. The formers' views are supported by Lee (2006:4) who stated that it is a widely held view that 'intra-modal competition through platform competition (competition among several different

[29] This graph was constructed using data obtained from Telkom Annual reports and the Telkom website.

broadband platforms) is crucial for reducing prices, improving quality of service, increasing customers and promoting investment and innovation.' DotEcon (2003) made similar findings in the European market and stated that it was preferable to have facilities based competition between differing platforms rather than access based competition. They found that facilities based competition led to greater competition over more aspects of an operator's activities. This led to real choice for the customer and exerted downward pressure on prices and facilitated innovation (DotEcon, 2003:5).

ISP2 pointed out that there is no real ADSL broadband market in South Africa. There are only resellers of the Telkom infrastructure as the physical piece of copper is still in monopoly hands. ISP2 went on to further state that there in unequivocally no competition in the ADSL broadband market because of such an arrangement.

Interestingly, this view was not shared by the ISPG who stated that the market is competitive as it has been led by the wireless service providers. The ISPG admittedly compares the current level of competition to the situation a few years ago when there was virtually no other broadband service provider except Telkom. CO3 agrees with this view only when comparing in terms of rival technologies. CO3 debated whether comparing rival technologies could actually be construed as true competition and blamed the lack of competition to significant barriers to entry that new entrants face when trying to break into the broadband market. Some of the most critical barriers were attributed to the regulatory environment which was seen as not conducive to easy market entry. Although this particular comment did not address the specific focus question at hand, it did present the view that the regulator may have to look within itself at measures that it has implemented before looking for solutions that address a particular challenge being faced, i.e. the regulator aims to increase the uptake of ADSL by implementing regulations aimed specifically at ADSL while other regulations around facilities leasing, right to spectrum, service licences etc. may also assist in increasing the uptake.

FLO1 called for a broadband review before any questions of the level of competitiveness of the market could be answered. FLO1 suggested that ICASA look at the retail and wholesale markets in terms of broadband in South Africa where the

retail market is sufficiently competitive as there are several ISP's providing ADSL services to the end user. FLO1 conceded that Telkom has the monopoly in the wholesale market of ADSL service provision but this did not represent an unusual arrangement as the cellular operators in South Africa currently also do not wholesale their products.

The common thread that emerges from all the focus questions around the competitiveness of the broadband market in South Africa was that there is insufficient competition to truly declare the market as being competitive. Fisher *et al* (2003) showed that a large number of operators in a market did not necessarily make that a competitive one and that the strength and dominance of the operators determine the competitiveness of the market. The important aspects to note was that the mobile broadband providers did not provide an adequate substitute for ADSL services and could not be seen as pure competitors in this market. Although Lee (2006) found that intra-modal competition was an acceptable form of competition, i.e. competition between fixed and wireless broadband operators, this competition was felt to be insufficient in South Africa. Another important point made was that the ISPs providing ADSL services were not true competitors to Telkom as they were simply resellers of Telkom's ADSL circuit. Overall, after examining the focus interview responses, one can conclude that the broadband market in South Africa cannot be considered as a competitive one.

6.5 The need for regulatory intervention

This section investigates the need for regulatory intervention to stimulate the uptake of ADSL in South Africa. The aim of this section of the inquiry was to determine definitively from the pre-selected sample of ADSL stakeholders, their views on regulatory intervention without actually getting into the mechanics of such an intervention.

There was a majority agreement that there was a need for regulatory intervention, and that specific types of regulation would have to be implemented. There was

support for the light touch or regulatory intervention as identified in the literature review. Some of the ideas suggested by respondents included:

a. Facilitating competition by licensing alternative exchange carriers similar to what has occurred in the US telecoms markets. There would be a significant amount of initial interest at the outset. This would eventually lead to a certain amount of attrition and only the operators with a sound business case would eventually survive.
b. Regulating quality of service to ensure that operators live up to the claims that they make.
c. Do not regulate price as operators would only aim to meet the prices that are mandated by the regulator. They would have no incentive to reduce prices. ICASA does not need to regulate data tariffs in any case as the example of broadband data tariffs show that these prices have dropped from R45 per megabyte three years ago to 20c currently and have been driven down solely by competition.

These are all sound suggestions on the face of it, however sometimes the realities of the country we live in sometimes dictate the strategy that should be adopted. Opening a market up to any and all operators may seem like a viable 'big-bang' approach to ensuring an adequate level of competition. The size of the South African telecommunication market is considerably smaller than the US market. While the US market may be able to sustain several competitive operators, the South African market most certainly would not. Even in the competitive US and UK broadband service provider market, 46% of all these operators went bankrupt or were acquired by 2001 (Fisher *et al,* 2003:32).The regulator would have to look at the best interests of the country and the effect that operators going out of business would have on the market. It may even be that introducing too many players would eventually threaten the economic viability of all of them. One may argue that the regulator must balance this with the current situation where there is a monopoly ADSL market which is subjected to monopoly pricing, however this should be the call of the regulator.

The other cellular providers (CO2, CO3) both agreed that there is a need for regulatory intervention and both suggested local loop unbundling as a possible regulatory measure. The actual mechanism being suggested by the interviewees is not the core concern at this point of the analysis, the core focus at this point is

whether there is a general agreement to the principle of implementing regulatory intervention to increase the uptake of ADSL. The focus of the cellular operators seemed to be aimed at regulatory intervention a wholesale level, possibly because this is where they are the most affected by the monopoly services offered by the incumbent operator. The fixed line operator (FLO2) also held views similar to the cellular operators but opposite to that of its rival fixed line operator by advocating local loop unbundling as a regulatory measure. One could draw the conclusion that the cellular operators and FLO2 were advocating a 'heavy handed' type of regulatory intervention that focused primarily at the wholesale market.

The Internet Services providers also agreed with cellular operators and suggested that regulatory intervention as a possible solution. It would seem that the ISPs are wary of the sort of regulatory intervention that ICASA implements and did not want regulation to make the situation worse. Their view was that light touch regulation would be required and that more competition was necessary in the market. Whether introducing competition via regulations could be considered as a light touch regulatory approach is debatable, but it is clear that the ISPs are looking for mechanisms to lower prices in the ADSL broadband market.

The regulator quite obviously felt that regulatory intervention was most certainly required, but seemed at odds to quantify the type of intervention that it considered as the best approach to regulating ADSL in South Africa. The regulator also seemed to be grappling with enforcement procedures and admitted that no action has been taken against Telkom over their non-compliance to the current ADSL regulations. It would seem that although the regulator had a clear vision of its mandate in terms of regulating the ADSL environment, it lacked in it own word, 'teeth' to facilitate and enforce such regulations. In terms of this section of the analysis, it should suffice to note that the regulator did agree that intervention in the market was required and the issue of enforcement could be an area of further study.

ISPG saw regulatory intervention as a 'double edged sword' and was of the opinion that the lesser the involvement of the regulator in the industry, the better it would be for the industry. This is in stark contrast to the views held by the other ISPs interviewed who were of the opinion that regulatory intervention, albeit as light touch

regulation, must be implemented in South Africa. This view was shared by FLO1 who advocated a market review as the only form of regulatory intervention that should occur.

6.5.1 The focus of the regulatory intervention

This section looks at the focus of regulatory intervention and whether it should be specific to ADSL or focus on broadband technologies as a whole. The consensus among the cellular operators was that regulatory intervention should be technology neutral and focus on broadband technologies as a whole. This would seem counter-intuitive since the only inter-modal level of competition to ADSL would be the wireless operators which are dominated by the cellular operators. One could surmise then that the cellular operators are advocating regulatory intervention in the market in which they operate. Specific areas like data usage and data pricing were identified by the cellular operators as further areas for regulatory intervention.

Other wireless operators like WBO1 and WBO2 seemed to concur with the cellular operators' views by stating that regulation should focus on the service and not the technology as ADSL was only one of many broadband technologies available. WBO2 did however state that as ADSL was a monopoly market; it should thus be the focus of regulatory intervention.

ISPs in general were also in support of having generic broadband regulations. ISP1 saw it as important for the regulator to address some broader issues in the communications service market first, which could be analysed to reflect as support for an increased scope of regulating broadband services.

Another common thread that emerged from the interviews was that introducing technology specific regulations was dangerous as it could be construed as anti-competitive and as asymmetrical regulation. The consumer advocate group disagreed with any such assertions as they felt that it was important to separate ADSL from other broadband technologies since ADSL make use of an already existing infrastructure. This is not the same for wireless networks who have to deploy

base stations and access spectrum in order to roll out services. This is an important consideration for the regulator as the costs of rolling out ADSL has been largely already covered and recouped by the network operator from the rental revenues received. There are obviously other network elements that need to be added such as DSLAMS (DSL Forum, 2006:1) that enable the ADSL service to operate, and it is this type of consideration that makes an ADSL specific regulation make more sense.

The interviewees have made a clear statement that regulatory intervention should not be technology specific and focus on the service only, i.e. the provision of broadband services. It is hard to believe that it was the intention of the regulator to draw up broadband regulations with ADSL specifically in mind. Rather, it would seem like the regulator's hand was forced to draw up ADSL regulations after the flood of complaints that were received after the ADSL service was launched (ICASA, 2005:5). The regulator also concedes during the focus interview that regulations should be drafted to include all broadband services as a whole.

Be that as it may, it is clear that this piece-meal attempt at drafting specific regulations may be to the detriment of other services and would seem to be an asymmetrical regulatory initiative. The interviewees who represent a wide-cross section of the broadband community clearly felt that these regulations would need to be either withdrawn or redrafted to include broadband services in general.

6.5.2 The degree of regulatory intervention

This section is based on the premise that regulatory intervention is required to increase the uptake of ADSL in South Africa. It then investigates the degree of the intervention required. In the literature survey, three degrees of intervention was identified, i.e.

- 'light touch' regulatory intervention which prescribed the minimum amount of regulatory intervention in the market;
- 'heavy handed' regulatory intervention which could prescribe structural intervention to the ADSL market;

- No intervention at all in the market where the regulator leaves the uptake of ADSL to market forces.

Although the interviewees were afforded the opportunity to choose whatever degree of intervention they felt necessary, having no intervention would have also been accepted as a response. Competition was also defined as a regulatory measure, although categorising it as light touch or heavy-handed would depend on how conditions conducive to competition are implemented. For example, unbundling the local loop via regulations to allow competition in the last mile provision of Internet access could be construed as heavy handed regulations. Introducing competition in a market by issuing more service licences could be construed as a lighter touch regulation. The interviewees grappled with defining the degree of intervention required when looking at competition. This related to Lee's findings (Lee: 2006) where she found that the uptake of broadband services was due mainly to the different platforms available for broadband access rather than specific regulations aimed at local loop unbundling.

The general view of the wireless broadband operators was that regulatory intervention should focus on creating a level playing field for all licensed operators to compete effectively and to ensure the market is open enough to stimulate effective competition. The most important job of the regulator as expressed by WBO1 was to create certainty in the market for operators as are hesitant to invest in an industry without certainty. These comments by the wireless broadband operators focus around competition and lend itself to heavy handed regulatory intervention as it tends to border on structural intervention (e.g. Local loop unbundling).

The cellular operators were divided on this issue with two of the three operators insisting on light touch regulations while the third advocated specific pricing regulations (heavy handed). The cellular operators did agree on having greater quality of service regulations which lend itself more to of a light touch regulatory regime. It would seem that the cellular operators tend to compare the ADSL experience to the wireless broadband market, and while such comparisons can be useful, it could also be misleading. The wireless broadband market is a fully competitive one with several players offering different technologies using the wireless

spectrum. ADSL currently is being offered by a single operator and is obviously a monopoly market, thus regulatory intervention pertinent to the wireless broadband market may not necessarily be appropriate to the ADSL broadband market. There could also be some hesitancy from the cellular operators to support any form of heavy handed regulations as it may also apply to their market as well.

The Internet services providers were surprisingly diverse in their approach to this question. ISP1 saw regulatory intervention as a last resort in the situation of a market failure and suggested competition as the best way forward. ISP2 saw light touch regulation or no regulation in an ideal market while ISP3 called for heavy handed structural intervention in the market. This makes it quite difficult to analyse the general opinion of Internet service providers. ISPG could be seen as a voice of all ISPs but these interviews have shown that the particular size and ambitions of the particular ISP being interviewed determines the type of response received. It was clear to the researcher that on several occasions, the smaller ISP would have a difference of opinion from the larger ISPs. These differences can be a topic for further research.

