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# **Telecommunications prices in South Africa**

An international peer group comparison

## The South Africa Foundation

The South Africa Foundation is an association of South Africa's largest corporations and major multinational companies with a significant presence in South Africa. They are represented on the Foundation's Council at the level of Chief Executive or Chairman. The Foundation is the independent, non-partisan voice of South African business leadership. It is financed entirely by private subscription from its corporate members.

The Foundation believes that business leadership has a collective duty to contribute to the process of policy-making on national and international affairs. It further believes that a strong, independent private sector, operating within a market-orientated economy, is an essential feature of any successful, free and democratic society.

## Objectives of the Foundation

The Foundation seeks to formulate and express a co-ordinated view on macro-economic and other national issues and to promote the interests and further growth of South Africa's private sector both domestically and internationally. The Foundation strives to promote enterprise and an environment conducive to the conduct of business. It is also believed that the development of human capital and the raising of income levels are essential in building a successful nation.

The South Africa Foundation fosters relationships between South Africa and the rest of the world, in the belief that these relationships will improve opportunities for South Africa as well as for the entire southern African region.

## This Study

In 2004, following a challenge from President Thabo Mbeki to South African business leaders to help identify major business opportunities for the country, the South Africa Foundation commissioned a report from McKinsey and Company into Business Process Outsourcing and Offshoring (BPO&O). The study was co-sponsored with the Department of Trade and Industry/TISA, Johannesburg City Council/EDU and ComMark Trust. It found that indeed a major opportunity existed for South Africa to enter the BPO&O industry more vigorously. Yet, a major inhibiting factor to realise the sectors potential was the exorbitant cost of telecoms in South Africa. Consequently the South Africa Foundation commissioned this study in the pursuit of its core mission of promoting enterprise and an environment conducive to the conduct of business.

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The views expressed in this document are those of the author and do not purport to represent the views of the South Africa Foundation or any of its members. It is published as a contribution to the public debate on an important issue of topical interest.

# **Telecommunications prices in South Africa**

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<b>TABLE OF CONTENTS</b>	<i>page</i>
List of Tables .....	iii
List of Figures .....	iv
Glossary .....	v
Executive Summary.....	1
<b>1. TELECOMMUNICATIONS IN SOUTH AFRICA .....</b>	<b>7</b>
1.1. Previous research.....	11
1.1.1. Yankee Group.....	11
1.1.2. NUS Consulting.....	12
1.1.3. Tarifica .....	12
1.1.4. Efficient Research .....	13
<b>2. Methodology .....</b>	<b>14</b>
2.1. Product comparison .....	16
<b>3. Impact on data services .....</b>	<b>18</b>
3.1. Business data.....	18
Box 1: International bandwidth prices .....	22
3.2. Retail data .....	23
<b>4. Impact on voice services.....</b>	<b>25</b>
4.1. Business voice .....	25
4.2. Retail/off-peak voice .....	27
Box 2: Cross-subsidization and exchange rate issues.....	30
<b>5. The impact on business in South Africa .....</b>	<b>31</b>
5.1. VANS industry .....	31
5.2. Mobile industry.....	33
5.3. Financial institutions.....	34
5.4. Call centre industry .....	34
5.5. Internet-based businesses.....	35
<b>6. The proposed legislative changes.....</b>	<b>36</b>
6.1. Self-provisioning for mobile operators.....	36
6.2. Provision of voice by value added service providers .....	36
6.3. Self-Provisioning for VANS, and cession of telecommunications services by VANS.....	38
6.4. Optimising the use of private telecommunications network facilities .....	40
6.5. Net effects of the regulatory changes.....	40
6.6. On-going Issues .....	42
<b>7. Conclusion .....</b>	<b>43</b>
Bibliography .....	45

	<i>page</i>
Appendix 1 – Index components .....	.46
Appendix 2 – Exchange rates used .....	.53
Appendix 3 – Submarine cable network .....	.54

<b>LIST OF TABLES</b>	<i>page</i>
Table 1: International comparison countries .....	.2
Table 2: International comparison countries .....	.15
Table 3: Summary of cost findings .....	.29
Table 4: Exchange rates used .....	.53