There was strong consensus among REG, ISPG, FLO2 and CAG to ensure that the any regulation promulgated is on a wholesale level. Again, the theme emerging from these responses point to the fact that wholesale regulations would assist competition. These wholesale regulations can be price regulations, facilities regulations or structural regulations. Extreme emphasis was placed on the fact that ICASA should not micro-manage the industry with retail regulations as the retail space would take care of itself if there is vibrant competition in the market. ICASA was constantly reminded that the ADSL market is a monopolistic one and that regulatory intervention was always a viable option in such a market. The current ADSL regulations were not seen as a positive step taken by the regulator and was cited as an example of what should not be done in regulating a sector such as the ADSL market. The ADSL regulation and its flaws will be discussed in greater detail due the regulation being referred to several times by the interviewees.

ISPs were also at pains to point out that although they provide a complete ADSL service to the customer, it in no way means that they are responsible for the end-to-

end access to the customer's premises. ISPs still have to lease the ADSL circuit from the incumbent operator and are billed for this circuit at a discounted rate. ISPs then in turn are able to bill the customer a single fee for both the circuit and service provider costs. This is certainly not a competitive market as the ISPs are simply reselling the line of the operator to the end customer.

The regulator would then have to clearly define the type of competition it intends to introduce and this would thus have an effect on the level of regulatory intervention required. A study by Distaso *et al* (2005) wherein he analysed data from 14 European countries showed surprising results. Distaso *et al* found that inter-modal competition was the key driver for broadband uptake while competition in the DSL market did not play a significant role. These findings should be borne in mind when or if ICASA draws up regulations aimed at increasing the uptake of broadband in mind. Distaso views are echo by Crandall (2003) who stated that despite its very aggressive unbundling and line sharing policy since the 1996 Telecommunication Act, the FCC was not successful in stimulating sustainable entry from independent providers of DSL services. This form of regulation is most certainly heavy handed regulation that did not work in other countries and is being suggested as a probably degree of regulatory intervention for South Africa. This is not to say that heavy handed regulation is not what is required for South Africa, as pointed out earlier, the South Africa market and the United States are very different, with the US market being several times larger than the South African market.

Even the African continent is a completely different market from the US one, as studies have show heavy handed regulatory initiatives being successful in other African countries. As an example, Cohen (2008) showed that structural regulatory intervention greatly increased the uptake of broadband in several North African countries. It is possible that Cohen's study of the North African market would be a more realistic benchmark of the South African broadband market than the US and European examples. The markets chosen by the regulator by which to benchmark South Africa with would be critical in establishing the regulatory initiatives that are required to stimulate the broadband market. The most sensible approach would be ensure that the views of the current operators in the South African broadband market

are given a forum before the regulator adopts a course of action with regards to the degree of regulatory intervention.

6.5.3 Who should intervene?

This section of the research report focuses on choosing the organisation or body that would be best suited at intervening in the ADSL market of South Africa. The majority of the interviewees supported ICASA as the electronic communications regulator to be the organisation responsible to intervene in the ADSL market. The rationale for such an intervention goes back to the fundamentals of regulation and intervention. South Africa is one of those countries that have both a sector specific industry regulator for electronic communications as well as a general competition authority. South Africa also has the Department of Communications who, among other functions, drafts policy for the electronic communications sector. These three bodies were identified by the interviewees as being ideally placed to intervene in the ADSL market. With three such bodies operating in a converged communications market, some sort of overlap is bound to exist. It is this sort of overlap that the interviewees had different ideas on.

ISP1 provided a sensible solution of looking at the roles of the different bodies before making any decision on who should intervene. Intven *et al* (2000:11) saw sector specific regulatory bodies as those that are responsible for regulating both proactively and retroactively. Competition Authorities on the other hand generally tend to exercise their powers on a retrospective basis. In the case of ADSL, CAG argues that the choice of regulator depends on the market position. FLO2 makes a case for the competition commission to intervene as Telkom is the current monopoly ADSL provider who is arguable abusing its dominant market position. It is for this reason that FLO2 suggests that this falls within the mandate of the competition commission. FLO2 does concede in regulatory areas such as local loop unbundling, it would be ICASA's mandate to regulate. This similar type of debate is also supported by CO2 and WBO2 who also differentiate the appropriate regulator based on the market position.

The table below highlights the differences between a sector specific regulator like a telecommunications regulator and a competition authority. The differentiation is based on policy, scope and timing.

Feature	Competition Authority	Sector-Specific Regulation
Timing/Process	➢ Typically applies remedies retrospectively (i.e. after the fact) ➢ Specific complaint or investigation driven ➢ Formal investigative, other procedures ➢ Narrow scope for public intervention	➢ Prospective as well as retrospective ➢ Decisions or other processes of general application, as well as specific issue proceedings ➢ Mix of formal and less formal procedures ➢ Typically broader scope for public intervention
Policy Focus	➢ Objective to reduce conduct which impedes competition ➢ Focus on allocative efficiency/ preventing abuse of market power or other misconduct	➢ Typically applies multiple policy objectives ➢ Traditional (monopoly) regulation likely to pursue social objectives other than allocative efficiency (universal service for example) ➢ Transitional regulation may focus on preventing anti-competitive behaviour as market becomes competitive; (ultimately, forbearing from regulation may be a policy objective as competition becomes sufficient to protect public)
Scope	➢ Economy wide, multiple industries ➢ Powers of intervention and remedies tend to be narrowly defined.	➢ Usually industry-specific (usually develops greater sectoral expertise) ➢ Powers tend to be more broadly defined (correspond to breadth of policy objectives and procedures).

Table 6.4: Differences between a Competition Authority and a Sector Specific Regulator (Intven, 2000:12)

Using this table as a guide, we can then investigate the ADSL environment in South Africa to best choose the most appropriate regulator to intervene in this sector. In terms of the timing and the process, ADSL regulations can either be prospective or retrospective. The regulatory process would certainly require a substantial amount of public and stakeholder input to draft regulations around ADSL, although the process could be initiated by a specific complaint.

Moving onto the policy focus, the objective of ADSL regulations would have multiple policy objectives. There is socio-economic, competition and technology policy objectives to name a few that have to be considered before drafting any ADSL regulations. Other policy issues would revolve around preventing a dominance of

market power as well as considering social issues and the objectives of regulations would be to prevent anti-competitive behaviour.

It would seem that based on the theoretical explanation based on functions of different regulatory bodies, ICASA would emerge as the authority best placed to regulate the ADSL environment. However, there are several practical imperatives that would need to be considered before a final judgement can be made. For example, the interviewees raised the point of the regulator being well resourced both in human capital and financially. The interviewees expressed reservation whether ICASA would fit the bill in either category. The regulator itself expressed concerns of its own credibility based on the perception that it lacked 'teeth'. A toothless regulator may be able create the ideal regulatory environment, but this would all be for nought should there be no functional and effective mechanism to enforce this environment.

The theoretical and practical environments have to be both considered when making a decision on the best authority to regulate. The challenges faced by the ICASA are not insurmountable and given the right resources, ICASA seems to be in the best position to regulate the ADSL environment in South Africa.

6.5.4 Types of Regulatory intervention

This section outlines the mechanisms of the regulatory intervention by looking at measures available to the regulator as well as the method that these measures can be implemented. A consolidated and specific initiative was seen as the key to having a positive regulatory intervention in the ADSL market. This again alludes to the current approach adopted by the regulator where specific regulations are being drafted by the regulator which does not represent a consolidated approach in dealing with ADSL as a technology or even broadband as a service. The general opinion of the interviewees was that the current legislation and regulatory framework provides an adequate base to build upon; however the effectiveness of the regulator in clarifying grey areas and ensuring the rights of licensed operators needed to be improved. The interviewees felt that this was required to ensure the viability of the broadband markets by ensuring that unlicensed operators/service providers do not

erode the margins required to deliver obligations imposed on licensed operators, thereby protecting the consumers from receiving inferior services. A cynical person may look as t his as operators trying to protect their 'turf', although it is the mandate of the regulator to protect the rights of electronic communications users and licensees alike.

Other areas of concern expressed by the interviewees revealed a jaded outlook to the regulatory environment. The experience of the operators with regards to competition in telecommunications industry generally showed a strong tendency for both politicians and regulators to prefer selecting and managing competitors than promoting an open competitive marketplace, thereby creating a comfortably closed market for the chosen 'competitors'. This did not create an environment, where start-up companies who needed connections with the established networks that are already in place, could flourish in the market. This process is governed by the policy makers and regulators. The smaller carriers rely on the backbone of established carriers' networks and hence a fair pricing system and access system was seen as a critical area that regulations should address.

From the interviews, one can begin to identify and classify specific streams of regulatory intervention that would be suitable for the South Africa environment. As discussed previously, the market in South Africa may not necessarily react positively to regulatory initiatives implemented elsewhere in the world. It was thus important to canvas the views of the interviewees who represent the market being targeted for regulation. Some of the classifications identified include:

- Local Loop Unbundling
- Price Regulation and Affordability
- Competition
- Quality of Service

These key areas identified are all inter-related. For example, local loop unbundling is a form of introducing competition in the market. Competitive forces generally decrease prices which in turn made the service more affordable. Greater competition also leads to operators ensuring that they provide a better quality of service to their customers, or else their customers may move to a competitor. The synergies

between these key areas could also be advantageous to the regulator as the 'knock-on' effect of on type of intervention positively assists other types of intervention.

Local Loop Unbundling

Local loop unbundling was seen as the preferred choice of regulatory intervention by the interviewees. The respondents were also satisfied if local loop unbundling was a gradual step process that involved first introducing bitstream access, then shared access followed by full local loop unbundling as the ultimate goal. This method of a phased access was supported by the fixed line operator FLO1. The method of implementation of this phased access towards local loop unbundling was somewhat contentious, with some of the operators opting for a policy driven process while the other operators insisted on it being a regulatory driven process. The argument against using policy as an implementation tool centred on the notion that government did not understand the industry and did not have an appreciation of the market. Respondents felt that the industry and stakeholders should be consulted at every step of the process in order to achieve positive results. The argument for policy centred on the fact that a policy process was already underway spearheaded by the Minister of Communications and that this process would be the catalyst to drive local loop unbundling. It is difficult to follow the argument offered by the fixed line operators that policy should be used as an implementation tool as the policy directives clearly make mention that the regulator should implement the policy directives (Department of Communications, 2007:1). This makes a strong case for the implementation of local loop unbundling to be facilitated via regulations. Internationally, local loop unbundling has generally been implemented by the regulator via specific unbundling regulations (Lee, 2006:7) and it would stand to reason that a similar approach would be adopted in South Africa. This approach was seen as the best approach with the majority of the interviewees choosing it as an option.

The ladder of investment approach seemed to be the most balanced approach suggested by the interviewees and it was mentioned in one form or the other by the majority of the interviewees. Sutherland (2007:4) explained this approach as one that allowed the network operator the leeway to make a staged investment into a

telecommunications market in which there is an existing incumbent who has already rolled out a fixed line network. This method allows the new entrant to be able to generate revenue in the market almost immediately without investing immediately in infrastructure. It provided an alternative method of market entry rather than forcing the new entrant to roll-out a complete national network before it can sign up customers and start earning any revenue. This would make sense in South Africa as the Telkom has already rolled out an extensive fixed line network which would be difficult and expensive to duplicate. Allowing other entrants access to this network would allow them to offer services to new customers at very little infrastructure cost.

The ladder of investment was a tool originally designed for voice telephony with the ladders being International Simple Resale (ISR), Carrier Selection (CS) and Carrier Pre-Selection (CPS) and finally unbundled local loops (Sutherland, 2005:5). This ladder metaphor was later extended to Internet access at narrowband speeds and then eventually broadband speeds (Sutherland, 2005:5).

The Minister's policy directive is similar to the model suggested by Sutherland (2007) and has the following 'rungs' of the ladder (Department of Communications, 2007:1):

- full unbundling;
- line sharing and
- bitstream (wholesale) access.

The model above is written in the order presented by the Department of Communications, i.e. first full unbundling, followed by line sharing and then bitstream access. This is probably an oversight by the Department of Communications as the ladders of investment generally move from the shallowest level (bitstream access) to the deepest level (full unbundling) and this would correspond to the investment made by the operators to facilitate such access.

The Internet Service Providers as well the ISPG all supported local loop unbundling as a regulatory measure to increase the uptake of ADSL in South Africa. The ISPs supported access to Telkom's wholesale interconnect service, which would be a similar model to the bitstream access. This strategy in the opinion of the ISPs would drive down prices and increase uptake of the service. WBO2 had similar views but

felt that local loop unbundling should be complemented with government funding with additional roll-out of copper to underserved areas in fully unbundled loops. Operators should then be given tax breaks to operate in these areas so as to make their business plans more feasible.