<b>List of Figures</b>	<i>page</i>
Figure 1: International leased lines, annual fee for 2mbps . . . . .	.3
Figure 2: South African telecommunications providers EBITDA growth . . . . .	.8
Figure 3: Cost of a bundle of local, mobile and international calls (as a percentage of monthly per capita GNI) versus phone penetration rates (fixed plus mobile) . . .	.9
Figure 4: Regional growth in and level of active internet users, 2002 . . . . .	.10
Figure 5: Internet penetration levels versus the cost of the internet as a percentage of per capita national income . . . . .	.11
Figure 6: Business ADSL, monthly fee for approximately 512kbps . . . . .	.19
Figure 7: Domestic leased lines, annual fee for 2mbps under a distance of 10km . . . .	.20
Figure 8: International leased lines, annual fee for 2mbps . . . . .	.21
Figure 9: Range of international leased line prices . . . . .	.21
Figure 10: Retail ADSL, monthly fee for 512kbps . . . . .	.23
Figure 11: ISP monthly fees . . . . .	.24
Figure 12: International calls, cost of a 3 minute call to the US . . . . .	.25
Figure 13: Fixed line local calls, cost of a 3 minute call in peak times . . . . .	.26
Figure 14: Mobile calls, cost of a 3 minute call to a fixed line in peak times . . . . .	.27
Figure 15: Fixed line local calls, cost of a 3 minute off-peak call . . . . .	.28
Figure 16: Mobile calls, cost of a 3 minute off-peak call . . . . .	.29
Figure 17: Brazil - South Africa comparison, price on all items normalised to 1, average exchange rate for the year ended February 2005. . . . .	.30
Figure 18: Brazil - South Africa comparison, prices on all items normalised to 1, R/US\$9.00 . .	.30
Figure 19: The relative contributions of ISPs and Telkom to the cost of spending 20 hours a month online in 1993 (peak times) . . . . .	.32
Figure 20: The relative contributions of ISPs and Telkom to the cost of spending 20 hours a month online in 2003 (peak times) . . . . .	.32
Figure 21: Fixed line penetration rates versus PPP-adjusted GDP per capita . . . . .	.47
Figure 22: International call costs versus PPP-adjusted GDP per capita . . . . .	.47
Figure 23: Mobile phone penetration rates versus PPP-adjusted GDP per capita . . . . .	.48
Figure 24: Mobile phone call costs versus PPP-adjusted GDP per capita . . . . .	.48
Figure 25: Internet penetration levels versus PPP-adjusted GDP per capita . . . . .	.49
Figure 26: Internet costs versus PPP-adjusted GDP per capita . . . . .	.49
Figure 27: Information and communication technology investment versus PPP-adjusted GDP per capita . . . . .	.50
Figure 28: Broadband penetration levels versus PPP-adjusted GDP per capita . . . . .	.50
Figure 29: Telecommunications competitiveness index versus PPP-adjusted GDP per capita . . . . .	.51
Figure 30: Telecommunications competitiveness index versus PPP-adjusted GDP per capita . . . . .	.52

## GLOSSARY

<b>ADSL</b>	Asymmetric Digital Subscriber Line. A technology used to provide broadband internet connections over standard phone lines.
<b>CPI-X</b>	The Telkom price cap. It is calculated as the percentage change in the Consumer Price Index less an X efficiency factor.
<b>DSL</b>	Digital Subscriber Line. A technology used to provide broadband internet connections over standard phone lines. See also ADSL.
<b>EBITDA</b>	Earnings Before Interest, Tax Depreciation and Amortisation.
<b>Estel</b>	Eskom Telecommunications. Houses the telecommunications assets, employees and functions of the Eskom group.
<b>E1</b>	An E1 data line carries data at a speed of approximately 2mbps.
<b>Gbs</b>	Gigabytes per second. A gigabyte is one billion bytes.
<b>GDP</b>	Gross Domestic Product.
<b>ICASA</b>	The Independent Communications Authority of South Africa. The South African telecommunications and broadcasting regulator.
<b>ISDN</b>	Integrated Services Digital Network. A set of communications standards allowing a single wire or optical fibre to carry voice, digital network services and video. <sup>1</sup>
<b>ISP</b>	Internet Service Provider.
<b>ISPA</b>	Internet Service Providers' Association.
<b>IT</b>	Information Technology.
<b>Kbps</b>	Kilobytes per second. A kilobyte is a thousand bytes of data.
<b>Leased lines</b>	A private telephone circuit permanently connecting two points, normally provided on a lease by a local Posts, Telephone and Telegraph. <sup>2</sup>
<b>Mbps</b>	Megabytes per second. A megabyte is one million bytes.
<b>PABX</b>	Private Automatic Branch Exchange.
<b>PPP</b>	Purchasing Power Parity. A PPP exchange rate reflects the actual cost of buying a basket of goods in the country concerned. It thus is a better reflection of domestic purchasing power than market-determined exchange rates.
<b>PSTN</b>	Public Switched Telephone Network.
<b>PSTS</b>	Public Switched Telecommunication Services.
<b>PTN</b>	Private Telecommunications Network.
<b>SAFE</b>	The South Africa Far East cable runs up the east coast of Africa and provides the principal telecommunications connection between South Africa and Asia.