Another interesting view that emerged from the Fixed Line Operator who is the incumbent ADSL provider was the willingness of this company to proactively participate in the Local Loop Unbundling process. This is a mindset shift identified by Cohen (2007:1) who wrote that 'once incumbent operators perceive their core infrastructure as a revenue-generating opportunity, these innovative arrangements will also facilitate the development of new entrants and service providers.' It would seem like FLOx[30] has perceived its core infrastructure as a new revenue generating opportunity or else has simple resigned its fate and accepted local loop unbundling as an unavoidable eventuality. Either way, FLOx had suggested local loop unbundling as a regulatory measure and was specifically the respondent that advocated the ladders of investment.

Cohen's (2007) views paints a positive picture of the local loop unbundling process in Africa, where she quotes studies showing that infrastructure sharing can reduce costs and capital expenditure components by as much as 40%. This is a substantial saving which if passed directly onto the consumer, would be able to reduce the costs and increase uptake of broadband considerably. Cohen (2007) also points out the MENA region (Bahrain, Egypt, Morocco and Saudi Arabia) as an example where growth and success rely extensively on rolling-out competing networks. This formula for success would also apply to South Africa or any other developing country where the cost of rolling out competing networks may not make economic sense. An example that stands out is the one of Morocco where market reports indicate that since LLU was enforced in 2007, the broadband market grew 19% in six months (Cohen, 2007).

There are also views on local loop unbundling contrary to those above, although interestingly, these views were not voiced by any of the interviewees. For example, Hausman (2002) studies into local loop unbundling the US broadband market found

[30] X has been inserted instead of the number of the operator in order to protect the identity of the respondent.

that local loop regulations actually had the effect of impeding the incumbent operator's roll-out plans for network infrastructure. This had the unintended consequence of transferring the market power to the cable operators who then had majority control of the US broadband market. As South Africa does not have a cable broadband service offering, this transfer of market share may then be reflected to the wireless broadband operators. Whether this would actually be a negative consequence or not requires further study. Faulhaber (2002) contended that line sharing would probably have no future effect on broadband deployment, either positive or negative.

It is clear that there are differing views of local loop unbundling and the effect it would have on the uptake of ADSL in South Africa. It is again important to remember that the South African electronic communications market is different from the US and the arguments against local loop unbundling are cited primarily from US examples. One would be more inclined to look at African examples of local loop unbundling results as being closer to what could be expected in South Africa. The interviewees also felt the local loop unbundling would be the single biggest regulatory initiative that could change the ADSL market appreciably. It is also clear the effective regulation would be critical to facilitate an initiative like local loop unbundling. The market seems to be poised on a mind-set shift from traditional business models to more innovative ways of conducting business and regulation plays a vital role in facilitating such a change. Local loop unbundling is not a new initiative and has been implemented with varying degrees of success around the world. South Africa has a wealth of experience to draw upon based on other countries past experiences. South Africa would have to tailor any regulatory initiatives to suit the South African context as well and should not be swayed by negative experiences or varied results in other first world countries. The operators and stakeholders who responded to the interviews were convinced that local loop unbundling would have the largest impact on ADSL in South Africa when compared to other initiatives. These interviewees are also best placed to comment on any issue about ADSL as they understand the unique South African market the best. The regulator would have to consult widely with these industry experts to ensure that the end result would be regulatory intervention that has industry buy-in.

Price Regulation and Affordability

ISP3 quoted a report published by the South Africa Foundation that stated that 'evidence shows that Telkom's pricing structure, when contrasted to an appropriate peer group of international competitors, is typically towards the top of the pricing spectrum.' The price of ADSL in South Africa was seen as a significant factor inhibiting the uptake. Price regulation and affordability are inter-related issues and the interviewees made subtle distinctions between these two concepts, but the overall idea was that there should be regulatory intervention to ensure that prices are lowered. The concept of price and affordability as touched briefly upon earlier also ties in to competition which would be discussed as a separate sub-section. The majority of the interviewees suggested that ICASA should regulate prices at wholesale level as this would provide an environment where sufficient competition would occur at the retail level. There were several ways suggested to do this including facilities leasing, bit-stream access and local loop unbundling. The important point to note was that the current retail level regulation was not seen as a viable method of regulation.

The ISPs along with one of the cellular operators saw a public review as a mechanism in which affordability issues could be addressed. This public review process would investigate the current prices and look at ways that these prices could be reduced by involving the broadband operators. The output of such a process would be to determine the wholesale rate of services that the incumbent ADSL operator could charge and draft regulations to enforce such a rate. The interviewees suggested using the Cost of Accounts/Cost Allocation Manual (COA/CAM) of the incumbent operator to determine its actual costs in providing the ADSL service so that the wholesale rate can be determined.

There are also pricing issues dealing with local loop unbundling. In the US, the FCC had implemented Total Long Run Incremental Costs (TELRIC) to determine the cost of unbundled network elements based on costs (Lehman, 2002:1). This process ran into numerous legal interventions from the operators and the FCC's TELRIC measure had to be eventually affirmed as a legal measure by the US Supreme Court (Lehman, 2002:1). FLO1 had already stated during the interviews that Long Run

Incremental Costs (LRIC) was a flawed model that it did not support. This is a possible sign of future legal wrangling which may delay the process of local loop unbundling.

A possible solution to the problem of setting appropriate regulated prices for unbundled elements was suggested by Hausman (2002:20). This involved examining any new investments by an incumbent carrier. Should a competitor wish to buy the unbundled elements associated with such an investment, the incumbent can offer the competitor an agreement that spans the viable life of that investment. Hausman (2002) then calculated the price of the unbundled element as 'the total investment cost plus the operating costs each year for the unbundled element. If demand did not materialise or prices fell, the new entrant would bear the economic risk of this outcome'. Such a solution may prove to be problematic in South Africa. It would most certainly be accepted by the incumbent fixed line operator as any competitor would have to share in the risk of rolling out any new unbundled elements. It does have its merits for any other operator who would ordinarily have had to roll out a completely new network to offer services to the customer. The price of the shared cost would most certainly be much less than the cost of the new operator rolling out a separate network.

Competition

Competition was seen as another key regulatory initiative by the interviewees. Competition could be a regulatory initiative that licenses more operators in the ADSL market or competition could be a regulatory initiative that unbundles the local loop. There were two types of competition that were identified by the interviewees that would affect the ADSL market. The first was facilities based competition (similar to the inter-modal competition discussed earlier in the research report) which is competition based on different competing platforms. This type of competition would encompass all technologies used for broadband technologies in South Africa. This would include the cellular broadband operators, wireless broadband operators and fixed line broadband operators. The other type of competition was access based competition (similar to the intra-modal competition discussed earlier in the research

report) which is competition based on similar competing platforms or the same platform. This would include bitstream access and resale of services.

The type of competition that all the ISPs alluded to during the focus interview was access based competition. ISPs wanted some sort of access to the incumbent's local loop to provide services of their own. While this type of competition would be a positive step to drive the uptake of ADSL in South Africa, it is not necessarily the best model. The DotEcon (2003) report stated that there is sufficient evidence to show that it is platform competition that drives broadband penetration and not access-based entry. To simply have just access based competition based on bitstream access or the resale of services may not bring about all the benefits of true competition (like innovative service offering and lower prices). More importantly, access based competition risks crowding out facilities-based competition (DotEcon, 2003:7). Facilities-based competition has been shown to bring many benefits for society as it leads to competition over more aspects of an operator's activity, bringing real choice for customers, exerting downward pressure on costs and prices as well as providing incentives for service innovation (DotEcon, 2003:7). South Africa currently has facilities based competition with several different platforms used to deliver broadband services. It is this type of platform competition that the regulator would need to foster and develop as this would drive the uptake of ADSL and broadband services in general. It is also important to note that most of the ADSL competition examples quoted by the interviewees are based on the European experience, which is generally skewed towards an access based model that adopts predominantly a bitstream access mechanism or a simple resale mechanism. The regulator would need to focus on drafting regulations that facilitate the use of other competing platforms. The common oversight that was noted from the interviewees was the view that wireless access was the only other substitute for ADSL. There are several other broadband technologies that could compete with ADSL in South Africa. Some of these technologies identified by the DotEcon Report (2003:9) that are applicable to the South African environment have been listed below:

- Fibre to the home (FTTH). FTTH provides very high bandwidth to the end-user via fibre optic cables. As fibre optic cables are generally expensive, such roll-outs are limited to high density developments. This would be applicable to the

suburban areas in the main centres in South Africa where one could find a high density of townhouses, flats and apartments.

- Fixed Wireless Access (FWA). FWA provides the 'last mile' connectivity to the customers through the use of the frequency spectrum and acts as an alternate local loop.
- Satellite: Satellite signals are useful as they cover large areas and can reach remote locations where it is impractical to cover with ADSL. Satellite broadband access is comparatively expensive but could carve itself a niche market in covering remote areas. South Africa's vast spaces and sometimes remote locations could be easily served by satellite.
- Power Line Telecommunications (PLT). PLT systems use the lower frequency portions of a power line cable connecting from a central transformer to several homes (ICASA, 2008:1). This power line cable essentially forms the local loop which would generally be a telephone cable. In an ideal situation, any home or business that is connected to the electricity grid would not need any further infrastructure or cabling to receive a broadband signal (ICASA, 2008:1). PLT trials are currently being conducted in South Africa and are being closely monitored by ICASA. The current Achilles heel of PLT systems is the potential for interference to other radio services, although this problem can be mitigated and managed (ICASA, 2008:1).
- Free Space Optics: This technology has the potential for creating low cost networks with very high bandwidth.
- 3G/HSDPA: These are mobile broadband services that are deployed by the cellular network operators.
- WiMax: A high speed long range wireless broadband technology.

The platform based competition in South African can go a long way in increasing the uptake of broadband services. This may not directly increase the uptake of ADSL in South Africa, but this is possible due to the indirect competition that these alternative platforms would provide. Increased competition would mean lower prices of all broadband services. Lower prices would lead to increased uptake of broadband services, including the uptake of ADSL. While it may be desirous for the regulator to focus on the uptake of ADSL as a technology, drafting competition based regulations

may not necessarily be the only way of achieving that goal. It is also a worrying sign that this type of competition was not regarded as a credible alternative to the interviewees who are a general representation of the broadband market in South Africa.

Quality of Service

Quality of service was seen as an important area for regulatory intervention by the interviewees. The interviewees did recognise the fact the ADSL regulation published by ICASA was an attempt address certain quality of service issues around ADSL, but felt that this regulation did not adequately address their concerns.

There are several consumer issues that the ICASA ADSL regulation did not cover at all or did not cover adequately enough. The first issue dealt with the speed of the ADSL service itself. Early on in this research report, the official definition of broadband was discussed along with the minimum speeds of a broadband service. The interviewees felt that ICASA is not ensuring that the broadband services on offer are on par with the advertised speeds. The general concern was that consumers are being charged for a broadband service but do not receive these advertised speeds. This argument from some of the interviewees was that this amounted to false advertising and the providers responsible for these services needed to be sanctioned by ICASA. FLOx contended that it would be impossible for any operator to guarantee speeds of an ADSL service as ADSL is seen as a 'best effort' service'. FLOx stated that the network operator could only guarantee the speed between the local exchange and the customer and that the international connection to an international server is dependent on the speed provided by that international service provider. This assertion by FLOx was refuted by CO1 who stated that it was possible to control the total speed from end to end. While CO1 did not elaborate on how this could be done, one would be challenged to refute FLOx's argument as it seemed to be sound. With that said, one would also expect the maximum throughput[31] to the customer should be the same as advertised, although the actual download speed may be dependent on international servers. The interviewees included wireless broadband operators

[31] The maximum available download speed that the customer can experience.

along with the ADSL providers when commenting on the issue of speed, but the focus currently would remain on the ADSL service.

Other consumer related issue that was raised by the interviewees dealt with the customer support that was experienced by the ADSL customers. This customer support was viewed to be generally very poor with fault resolution taking days and even sometimes going on for weeks. The installation time for an ADSL service was also seen as poor, with interviewees quoting figures ranging from six weeks up to several months. FLOx responded to the issue of installation times by stating that the demand for ADSL services far exceeded the incumbent ADSL operator's capacity to provide these services. FLOx used this argument to question the need to for regulatory intervention in the first place, as it was clear in FLOx's point of view that the uptake of ADSL services was limited by capacity problems experienced by the incumbent ADSL operator.

The general consensus from the interviewees was that the regulator should enforce service level agreements between the consumer and the ADSL network operator. These service level agreements should include agreement on speeds, installation times, fault response times etc. This should be a commercial agreement between the ADSL operator and the customer and any deviations from this agreement should be regarded as a material breach of the agreement and the customer would then have recourse to take action against the ADSL operator. The regulator's role should be to ensure that the ADSL operator is forced to agree to sign a service level agreement with the customer and not to regulate the service level agreements themselves. This is an elegant solution that would see the regulator putting the administrative burden of compliance on the ADSL operator, while ensuring that its mandate of consumer protection is till met. If required, the regulator can mandate the clauses that should be contained in a Service Level Agreement and enforce this by publishing it as a regulation.

6.6 What factors would Regulatory intervention affect?

This section looks at whether regulatory intervention would address specific factors that influence the uptake of ADSL in South Africa. Interviewees saw regulations affecting generally the price of ADSL as well as the ADSL market in general. CO3 saw ADSL as being called upon to fulfil maybe too large a role. CO3 saw this investigation into the uptake of ADSL an important one, but also asked that the bigger picture be taken into consideration. The bigger picture entailed creating access to a larger market of customers either by wired or wireless technologies. CO3's argument was that if we connect the unconnected, we would be freeing up a bigger market as the uptake of fixed lines are limited by the total number of wired subscribers. Although this was discussed previously, it is important to note again since the goal of regulatory intervention in the eyes of the regulator would be to increase uptake, lower prices and stimulate competition. By focusing on the immediate goals at hand, the regulator should always look at the bigger picture when deciding what factors regulatory intervention should address.

Another important area for consideration would be the demand for ADSL services. Regulation is intended to focus on supply side issues of ADSL, but the demand side issues of ADSL must also be taken into consideration. Howell (2003:14) found that the uptake of ADSL was not limited by a supply side constraint; rather it was a limitation in the number of broadband applications that were required. She found that the majority of the bandwidth used in New Zealand was used by private consumers rather that business users. She further found that the amount of bandwidth consumed by the private users was dominated by a small percentage of individuals (Howell, 2003:14). Her conclusions about broadband applications may be a little out of date because since 2003, websites have generally moved into a more multi-media feature rich environment that tends to lend itself to a broadband connection. Even so, her point would be still valid for South Africa today as the level of broadband penetration in the country is relatively low and the South African websites are generally not bandwidth intensive as other developed countries. Thus it is important for regulation to focus on other areas of the broadband environment in general.

One could argue that a greater variety of broadband applications would become prevalent only when there are a greater number of broadband subscribers available. This is in contradiction to Howell's (2003) findings were she envisages broadband applications driving broadband uptake. In the New Zealand example cited by Howell, dial-up subscribers continued to grow after the introduction of broadband services. In South Africa, the opposite is true with the number of dial up subscribers showing a decline in 2005 and 2006 after several years of strong growth (Goldstuck, 2005:61). This trend shows that there are broadband applications available for Internet users in South Africa and Internet users are switching from dial-up to broadband to be able to experience this type of applications.

Price was the other over-riding factor that regulatory intervention was seen to affect. All the initiatives from local loop unbundling to wholesale price regulation was seen as critical by the interviewees to lower the price of ADSL in South Africa. The research questions did not specifically ask the interviewees whether they felt the price of ADSL in South Africa was exorbitant or not, but the responses received seemed to suggest that price was a major factor in limiting the uptake of ADSL. The research questions focused on the uptake of ADSL in general and specifically did not list any particular factor that would influence the uptake and rather left the questions open ended for the interviewees to respond. The price of the ADSL service currently being offered in South Africa is discussed in greater detail when the ADSL regulation is analysed, although it is important to note at this point that the interviewees saw regulatory intervention as a solution to lowering prices of ADSL services in South Africa.

6.7 Regulations and Uptake

This section looks at the ways in which regulations could positively affect the uptake of ADSL in South Africa. Interviewees saw regulations lowering prices and increasing competition, much the same as the previous question. Some respondents felt that once the regulations are finalised, operators can start to move forward with certainty with their business plans and focus on increasing their subscriber base. The general

comment received was that unbundling the local loop will stimulate competition and offer more value proposition to the customer. There is currently little incentive to offer more value to the customer by the incumbent ADSL operator as there is currently as there is no direct competition to the incumbent operator.

Pricing was seen as the single biggest obstacle to the uptake of ADSL by the interviewees. Regulations were seen as a mechanism to lower price which would then lead to a higher uptake. The pricing regime was also seen as something that the regulatory intervention would address positively as prices should be based on bandwidth and not data usage. This model would allow for a greater uptake of ADSL services. It could be said that there is a market mismatch in South Africa where prices are not directly related to bandwidth prices. Conducting market reviews and auditing an operators cost would give the regulator an idea of what wholesale costs of a particular service are and would thus be able to regulate wholesale costs more efficiently. If these wholesale costs are passed onto the ISPs, it should lead to a reduction in the retail price of the ADSL service. Any price decrease should lead to an uptake of the service as a positive consequence.

6.8 Policy Initiatives

This section introduced the policy arc of inquiry and the interrelationship with regulatory intervention. The area of inquiry focused around whether any policy initiatives should be in place before regulatory intervention could be effective.

The general consensus was that a broadband policy should be in place to support broadband regulatory initiatives. Policy was seen as an important support component to regulatory intervention and policy set the framework for regulatory intervention. Ferguson (2002:1) saw a national broadband policy as a critical element to facilitate broadband access. He suggested that such policy set primary goals of establishing a competitive, open architecture industry with the view of providing universal broadband service. He also saw policy providing direction and being continually improved to keep pace with the information technology sector. Ferguson's view of policy reflects a living process that provides direction to the broadband industry. It is the task of regulation to implement the vision of policy directives to ensure that the

end goals are attained. Government is generally the custodians of broadband policy as it is Government that is responsible for relating to its citizens a shared vision of the future. Broadband policy is severely lacking in South Africa and the country requires the strategic vision for broadband access that broadband policy can provide.

This is not to say that regulatory initiatives cannot exist without broadband policy. It was noted that during the interviews, several respondents expressed views that the regulator has sufficient scope within the mandate of the Electronic Communications Act to proceed with broadband regulations without waiting for any policy directives. The feeling of urgency was quite clear among the interviewees that decisive regulatory intervention was required and that the regulator had to stop looking for reasons to delay taking action. There was also mention that the current regulatory structures had already set the framework for further regulations around broadband. These regulations included facilities leasing regulations and the current ADSL regulation.

As policy was seen as a guide to the regulatory process, the effect of policy on regulatory was seen as a positive one. Policy was not seen as a process that would inhibit the uptake of ADSL or inhibit the regulatory process. The absence of policy however was also not seen as a critical factor that would negatively influence the uptake of ADSL.

The regulatory environment was seen as a complex environment by the interviewees who saw policy as a guiding process that would assist with managing the regulatory environment. The only caveat highlighted by the interviews was the fact the policy announcements had to be clear and unambiguous. Unclear policy announcements by the Department of Communications were seen as a major stumbling block to the uptake of ADSL as it creates uncertainty in the market and erodes investor confidence.

The synergies between policy and regulatory also had to be clearly defined so as not be working against each other. The interviewees were strongly of the opinion that policy initiatives should precede any regulatory intervention. This response was tempered by those who warned the regulator to act in the absence of policy should

no policy exist. The point that came across clearly was that due diligence should be followed by the regulator in allowing policy initiatives to take their course before addressing any regulatory initiatives.

The debate of policy versus regulatory interventions is an interesting one that requires substantial research to determine which intervention (or maybe both) is required to stimulate the uptake of ADSL in South Africa. As the research is limited to the effect of regulation on the uptake of ADSL, the discussions on this topic would have to be curtailed.

6.9 Price Regulation

This section of the research looks at the viability of regulating prices of the ADSL service. Price regulation has been previously discussed as it was raised by the interviewees as a mechanism to reduce the prices of the ADSL service. This section highlights the main arguments for and against price regulation.

The question when put to the interviewees drew a surprisingly mixed result with an almost equal spilt for and against price regulation.

It was clear that there was a sense of frustration amongst most the interviewees who were grappling with the high prices of the ADSL service and wanted some sort of intervention to drive down prices. They were also very sceptical of the type of intervention for fear that it would exacerbate the situation instead of assisting it.

The regulation of price was seen as a last resort in a healthy competitive market. Competition was seen as the preferred method of intervention in markets with high prices. Price regulation was only recommended in cases of a monopoly environment or in cases of market failure. The South African environment is definitely one where the ADSL market is a monopoly market and ADSL prices are unilaterally decided by the incumbent ADSL operator without any competitive forces to temper pricing decisions.

The question then arises, how should one regulate prices in a monopoly environment? The answer provided by the interviewees seems to suggest that price regulation could only be done at a wholesale level. This is the only way that it could be done while preventing margin squeeze and exclusionary behaviour. Retail price regulation was overwhelmingly rejected by the interviewees.

The regulator would have to look at the social good of the country in order to make a decision on regulating prices. High telecommunications would have an effect on inflation and thus economic growth. It would thus be a balancing act that the regulator would have to perform in order to weigh the social good of price regulation versus the detrimental effects. Price regulation general has the effect of curtailing network growth.

The methods of implementing price regulation varies, with the most common type of price regulation being used was Long Run Incremental Costs (LRIC). This form of price regulation was seen as a popular choice by the interviewees as the copper infrastructure had been already laid into the ground, thus resulting in reduced prices to the end user. The network operators would however disagree and would prefer fully allocated costs as a more representative model of their actual prices. Another suggestion regarding the price regulation involved conducting a market review and identifying operators with significant market power. The operators with significant market power would then be subject to tighter price regulations based on their ability to control the market.

The principle behind price regulation however remains that price regulation is essential in certain markets. It is up to the discretion of the regulator to decide on the model of price regulation based on the unique circumstances of the country. South Africa would require price regulation due to the monopoly nature of the ADSL market. The type of regulation would have to be chosen very carefully to balance the interests of network growth as well as economic growth. As pointed out by CO3, there is no panacea when choosing an appropriate model for price regulation.

6.10 ICASA's ADSL regulation

Introduction

It is an important step to examine the current regulatory environment with regards to regulation and ADSL in South Africa. This section examines the ADSL regulations promulgated by ICASA and the steps leading to such a regulation being promulgated. This is achieved by examining the findings of ICASA's ADSL enquiry as this was the first step towards the promulgation of the regulation. The findings document is also important as it summarises all the submissions to ICASA regarding the ADSL service as well as summarises the oral presentations that were made during the ADSL hearings.

There are however several serious shortcomings of ICASA's ADSL enquiry, more specifically the questions posed in this enquiry. After studying the questions and the responses received, it becomes clear that the questions revolve directly at specific consumer complaints and do not address the ADSL service or the ADSL technology as a whole. An example would be questions focused around the ADSL 'cap' and the pricing structure-retail level questions rather than questions probing the cost of bandwidth and the underlying problems that is associated with this. It is for this reason that interviews were conducted to further probe the issues around ADSL.

Background

a) In 2005, ICASA received forty six complaints (ICASA, 2005:6) from the public regarding Telkom's ADSL service, prompting an inquiry in terms of Section 27 of the Telecommunications Act. ICASA then published Government Gazette No. 27123 which solicited inputs from the ADSL consumer on their views and experience on the manner in which ADSL is provisioned in South Africa.
b) Four hundred and forty six submissions were received, with thirty six requesting an opportunity to make an oral submission (ICASA, 2005:5). After this public consultation process, ICASA published Notice 1292 of 2005 titled 'Findings Document in Terms of Section 27 of the Telecommunications Act (Act No. 103 of 1996) on the Enquiry into the

Provision of ADSL Service'. This document was published in a questionnaire format with the following subheadings:

- Definitions.
- Legislative Framework.
- Policy Issues.
- Consumer Protection Issues.
- Technical issues.
- Additional issues.
- Legal Issues.
- Conclusions and Recommendations.

ICASA then published a regulation titled 'Regulations regarding the provision of Asymmetrical Digital Subscriber line (ADSL) Services'[32]. As the title implies, this regulation regulated the provision of the ADSL service provided by the incumbent ADSL operator-Telkom.

Public reaction

a) Telkom objected to key statements in the findings document and ICASA then issued a media statement stating that the findings document was as its name suggests - just a findings document and that a final regulation was still to be published (CAG interview, 2007).
b) ICASA then published the final regulation that was seen as a weak version of the tough stance taken during the findings document (CAG interview, 2007). It concentrated more on the consumer protection issues that were addressed at the hearings and less so on the issues of costs. Many of the clauses contained in the regulation were seen as 'unworkable' and difficult to implement (CAG interview, 2007).