<sup>1</sup><http://www.hyperdictionary.com/dictionary/Integrated+Services+digital+Network>

<sup>2</sup><http://www.hyperdictionary.com/dictionary/search.aspx?define+leased+line>

<b>SAT-3</b>	The South African Telecommunications Cable No. 3 runs up the west coast of Africa and provides the principal telecommunications connection between South Africa and Europe.
<b>SAIX</b>	South African Internet Exchange.
<b>SMME</b>	Small, Medium and Micro Enterprises.
<b>SNO</b>	Second Network Operator.
<b>Transtel</b>	Transtel is a division of Transnet, and owns and operates the largest private telecommunications network in the southern hemisphere. External customers contribute about a quarter of total revenues. <sup>3</sup>
<b>T1</b>	A T1 data line carries data at a speed of approximately 1.5mbps.
<b>VANS</b>	Value Added Network Services.
<b>VOIP</b>	Voice Over Internet Protocol.
<b>VSAT</b>	Very Small Aperture Terminal. A kind of ground station used to contact a communications satellite such as INMARSAT (International Maritime Satellite). <sup>4</sup>
<b>WASC</b>	West Africa Submarine Cable.

<sup>3</sup>Paraphrased from <http://www.transnet.co.za>

<sup>4</sup><http://www.hyperdictionary.com/dictionary/very+small+Aperture+Terminal>

## **EXECUTIVE SUMMARY**

A key performance indicator for telecommunications in South Africa is the relative price structure of services, in an international context. Relative prices affect the competitiveness of the South African telecoms industry in export markets. In addition, because telecommunications are an input into virtually all productive activities, if telecoms prices are higher than their competitive level, they act as a tax on industry and a drag on economic growth.

At least four previous reports have raised concerns about South Africa's telecommunications pricing structure. In the area of fixed line services, Telkom is a fairly lightly regulated monopoly. Monopolies, by definition, almost always set prices higher than the competitive benchmark, so there is a prima facie case to be made that Telkom has an incentive to sustain a high price structure. However, the pricing evidence presented by previous reports has been to some extent conflicting, and the selection of an international peer group in these reports has not been conducted specifically with the intention of providing a good comparison to South Africa. This report therefore seeks to address this issue.

Most importantly, the purpose of comparative studies such as this one is to assess how close to or how far from the competitive, or best practice, price benchmark South Africa is. There is no innate reason why South Africans should not have access to telecommunications services at that benchmark price level. Thus the approach used in this study is to compare South Africa to a best-practice peer group.

### **INTERNATIONAL PRICE COMPARISONS**

The level of South African telecommunications pricing should ideally be measured against pricing in countries which are not only similar to South Africa (in relevant characteristics such as the geographical dispersion of population, income dispersion and market structure), but are also considered to have advanced telecommunications sectors. If an international price comparison was made on the basis of a random selection of countries, it would run the risk of including countries with distorted, over-priced or otherwise underperforming telecoms sectors.

In order to identify an appropriate international peer group for South Africa, an index of telecommunications competitiveness was constructed. The index suggested that the following group of countries had particularly highly developed telecommunications sectors, given their level of Purchasing Power Parity (PPP) - adjusted Gross Domestic Product (GDP) per capita. They were therefore selected as a "best-practice" comparison group of developing and developed countries. The methodology used to construct an index is detailed in Appendix 1.