[32] Notice 1112 of 2006.

The Findings Document

As stated before, the findings document was divided into the following subheadings:

a) Definitions

This section was ICASA's first attempt at introducing a formal definition of broadband as being: 'an always-on data connection that is able to support various interaction services, and has the capability off a minimum download speed of 256 Kbps.' (ICASA, 2005:5). It was also noteworthy that this definition precluded Telkom's 192 Mbit/s ADSL offering as being defined as broadband. ICASA further defined broadband using the ITU Standardisation Sector Recommendation I.113 which defines broadband as being a 'transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2 Mbit/s (ITU, 2005:12). This dual definition was included to highlight the varying definitions of broadband internationally. ICASA eventually chose to ignore the ITU definition of broadband in favour of their former (less stringent) definition of broadband (ICASA, 2005: 5). This could be possibly attributed to the fact that at the time of publication of the regulation, the fastest ADSL broadband speed available was Telkom's one Mbit/s offering and choosing the ITU definition of broadband would have precluded all of Telkom's ADSL offerings at that time.

b) Legislative Framework.

In this section ICASA justified their decision to conduct an enquiry into Telkom's ADSL service based upon the objectives of the Telecommunications Act. ICASA specifically stated that the complaints received mandated them in terms of Section 2 of the Telecommunications Act to conduct such an enquiry.

c) Policy Issues.

Telkom challenged ICASA's decision to focus on ADSL only as there were a host of other broadband option available (ICASA, 2005:7). This also reflects on the question of possibly broadening the scope of this study to include other broadband technologies. ICASA stated that ADSL would be solely focused upon as 46 complaints received by ICASA were directly only at Telkom's

ADSL service (ICASA, 2005:7). As figure 4 below illustrates, DSL forms the majority of all broadband subscriptions (63%) with OECD countries in December 2006. This further highlights the fact that DSL is the dominant broadband technology within OECD countries and somewhat justified ICASA's decision to focus specifically on ADSL.

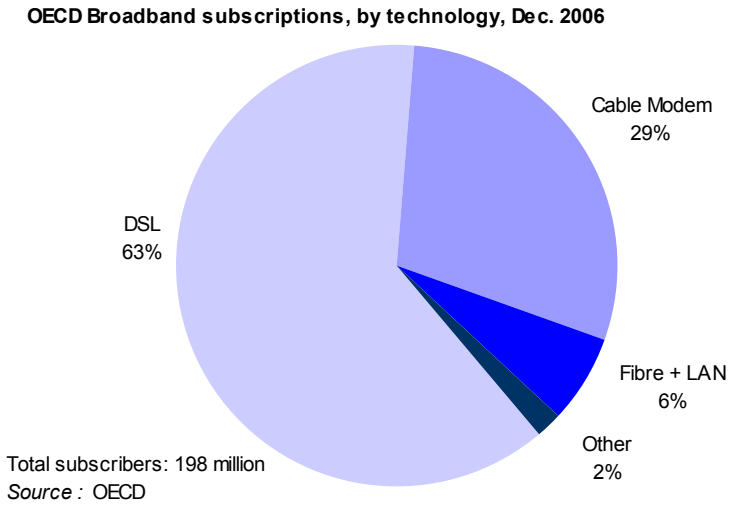

Figure 6.4: OECD Broadband Subscriptions (OECD, 2007:10)

The issue of the price of bandwidth emerged as a key point. Several presenters stated (and substantiated via oral presentations and data) that the price of bandwidth in South Africa was several times more than anywhere else in the world (ICASA, 2005:8). Several presenters at the ICASA ADSL hearings pointed out that although international bandwidth prices have dropped considerably from 2000 until 2005, this price drop was not reflected in South Africa's bandwidth prices (ICASA, 2005:8).

Further to this, it was pointed out that Telkom's access charge for the SAT3[33] cable was several times more than its international partners, although Telkom was the biggest shareholder in SAT3 project (ICASA, 2005:8). It can be argued that South Africa's bandwidth prices are high when compared internationally and this may be considered as a key factor to the uptake of ADSL and should have been one of they key

[33] South Atlantic Telecommunication cable no.3.

regulatory focus points for ICASA to consider. This however did not occur as Telkom pointed out that the SAT3 cable did not form part of the ADSL enquiry and thus could not be commented on during the hearing (ICASA, 2005:8).

Line Rental Issues

The ADSL technology uses the same copper line used for fixed line telephony for ADSL access. From the submissions received, 81% of the respondents felt that a duplication of the line rental fee for ADSL[34] was unjustified and would prefer to pay a single fee for access to the line (ICASA, 2005:9). 19% of the respondents stated that they would be happy with the line rental provided that the line rental fee was reduced (ICASA, 2005:9). While it may be Telkom's desire to ensure that customers retain their fixed line connection, an OECD study on pricing and policy showed that it is a trend amongst telecommunications service providers to provide bundled flat rate services to prevent customers from 'dropping fixed lines in favour of mobile' (OECD, 2006:21). This study surveyed 87 providers in 30 OECD countries and found that none of them charged a separate line rental for fixed line telephony (OECD, 2006:21). Figure 6.5 shows a breakdown of the services that is provided for a single flat fee. None of the operators surveyed in the OECD study charged a separate line rental fee. There is a trend to bundle services for a single fee to add value and make the operator's product stand out. Several operators are moving into bundled triple play services (voice, video and data). Multiple-play offerings increase average revenue per user (ARPU) (OECD, 2006: 11) and this supplements the loss of earnings that may be experienced from the voice service alone. It should be noted that most of the operators surveyed in the study operate in a competitive environment with a least two or more operators offering ADSL and fixed line telephony to the market.

Telkom claimed that the line rental fee was there to cover the cost of the copper from the exchange to the subscriber and that the ADSL line rental fee is to recover the cost to install and maintain the equipment that is used to convert the copper pair into an ADSL link (ICASA, 2005:10).

[34] Prior to 1 August 2007, Telkom charged a separate fee for ADSL access and a fee for line rental for telephony.

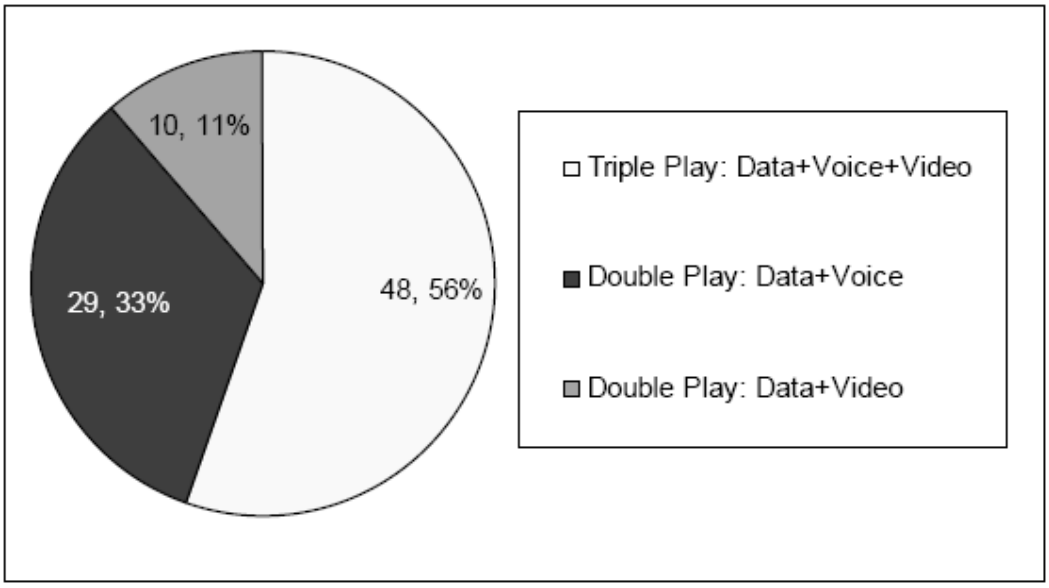

Figure 6.5: Services available for a flat fee in 30 OECD countries (OECD, 2007:14)

Policy imperatives suggested at the ADSL hearings

Several policy imperatives were suggested at the ADSL hearings for ICASA to consider introducing competition and increasing the uptake of ADSL. From the submissions received, 70% of all respondents argued that 'the Authority should stimulate competition so as to reduce excessive prices and ensure that services are offered at internationally competitive rates' (ICASA, 2005:10). The methods suggested to do so is summarised below:

a) Unbundle the local loop.
b) Force Telkom to lower prices.
c) Remove the ADSL access charge.
d) Deem the SAT3 cable an essential facility.
e) Allow ISP's to co-locate their equipment with Telkom.
f) Audit Telkom's actual A DSL provisioning costs by using the Cost of Accounts/Cost Allocation Manual (COA/CAM) to ensure that they are not profiteering.

Several of the 'solutions' listed above can be located in the literature surveyed and have been investigated further in this research report. The 'solutions' are listed here again for completeness.

A clear example of regulations supporting ADSL uptake would be Marcus (2005:2) who states that regulations support the uptake of ADSL by the full unbundling of lines where the incumbent 'rents' a copper pair to another operator for its exclusive use.

ICASA responded on a point by point basis to these 'solutions' suggested during the submissions. The 'solutions' suggested by the respondents at the ADSL hearings, are proven methods used by several countries.

An analysis of ICASA's responses to these 'solutions' seem to indicate that ICASA, whether rightly so or not, did not wish to address these issues at that particular stage – examples of this unwillingness are listed below.

a) Un-bundle the local loop.

ICASA's response was to defer this until the Electronic Communications Act was published as unbundling the local loop was one of the clauses of the then draft Act. The OECD (2002) has highlighted the importance of 'fair and non-discriminatory' (OECD 2002:4) access to network elements in a countries broadband infrastructure. Local Loop unbundling was seen as a major regulatory initiative that should be undertaken by regulators (OECD 2002:4). The local loop can be seen as an essential facility that cannot be easily or economically replicated and this puts the incumbent operator in a dominant position. Nearly all of the respondents in the interviews indicated that local loop unbundling would be a 'solution' to consider as a regulatory intervention. In the UK, OFCOM stated that they believed that Local Loop Unbundling was the most effective means of 'delivering more innovation, greater choice and lower prices in broadband' (OFCOM 2005).

b) Force Telkom to lower prices.

ICASA stated that the Chart of Accounts (COA) and Cost Allocation Manual (CAM) and rate regime regulations are the vehicle that is used to regulate prices (ICASA, 2005:14) and thus this 'solution' would not be covered by the ADSL regulation.

During the focus several respondents felt that ICASA should regulate prices - but not at a retail level as the draft regulation refer to. They suggested that wholesale price regulation would be in order as this would lead as a matter of course to retail price reductions that would be passed onto the consumers (ICASA, 2005:14). CO3 stated in the interviews that ICASA should regulate based on Long Run Incremental Costs (LRIC) as the copper used by Telkom has been in the ground for a long period of time and this cost has already been recovered by Telkom. The South Africa Foundation (2005) found that South African ADSL broadband is the most expensive of fifteen comparison countries (despite the fact that a number of the international products sampled had a substantially higher product specification than the Telkom ADSL offering), even if the ISP fee which is also necessary for ADSL connectivity is not included.

They found that South Africa's:

- 'ADSL fee is eight times as expensive as the cheapest country surveyed' (South Africa Foundation 2005:2);
- 'monthly ISP fees are the highest on a Purchasing Power Parity (PPP)-adjusted basis in the comparison group of thirteen countries and was five times as expensive as the cheapest country surveyed on a PPP basis' (South Africa Foundation 2005:2);
- 'business ADSL was the most expensive broadband of all fifteen countries sampled, and was more than nine times as expensive as the cheapest country surveyed' (South Africa Foundation 2005:3) .

Figure 6.6 lists the cost in US dollars of South Africa's 512 kbit/s ADSL with 14 other countries with similar speeds.

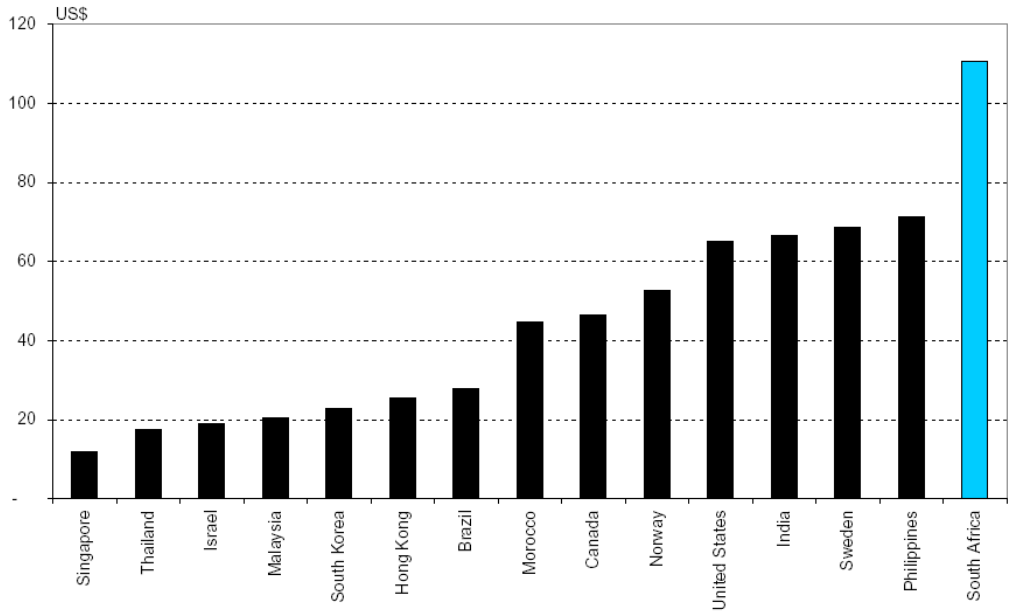

Figure 6.6: International Comparison of ADSL 512kbit/s (South Africa Foundation 2005:28)

c) Remove the ADSL access charge.

ICASA did agree with this 'solution' in the draft document (ICASA, 2005:11) but this was evidently removed from the final regulation. The practice of Telkom to charge separate access and Internet fees in unique to South Africa. MyADSL, one of presenters at the ADSL hearings suggested a compromise, which ICASA accepted as being fair of having a once-off access charge and thereafter only a line rental charge (ICASA, 2005:12). The access charge, as argued by several presenters at the hearings represented a double-taxation to the customer - 81% of all the submissions received to the ADSL regulation supported a single charge model (ICASA, 2005:9). The customer pays a line rental for the use of the copper from the telephone exchange to his home. The same copper is used for the provisioning of the ADSL service to the customer save for the addition of a network element called a DSLAM (DSL Forum, 2006:1).

Telkom had argued that several other network elements are required to provide the high speed ADSL service and hence the need for a separate charge to recover the costs of providing this service (ICASA, 2005:10). Telkom has since introduced a one-

price ADSL offering that does not differentiate between the access and Internet portions and has passed this service to other ISPs.[35]

d) Deem the SAT3 cable an essential facility.

ICASA had started an inquiry in 2003 on the issue of declaring SAT3 an essential facility and thus subjecting its charges to be mandated as wholesale charges. This process was suspended pending the implementation of the Convergence Bill (ICASA, 2005:11). Gillwald *et al* (2006) stated that:

> *'the exclusivity Telkom has over the SAT-3 landing station, as a result of its membership in the consortium, has allowed it to extract tract monopoly rents, making international bandwidth cost considerably more than its real cost.'*

As bandwidth costs form part of the ADSL charge, it would be logical to assume that the SAT3 issue would be investigated concurrently with the ADSL inquiry-this did not occur. The South Africa Foundation found that Telkom's pricing structure with regards to SAT3 could not be justified in terms of its operating conditions, and that their pricing was excessive (South Africa Foundation, 2005:31). The further pointed put that the sunk costs of investing in the cable would have already been recovered[36], thus Telkom should have been trying to sell all available capacity on that cable. In reality, Telkom currently utilises only 40 Gbs of a possible total capacity of 120 Gbs (South Africa Foundation, 2005:31). Telkom is the only entity that has exclusive rights to landing stations within the borders of South Africa (South Africa Foundation, 2005:31), giving them monopoly access to a crucial link from South Africa to the rest of the world. This could be considered as grounds to declare the SAT3 cable as an essential facility.

e) Allow ISP's to co-locate their equipment with Telkom.

ICASA referred the public to Government Gazette number 27186 which dealt with facilities leasing and encouraged interested parties to make comment to this regulation (ICASA, 2005:14). No comments were made addressing the specific issues of co-location raised during the hearings. Fletcher (2006) noted that 'the advent of local loop unbundling has enabled a new generation of managed service

[35] The 'one price' ADSL was introduced on 1 August 2007 by Telkom and other ISPs.
[36] There would be other ongoing maintenance costs which would be a fraction of the total cost.

providers to offer very cost effective networks to the public sector.' Fletcher (2006:16). According to him, this can be achieved in two ways:

a) Undbundling exchanges with a residential area and then selling a broadband service to residents within that area; (Fletcher, 2006:16).

b) Co-location, i.e. creating a managed network by allowing local providers to install their equipment within exchanges-this is a popular model with public sector network suppliers (Fletcher, 2006:16).

Fletcher goes on to state that Local Loop Unbundling (LLU) operators can build networks at significantly less cost than those operated by managed networks (co-location) while still being able to be scalable[37] (Fletcher, 2006:5). This in turn enables LLU operators to save up to 45% on a typical network cost as incurred by managed networks (Fletcher, 2006:5).

f) Audit Telkom's actual ADSL provisioning costs by using the Cost of Accounts/Cost Allocation Manual (COA/CAM) to ensure that they are not profiteering.

ICASA noted that the Price Cap regulations promulgated on 6 July 2005 included ADSL in the residential sub-basket. This would allow them to audit costs as suggested during the hearings. The regulation of price formed part of the focus questions used during the research. All cellular operators and ISPs interviewed felt that regulating prices was not a feasible option. CO1 noted that using COA/CAM would actually set the yardstick as to the maximise price an operator can charge, and they would inadvertently aim for such a price. Another common consensus between Cellular Operators was that ICASA was too fixated on regulating retail prices, and that wholesale price regulations were what would actually drive down the retail prices. ISPs were strongly unanimous on the fact that competition, not COA/CAM would be the element of success in lowering prices and increasing uptake-hence achieving the regulators ultimate goals.

[37] Scalable here refers to being able to upgrade circuits by using multiple copper pairs. E.g. upgrading from 2 Mbit/s to 10 Mbit/s.

g) Introduce Competition

ICASA had noted that increased competition resulted in reduced costs for telecommunications services but also noted that this issue was covered by the Convergence Bill as well (ICASA, 2005:12) and would thus not be addressed at that point.

Consumer Protection Issues

Consumer protection issues seemed to ICASA's primary focus. Some of the clauses relating to Consumer Protection issues included:

a) Provision of ADSL modems

This part of the ADSL report dealt with whether Telkom informs customers about their right to purchase other ICASA approved ADSL modems. 95% of the respondents to the ADSL regulation stated that Telkom does not widely inform its clients about this and only advertise their modem offerings (ICASA, 2005:15).

Telkom's response was that they were not obligated in any way to promote or inform customers about all ICASA approved customer premises equipment, but as a socially responsible company, they do have a list of approved equipment on their website (ICASA, 2005:16).

ICASA's findings agreed with Telkom's submission although the regulator stipulated that Telkom should not 'discriminate in line or modem fault attendance turnaround times' (ICASA, 2005:17). The reasoning behind this deliberation was that Telkom charges for a fault call out in any event whether or not the modems are Telkom supplied or purchased by the user.

b) Three Gigabyte Cap

The issue of capping proved to be one of the more contentious issues around the ADSL service. Telkom conceded that the cap did not form part of the product offering from the inception of the service and was only implemented

once the ADSL base had reached a 'critical mass' and the quality of the service experienced by users were negatively impacted (ICASA, 2005:17).

ICASA's regulatory intervention revolved around whether customers were adequately informed about the three gigabyte (Gb) cap and whether this cap was adequate enough. Of the 446 submissions received, 46% of subscribers agreed that Telkom did inform them, 37% stated that they were not informed and 17% did not respond (ICASA, 2005:17).

ICASA's findings on the cap were very critical on Telkom. The Authority found that Telkom did not give enough justification on what a 'critical mass' was and that no justification was given to explain the rationale behind the figure of three gigabytes as opposed to another cap (ICASA, 2005: 21). Further, the Authority did not understand why Telkom did not procure additional bandwidth to support their service. ICASA concluded their findings on this section by stating that further study relating to the cap would be conducted during the regulation making process. Unfortunately such a study did not materialise in the regulation, with the only reference to the size of the cap being that subscribers should have the option of topping up their cap without purchasing a new username and that local bandwidth usage would not be subject to the cap.

An investigation into the ADSL product offerings with respect to capping of various ADSL broadband providers around the world is included below. This investigation is standardised around the 512 Mbit/s service as far as possible. Where this speed is not available, the closet base speed was be used. If several operators offer the same speed ADSL service, the one with the largest cap was chosen.

Country	Cap (Gigabyte)	Speed (Kbit/s)
South Africa	3Gb	512
Australia	None	512
Canada	15Gb	5Mbit/s
Egypt	None	512

Germany	None	1024
India	5Gb	512
Japan	None	1500
New Zealand	None	512
Switzerland	None	500
The Netherlands	5Gb	416
United Kingdom	None	512
United States	None	768

Table 6.5: Table of ADSL Caps of 12 Countries (MyADSL, 2005)

It is clear from a quick survey of 12 countries puts South Africa last in terms of cap size. In the majority of the cases, the ADSL service of countries with larger or no caps are lower than what South Africans pay for their 512 Kbit/s 3 Gb cap. It would be safe to assume that ICASA would have seen statistics similar to the table above and would have drawn the same conclusions.

Telkom further said that they considered users who exceeded their cap as 'abusers of the service' (ICASA, 2005:23). ICASA considered several representations on the subject and reported at length on their findings. The key point of the findings related to the expected use of the service. Users of the service would be justified to assume that ADSL, being a broadband service would be used for high volume data transfers as it is defined by the ITU as 'modem technology that converts twisted pair telephone lines into access paths for multimedia and high speed data communications' (ICASA, 2005:23). Brito *et al* (2001) suggest that ADSL is an ideal technology for high data volume multimedia applications due to its high speed and always on-connectivity.

ICASA concluded that the use of ADSL for high data usage multimedia applications could not be considered as an 'abuse' of the service as such applications are considered as what the service is intended to be used for (ICASA, 2005:24). ICASA further went on to conclude that Telkom's justification that the imposition of the cap was there to protect ADSL users

from a small minority of 'abusers' could not be accepted. ICASA also stated that Telkom's claim that the ADSL service was meant for certain applications only was 'unjustifiably restrictive' (ICASA, 2005:24).

The Final Regulation

The final ADSL regulation was poorly received from both consumers and the ADSL industry, with the general consensus being that it was poorly written and that the regulator could have done a better job (CAG Interview, 2007)

Darren Miller, MD of Imaginet was quoted as saying

> *'…the ICASA ADSL regulations are poorly written and ambiguous. I can't even bring myself to say that ICASA's intentions were good. It seems clear that ICASA never even made the effort to understand ADSL before responding with a set of regulations so critical to the well-being of the South African Internet, the telecommunications industry, and Internet users. The only remedy for this entire situation is for ICASA to toss the existing ADSL Regulations in the dustbin and start from scratch'*. (MyADSL, 2005:6)

Similar comments were made be several other ISP's in that same article. During the interviews with ISP1 and ISP2, both raised similar issues that the regulation was flawed and not well thought out. Typical issues that were prevalent were that the intention of the regulation was sound, but the phrasing was not. An example would be the capping of local bandwidth, the regulations call for this bandwidth to be uncapped-a positive regulatory move to ensure that sites are freely hosted in South Africa and one that would promote the growth of the local Internet industry. The flaw was that the regulations did not specify that this uncapped local bandwidth must be free. The intention as stipulated in the findings document (ICASA, 2005:28) was that the local bandwidth usage should not count towards the users cap, and should be essentially free.

The issue of co-location as discussed in earlier can be used to illustrate some important points about the final regulation. The discussion points to the fact that co-location may not necessarily be the most cost effective way to increase uptake of ADSL. A regulator would rather focus on regulating local loop unbundling as a more

effective ‘solution’. Local loop unbundling is also identified as an effective solution to increase the uptake of ADSL in the research emanating from the interviews conducted as well as the literature reviewed. This illustrates the importance of the regulator researching the pros and cons of a particular proposal put forward during a public hearing and making a recommendation based on this research. The recommendation should form part of a draft regulation on ADSL that would be open for comment. The discussion document issued by ICASA does not go into the detail required to make an informed decision on the regulatory steps needed to be taken to address many of the complex issues raised during the public hearings. There is also no direct correlation on certain issues between the final regulation and the discussion document, as some of the key issues raised in the discussion document do not filter into the final regulation.