	PPP-adjusted GDP per capita	Population size	Population density per sq km	Gini coefficient
	US\$			
<b>South Africa</b>	10,000	45.3	37.1	59.3
<i>International telecoms best practice</i>				
<b>Canada</b>	29,003	31.6	3.4	33.1
<b>Hong Kong</b>	26,845	6.8	6,554.6	43.4
<b>Israel</b>	19,194	6.7	324.4	35.5
<b>Norway</b>	32,797	4.6	14.9	25.8
<b>Singapore</b>	24,389	4.3	6,967.2	42.5
<b>Sweden</b>	25,985	9.0	21.8	25.0
<b>South Korea</b>	19,497	47.9	485.3	31.6
<b>United States</b>	35,992	291.0	31.8	40.8
<i>Peer group telecoms best practice</i>				
<b>Brazil</b>	7,559	176.6	20.9	58.5
<b>India</b>	2,538	1,064.4	358.0	32.5
<b>Malaysia</b>	8,591	24.8	75.4	49.2
<b>Morocco</b>	3,844	30.1	67.5	39.5
<b>Philippines</b>	4,487	81.5	273.3	46.1
<b>Thailand</b>	6,937	62.0	121.4	43.2

**Table 1: International comparison countries**

Source: World Bank, Nationmaster.com

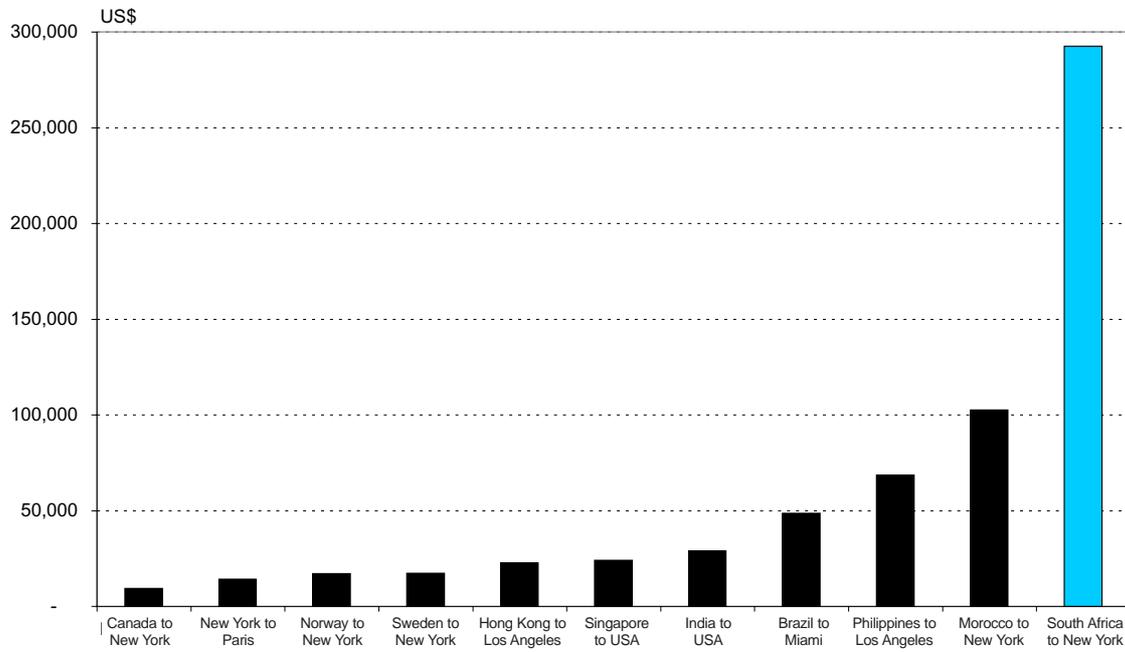
Telecommunications products were categorised broadly as voice or data, and business or retail. The country-by-country price comparisons indicated that South African telecommunications were frequently among the most expensive of the selected comparison group.

• ***Business data products: Asymmetric Digital Subscriber Line (ADSL), domestic leased lines and international leased lines***

Three products were chosen for comparison, namely monthly fees on ADSL broadband (average downstream speed of 512kbps or more); domestic leased lines (annual fee on a 2mbps line under 10km); and international leased lines (annual fee on a 2mbps line to the US).