Considering the above-mentioned deficiencies of the ADSL regulation, it is suggested that the regulation be amended.

7. Conclusion

The research results of this study have been qualitatively discussed and analysed. It is now necessary to reflect on the key issues that have emerged from this study in relation to the research questions. This chapter therefore looks at the key issues that have emerged from the study and offers recommendations based on these issues. Some areas of further study that have merged from this study that have not been fully explored are highlighted as suggestions for subsequent studies.

7.1.1 Regulatory intervention and the uptake of ADSL

It can be concluded that, as a response to the central research question, that regulatory intervention is required to encourage the uptake of ADSL in South Africa. The responses to the ICASA ADSL regulation process as well as the responses to the interviews conducted during this study point to a relatively poor uptake of ADSL in South Africa when compared to peer countries. Although arguments abound as to the choice of benchmarking countries, one cannot escape the fact that the overall trend points to a low uptake of the ADSL service in South Africa. The literature reviewed revealed three distinct threads of regulation applicable to increase the uptake of ADSL. These were ‘heavy handed’ regulation, ‘light’ regulation and no regulation at all. These regulatory approaches seemed to be successful in different countries with unique markets. The ‘no regulation’ strand of the literature was discounted at an early stage by the interviewees based on the monopoly ADSL market that exists in South Africa. The remaining two strands formed the core of the discussions around regulatory intervention in the ADSL market.

The overwhelming majority of the interviewees, supported by studying examples around the world, pointed to competition as being the best option available to increase the uptake of ADSL in South Africa. Several differing views were suggested to introduce competition in the broadband market. The best option that emerged would be the option of local loop unbundling. Local loop unbundling would possibly achieve the required mandate of increasing the uptake of ADSL in South Africa as it would stimulate competition, leading to lower prices and thus increasing demand.

Local loop undbundling would have to be implemented via a regulatory process and the best method prescribed would be to follow the 'ladders of investment' (Sutherland, 2005:5) route which allows for a phased access to the incumbents local loop. The type of regulatory intervention that would be required would have to be heavy handed at first to introduce structural changes to the incumbent's local loop in order for it to be unbundled. Light touch or no regulations have been shown to work in other countries only with healthy levels of competition, which is not applicable to the ADSL market in South Africa.

Criticism of local loop unbundling and its perceived failures in other countries have been discussed as part of the research, but these criticisms have to be balanced with the broader objectives of the regulator in increasing uptake of ADSL in South Africa. Lighter touch regulatory initiatives aimed at introducing further competition could follow once local loop unbundling has been implemented. Concerns around the network growth being curtailed by local loop unbundling are valid, but would have to be managed by the regulator and suggestions on managing this process have been put forward.

7.1.2 Factors that affect and the uptake of ADSL

There were several reasons cited for the poor uptake of ADSL services and these included the price of the service, quality of service issues and support of the service by the ADSL operator. The biggest issue that was identified related to the price of the service. This issue was further examined by identifying the components of the ADSL service such as international access and access to the local loop. Price regulation was mooted by a small number of the interviewees as a possible solution to address the issue of high prices, but there were several reservations in general to this method of intervention. Understanding retail price regulation and wholesale price regulation from the viewpoint of the ADSL stakeholders showed substantial opposition to retail price regulation. Wholesale price regulation was seen as the last option should price regulation be required.

7.1.3 Policy initiatives and regulatory intervention

The importance of policy and its effect on the regulatory environment have been briefly touched upon in this report and one can conclude that the current policy environment provides enough scope for the regulator to implement regulatory initiatives with regards to ADSL.

7.1.4 Technology Neutral Regulations

Regulations aimed at the broadband market as a whole would also have to be addressed at some stage by the regulator as ADSL specific regulations are asymmetrical regulation, although the regulator has had enough justification to proceed with such regulations in this particular case. The bigger picture of overall broadband regulations and possible broadband policy cannot be discounted as its importance has been highlighted in this study.

7.2 Recommendations

As an output of the research report, several recommendations are made as a result of the study undertaken. These recommendations follow the direction of inquiry set up during the interviews and would thus be categorised as such.

7.2.1 Definitions

It is recommended that an official definition of broadband be published by the regulator on an annual basis. This would allow this definition to be updated regularly in line with international trends. It is also recommended that the definition be based on the ITU definition of broadband.

7.2.2 Uptake

The regulator is urged to benchmark the uptake of ADSL in South Africa against similar developing countries as well as OECD countries. The uptake of ADSL could be considered as an important barometer of the diffusion of broadband technology within a country. The regulator should constantly be vigilant to pick up trends regarding the uptake of ADSL and act accordingly when problems are identified

7.2.3 Regulatory Intervention

It is recommended the regulator first conduct a complete market review of the broadband market. This should be followed by a phased approach to local loop unbundling using the 'ladders of investment' method detailed in the research report. No price regulation should be implemented as local loop unbundling should be able to address issues around the prices of the ADSL service. Local loop unbundling would also address the key issue of the uptake of ADSL services as it is envisioned that local loop unbundling would drive the uptake of ADSL by lowering prices of the service and thus increasing the demand for the service.

7.2.4 Policy

It is recommended that local loop unbundling as a regulatory initiative continue within the current policy framework created by the Department of Communications. The research has suggested that no further policy framework should be required before regulatory intervention can be effected to address the issue of the uptake of ADSL. Policy issues were identified at the onset of this research as being limited as the focus of the investigation centred upon regulatory intervention.

7.3 Further Research

During the research, several areas were identified for further study. These areas are related to regulatory intervention and the uptake of ADSL, but warrant further dedicated research to address issues not fully explored by this research. The areas for further research have been categorised into broad headings for ease of reference.

7.3.1 Market Research

There were several references during the interviews that called for a comprehensive market research report to be complied before any ADSL regulations are promulgated. It was also stated by the interviewees that a market review or market research would assist the regulator in making informed decisions about the environment in which it regulates. For the purposes of the research, it is suggested that the market research concentrate of the broadband market in South Africa, rather than the entire electronic communications market. The market research should focus on:

- Identifying the operators in a market;
- Identifying market degree of dominance of the operators within the market;
- Identifying broadband services and prices available to consumers;
- Identifying the diffusion of these services in the market.

Once completed, the market research could be used by the regulator to make informed choices in both the policy and regulatory arenas of the broadband market using statistical data gleaned from the research. It is suggested as a first step before any further regulatory intervention is implemented and would be included as a recommendation of this research.

7.3.2 Service Specific Regulations

The issue of service specific versus technology specific regulations was raised during the interviews. The interviewees generally suggested that the regulator move away from technology specific regulations as they could be seen as asymmetric regulation. Although this research suggests technology neutral regulations as a future regulatory route, a proper analysis of the effect of technology specific regulations would need to be conducted in order to assess any possible negative effects of this type of regulation. It is difficult to judge on the face of the information available whether the negative aspects of technology specific regulation outweigh any positives that may be brought about. Further research into this is required with the South African context in mind.

7.3.3 Competition

There was much academic debate around whether facilities based-competition or access-based competition facilitated broadband uptake (Lee 2006, DotEcon 2003, Ferguson 2002). The unique market that occurred within a country also seemed to dictate which type of competition was best suited to increase uptake of ADSL services. The current research was not able to fully investigate which type of competition would be best suited for South Africa. A comprehensive study into the merits of facilities-based competition and access-based competition would need to be undertaken in order to provide direction as to the best route for regulatory intervention. This could possibly be achieved by studying markets where these types of competition have been implemented and comparing them.

7.3.4 Enforcement

Several interviewees raised the issue of ICASA being capable of publishing regulations and being incapable of enforcing adherence to these regulations. It is essential for a regulator to have the resources and capability to effectively enforce its regulatory initiatives. The opinion from the interviewees in general was that this is not occurring. Any future ADSL regulation would be meaningless if the regulator is shown to be not enforcing these regulations and the effects of non-compliance to ADSL regulations was not quantified by the current research. A study into ICASA's track record of enforcement would be an important one and this study should further focus on the challenges faced by the regulator in terms of enforcement and possibly recommend corrective action to address these challenges.

7.3.5 Regulating Speed

There have been contrary views on the issue of the regulation of throughput speed provided by broadband operators. Some operators suggest that end to end throughput speed can be guaranteed and thus regulated while others insist that it is impossible to implement this. The throughput speed is a consumer related matter as consumers are promised fast broadband speeds only to be told than ADSL is a 'best-effort' service'. Although this is a quality of service issue, the current research was not able to suggest a possible solution this issue. A proper technical study into the

issue of throughput speed is required to enable the regulator to state with confidence whether end to end speed could be regulated.

7.4 Conclusion

What emerges from the entire foregoing study is that regulatory intervention in South Africa is most certainly required to ensure that the benefits of ADSL are fully appreciated by as many South Africans as possible. The research undertaken here has shown that the circumstance of the ADSL market in South African lends itself to regulatory intervention being implemented in order to achieve a desired objective of increased ADSL uptake.

8. References

Babbie, E. (2004). *The Practice of Social Research.* 10th Edition. California: Thomson-Wadsworth.

Baldwin, R., Cave, M. (1999). *Understanding Regulation: Theory, Strategy, and Practice.* Oxford. Oxford University Press.

Bar, F., Cohen, S., Cowhey, P., DeLong. B., Kleeman, M. and Zysman, J. (1999). Defending the Internet Revolution in the Broadband Era: When Doing Nothing is Doing Harm. *Berkeley Roundtable on the International Economy.* Working Paper 137.

BMI. (2003). BMI-TechKnowledge Communication Handbook. Johannesburg.

BMI. (2004). BMI-TechKnowledge Communication Handbook. Johannesburg.

BMI. (2006) South Africa Telecommunications Report Q4 2006 -Including 5-year industry forecasts. *Business Monitor International*. South Africa.

Bourreau, M. and Doğan, P. (2000). Regulation and Innovation in the Telecommunications Industry. *Forthcoming Telecommunications Policy.* France.

Brito, R., Liberman, M. and Merril, D. (2001). Asymmetrical Subscriber Line Applications. Worcester Polytechnic Institute. New England.

Cohen, T. (2008). Should Infrastructure be shared? *EngineerIT*. Johannesburg.

Congress of the United States. (2003). Does the Residential Broadband Market Need Fixing? *Congressional Budget Office.* Washington D.C.

Crandall, R.W. (2002). An Assessment of Competitive Local Exchange Carriers Five Years after the Passage of the Telecommunications Act, rev. ed., *Criterion Economics.* Washington, DC.

Crandall, R. and Jackson, C. (2001). The $500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access. *Criterion Economics*. Washington DC.

Crandall, R., Sidak, J.G. and Singer, J.H. (2002). The Empirical Case Against Asymmetric Regulation of Broadband Internet Access. *Brookings Institution.* New York.

Crandall, R. (2003).Broadband Communications. *Brookings Institution*. New York.

Crandall, R. (2004a). Charles Ferguson and the broadband problem. AEI- Brookings Joint Centre for Regulatory Studies Related Publication.

Crandall, R., Hahn R., Litan R., Wallsten, R. (2004b). Bandwidth for the people. *Policy Review*, No. 127, 2004.

Cresswell, J.W. (2003). *Research Design Qualitative, Quantitative and Mixed Methods Approached.* 2nd Edition. New York: Sage Publications.

Christian, C. (nd). World Broadband Growth Continues, South Africa lagging further behind. http://www.visualhosting.co.za/default.asp?pageID=278513035 Last accessed: 26 July 2006.

Department of Communications. (2004). Policy Announcement by the Minister of Communications, Dr Ivy Matsepe-Casaburri. Press statement. Department of Communications. Pretoria. September 2004.

Department of Communications. (2007). Local Loop Unbundling Media Release, Dr Ivy Matsepe-Casaburri. Press statement. Department of Communications. Pretoria. May 2007.

Distaso, W., Lupi, P. and Maneti, F.M. (2005). Platform competition and broadband uptake: theory and Empirical evidence from the European Union. *Paper presented at the joint PURC-University of Florida and LBS 2005 Telecommunication conference.*

DotEcon. (2003). Competition in broadband provision and its implications for regulatory policy. DotEcon and Criterion Economics. A report for the Brussels Round Table.

DSL Forum. (nd). ADSL Tutorial. http://www.dslforum.org/aboutdsl/adsl_tutorial.html, Last accessed: 26 July 2006.

Faulhaber, G.R. (2002). Broadband Deployment: Is Policy in the Way? United States.

Ferguson, C. H. (2002). The United States broadband problem: analysis and policy recommendation. Brookings working paper.

Fischer, J.S., Randolph, L.T. and Louie, M. (2003). Broadband in the United States and Europe – what went wrong and what are the lessons for Asia? Dynasty Capital Services.

Fletcher, B. (2006). Local Loop unbundling operators broadband networks for the UK public sector. Issue Final 1.1. *Office of Government Commerce*. London.

Garcia-Murillo, M. (2005). International broadband deployment: the impact of unbundling. *Communication & Strategies.* No. 57. 1-17.

Gilbert & Tobin. (2001). Operational Implications of Local Loop Unbundling and the Need for Technical Co-Ordination. Undertaken By Political Intelligence.

Gillwald, A. (2002). Case Study: Broadband The Case Of South Africa. *ITU Presentation*. Geneva.

Gillwald, A (2004). Stimulating Investment in Network Extension: The Case of South Africa. *World Dialogue on Regulation*. Lyngby. Denmark.

Gillwald, A. and Esselaar, S. (2005). South Africa Sector Performance Review 2005.

Gillwald, A. (ed) (2005). Towards an African E-Index. Household and individual ICT access and usage across 10 African States. *IDRC paper*.

Gillwald, A., Esselaar, S. and Stork, C. (2006). South African Telecommunications Sector Performance Review 2006. *LINK Centre Public Policy Research Paper No. 8.*

Goldstuck, A. (2005). The Goldstuck Report: Internet Access in South Africa, 2005.

Goldstuck, A. (2008). Broadband in SA and Africa. Lessons from Africa, lessons for Africa. Power-point presentation.

Hausman, J. (2002). Competition and Regulation for Internet-related Services: Results of Asymmetric Regulation. *MIT Working Paper*.

Hazlett, T. (2002). Regulation and Vertical Integration in Broadband Access Supply.

Howell, B. (2002). Broadband Uptake and Infrastructure Regulation: Evidence from the OECD Countries. *New Zealand Inst. for the Study of Competition and Regulation,* Working Paper BH01/01.

Howell, B. (2003). 'Solving' the 'Broadband Problem': a challenge for regulators or producers? *New Zealand Inst. for the Study of Competition and Regulation,* Working Paper BH03/03.

Huysamen, G.K. (1994). Methodology for the Social and Behavioural Sciences. Halfway House. Southern.

ICASA. (2005). Findings document in terms of section 27 on the enquiry into the provision of ADSL Service. Independent Communications Authority of South Africa. Government Gazette No. 27844. Notice1292 of 2005.

ICASA. (2008). Technical Standards for Powerline Communications. Independent Communications Authority of South Africa. Government Gazette No. 30752. Notice 214 of 2008.

Intven, H., Oliver, J. and Sepulveda, E. (2000). *Telecommunications Regulation Handbook.* Washington, D.C. Infodev.

ITU. (2003). Birth of Broadband. ITU Internet Report, International Telecommunication Union. Geneva.

ITU (2004). Best Practice Guidelines for the Promotion of Low Cost Broadband and Internet Connectivity*. ITU-D Regulatory Reform Unit.* 5th GSR.

ITU. (2006). Trends in Telecommunications Reform 2006: Regulating in a broadband world. International Telecommunication Union Press*.* Geneva.

ITU. (2005). World Telecommunication Indicators Database 2005. International Telecommunication Union Press. Geneva.

Jordana, J. and Levi-Faur, D. (2004). The Politics of Regulation in the Age of Governance. University of Haifa and University of Oxford.

Lee, S. (2006). The Effects of Competition and Regulation on Broadband Deployment in the United States. University of Florida. Florida.

Lehman, D.E. (2002). (How) do regulated prices affect competitive entry. *Emerald Research Register.* Paper 1463-6697. http://www.emeraldinsight.com/1463-6697.htm Last accessed 21 January 2008.

Lehr, W. H, Osorio, C.A and Gillett ,S.E. (2005). Measuring Broadband's Economic Impact. Massachusetts Institute of Technology. Massachusetts.

Lemley, M. and Lessig, L. (2001). The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era. *UCLA Law Review*, 48(4).

Levin, H. J. (1971). The invisible resource. Baltimore. Johns Hopkins University Press.

Marcus, J.S. (2005). Broadband Adoption in Europe. IEEE paper on regulatory and policy issues. IEEE Publishers.

Melody, W. (ed) (1997). *Telecom Reform. Principles, Policies and Regulatory practises.* Denmark. Technical University of Denmark.

Mueller, K. (2006). World Broadband Statistics: Q4 2005. Point Topic Ltd.

MyADSL. (nd). About MyADSL http://www.mybroadband.co.za/myadsl/community.php Last accessed: 13 June 2006.

MyADSL. (2007). SA Broadband Figures. http://www.mybroadband.co.za/myadsl/article.php Last accessed: 13 July 2006.

OECD. (2003). Developments in Local Loop Unbundling. Working *Party on Telecommunication and Information Services Policies*. Paris.

OECD. (2006). Multiple Play: Pricing and Policy Trends. *Working Party on Telecommunication and Information Services Policies*. Paris.

OFCOM. (2005). Broadband Regulation. http://www.ofcom.org.uk/consult/condocs/rwlam/bbr/bbr.pdf. Last accessed 6 November 2007.

OFTA. (1997). Regulation of Broadband Network Services. Statement of the Hong Kong Telecommunications Authority. Hong Kong.

Prieger, J. (2003). Unbundling Requirements, State Regulatory Policies and Broadband Internet Access.

Prieger, J. and Hu, W. (2005). New estimates of broadband entry and demand.

RSA. (1996). Telecommunications Act of South Africa. Act No. 103 of 1996 as amended.

RSA. (2005). Electronic Communications Act of South Africa. Act no. 36 0f 2005.

Sentech. (2008). The State of Sentech. http://www.sentech.co.za/index.php?module=ContentExpress&func=display&ceid=59&mmid=2 Last accessed 30 May 2008.

South Africa Foundation. (2005). Telecommunications Prices in South Africa. Occasional Paper No 1/2005.

Sutherland, E. (2007). Unbundling local loops: global experiences. Wits Link Centre.

Telkom. (nd). Investor Relations. http://www.telkom.co.za/minisites/ir/SENS/sensarticle_87.html Last accessed: 26 July 2006.

Thierer, A.D. (2005a). Solving the Broadband Paradox. City Network Solutions.

Thierer, A.D. (2005b). Broadband Telecommunications for the 21st Century: Five Principles: Five Principles for reform. *The Heritage Foundation.* http://www.heritage.org/Research/InternetandTechnology/BG1317.cfm Last accessed 21 March 2008.

TRAI. (2004). TRAI Releases Recommendations on Broadband India: An Integrated Policy For Accelerating Growth of Internet and Broadband Penetration. Press Release No. 30/2004.

Turner, D.S. (2005). Broadband Reality Check - The FCC ignores America's Digital Divide. Washington. Freepress.

Vanberg, M.A. (2002). Competition in the German Broadband Access Market. Discussion Paper No. 02-80.

Wallsten, S. (2005). Broadband Penetration: An Empirical Analysis of State and Federal Policies. Working Paper 05-12.

Wilsdon, J. and Stedman-Jones D. (2002) The politics of bandwidth. *Network innovation and regulation of broadband in Britain*. Britain.Demos.

World Metrix. (2006). Top 15 Countries by Internet Penetration. http://www.comscore.com/wm.htm
Last Accessed 17 January 2006.

Woroch, G.A. (2002). Local network competition. *Handbook of Telecommunications Economics.* Amsterdam. Elsevier Publishing.

Zhang, B. (2002). Understanding the impact of convergence on broadband industry regulation: a case study of the United States. *Telematics and Infomatics* Paper 19.

Appendix A: Interview Questions

GENERAL CONSENT FORM FOR INTERVIEWS

This interview is being conducted as part of a research report concerned with the ADSL and Regulatory Intervention in South Africa. The research report forms part of the requirements for a Master of Management degree from the University of the Witwatersrand. This research is conducted entirely in my personal capacity for academic purposes only and in no way reflects an official ICASA position. I will be interviewing managers or representatives from Internet Service providers, Network Operators and Industry groups associated with ADSL.

The interview should take approximately an hour to complete. The research report will not contain any material that would make it possible to identify any particular individual or company. Your identity and responses to any questions, along with the identity of your company, will be kept entirely confidential. With your permission, this interview will be recorded. The recordings will be stored in a password protected file on a password protected computer. The recordings and any notes from this interview will be securely stored, accessible only by the principal investigators on the project. The recordings will be destroyed at the end of this project in May 2008.

If you have any questions about this interview or the broader research of which it is a part, please feel free to ask the interviewer at this time. Contact details:

Praneel Ruplal
Tel: 011 321 8348
Fax: 011 321 8581
Cell: 0832621057
Email: pruplal@icasa.org.za

There are no anticipated risks to research participants. If you are concerned that revealing certain information may put you or someone you know in some type of unanticipated personal risk, you should feel entirely free to not answer any and all questions, and to terminate the interview at any time. Your participation is completely voluntary.

I have read the above and give my consent to participate in the study.

_____

Signature

_____

Date

The informed consent procedure has been followed.

_____

Investigator Signature P. Ruplal

_____

Date

Interview Questions

1. **Introduction**
   1.1. Do you regard ADSL as an important broadband technology for South Africa? Please elaborate.

2. **Definition**
   2.1. What, in your opinion, should be the definition of broadband in South Africa?
   2.2. Would you classify ADSL into the broadband category?
   2.3. Is it important to have an official definition of broadband? Please elaborate.

3. **Uptake**
   3.1. Is the current uptake of ADSL sufficient when compared internationally?
   3.2. What are the key policy and regulatory factors that can be identified which influence the uptake of ADSL? Please list the factors both positive and negative.

4. **Regulatory Intervention**
   4.1. Do you consider the broadband market sufficiently competitive?
   4.2. Do you believe that regulatory intervention is required to stimulate the uptake of ADSL in South Africa? Explain?
   4.3. Should the regulatory intervention focus on ADSL only or address broadband technologies as a whole? Please justify your answer.
   4.4. If at all, what degree of regulatory intervention is required?
   4.5. Who should intervene?
   4.6. Should there be specific regulatory measures or intervention?
   4.7. What should these measures be?
   4.8. What form(s) should this intervention take?
   4.9. How should the above intervention be implemented?
   4.10. Do you see the intervention addressing specific factors influencing the uptake of ADSL?
   4.11. Please explain how you see regulations making a positive impact on the uptake of ADSL?

5. Policy

5.1. What (if any) policy initiatives should be in place before regulatory intervention can be effective?

5.2. How would you see these initiatives influencing the uptake of ADSL?

5.3. How would it affect the regulatory environment?

5.4. Should one process wait on the other?

6. Miscellaneous

6.1. In your opinion, are there other non-regulatory options available to increase the uptake of ADSL?

6.2. Is regulating costs of ADSL a viable option?

6.3. If so, how could costs be regulated?

6.4. How important is it to regulate costs?

7. General

7.1. Is there anything else that you would like to add that may assist with this study?

Thank you for your co-operation.

Appendix B: Research Strategy[38]

ID.	TASK	JUN	JUL	AUG	SEP	OCT	NOV	JAN	FEB	MAR	APR	MAY	TOTAL
1	Literature Review	15	20	15	10	10	-	-	-	-	-		**70**
2	1st Draft of Proposal				5	5	5						**15**
3	Supervisor Review					5	-						**5**
4	Editing	5	5	5	5	5	8						**33**
5	Final Edits (Supervisor)						5						**5**
6	Submit Final Proposal						1						**1**
7	Edits to Proposal						5						**5**
8	Re-submit						1						**1**
9	Interviews							10	5	2			**17**
10	Transcribe Data							5	10	8			**23**
11	Analysis of Data	5		5	5			10	10	5	5		**45**
12	International Benchmarks					5	5	5	2	2			**19**
13	Develop Structure	5	5	5					4	3			**22**
14	First Draft									1			**1**
15	Peer Review									5			**5**
16	Supervisor Review									2	5		**7**
17	Second Draft											5	**5**
18	Editing										10	10	**20**
19	Write up Final draft										2		**2**
20	Final Edits (Peer Review)										1	1	**2**
21	Final Edits (Supervisor)										5	5	**10**
22	Amendments										3	5	**8**
23	Binding											2	**2**
24	Submit Final Report											2	**2**
	TOTAL DAYS	**30**	**30**	**30**	**25**	**30**	**30**	**30**	**31**	**28**	**31**	**30**	**312**

[38] The research strategy is presented as a time-table of events which commenced in June 2007 and terminated in May 2008. The numbers represent the days assigned to a particular task. Due to unforseen circumstances, several of the deadlines were not achieved although eventually all the milestones were.