On business ADSL, despite the fact that a number of the international products sampled had a substantially higher product specification than the Telkom ADSL offering, **South Africa was the most expensive broadband of all fifteen countries sampled, and was in fact more than nine times as expensive as the cheapest country surveyed. On domestic leased lines, on the data available, South Africa was the most expensive of twelve countries surveyed** (100% more expensive than the average price sampled, and almost fifteen times more expensive than the cheapest country surveyed). The most startling price comparison though was on **international leased lines, where South African prices are almost three times as high as the next most**

**expensive country sampled, and 31 times more expensive than the cheapest country** (out of ten countries, excluding Canada). International leased lines allow business to transport data and voice communications out of South Africa. The cost of international leased lines thus affects the cost of the internet, private data networks and Voice Over Internet Protocol (VOIP) to business.



**Figure 1: International leased lines, annual fee for 2mbps**  
 Source: Primetrica, telecommunications regulators websites, Telkom website

A simple back-of-the-envelope calculation suggests that there is a lot of room to decrease international bandwidth prices as they currently stand, without endangering Telkom’s return on investment. The total initial investment on the undersea cable was US\$650 million, which Telkom was only partially liable for. At an annual price of approximately US\$0.3 million per 2mbps line, Telkom would need to sell about 2 200 2mbps private lines, or about 11% of total line capacity of 40Gbs, to cover the total initial investment of US\$650 million in only one year.

• **Retail data: ADSL and Internet Service Provider (ISP) fees**

In both US\$ and PPP terms, **South African ADSL broadband is the most expensive of the fifteen comparison countries**, even if the ISP fee which is also necessary for ADSL connectivity is not included. Our ADSL fee is eight times as expensive as the cheapest country surveyed. In addition, **South Africa’s monthly ISP fees are the highest on a PPP-adjusted basis in the comparison group of thirteen countries**, or five times as expensive as the cheapest country surveyed on a PPP basis. The high price of international bandwidth inflates ISP fees by approximately 30%.

- ***Business voice: peak fixed line and mobile call costs (local and international)***

South Africa performs somewhat better on the cost of **international calls, coming in as the 5<sup>th</sup> most expensive out of 15 countries sampled, and 14% cheaper than the average price.**

In US\$ terms, ***peak local calls in South Africa were the most expensive of the fifteen countries sampled***, and almost 200% more expensive than the average price. ***Mobile-to-fixed calls were the 2<sup>nd</sup> most expensive out of fifteen countries***, and over 100% more expensive than the average price of the sample.

- ***Retail voice: off-peak fixed line and mobile call costs (local and international)***

In the case of off-peak local calls South Africa is the fourth most expensive of fourteen countries surveyed, in US\$ terms. ***If PPP adjustments are used, however, South Africa's performance deteriorates to third most expensive***, or 130% more expensive than the average PPP-adjusted price. South Africa's relative position on off-peak mobile call costs is little better. In US\$ terms, South Africa is the fifth most expensive of fifteen countries, but in ***PPP terms, our relative position worsens to third most expensive*** (100% more expensive than the average PPP-adjusted price).

Telkom's pricing structure has negatively impacted on the Value Added Network Services (VANS) and call centre industries in particular. Interviews with industry participants suggest that the roll-out of the internet and prices of telecommunications products in downstream markets have been strongly affected by Telkom's pricing, particularly in the international bandwidth market.

## **LEGISLATIVE CHANGES**

A number of legislative changes were announced by the Minister of Communications, Ivy Matsepe-Casaburri, in September 2004. They include the following:

- ***Self-provisioning for mobile operators***

The principal fixed line service used by mobile operators is the leased line network, which connects mobile phone towers with the national telecommunications grid. At present, these lines must be leased from Telkom. From February 2005, the mobile operators can install lines themselves or rent lines from another operator. ***Estel and Transtel already have a fairly substantial telecoms infrastructure in place, and in addition, have the rights of way to lay cable. They may therefore be a central beneficiary of this policy change. Some price effects on leased lines should also be seen.***

- **Provision of voice by value added service providers**

The announcement states that any licensed VANS will be able to offer VOIP or other voice VANS in competition to Telkom (but not traditional voice). VOIP offers companies substantial cost savings over traditional voice. However, the transition to VOIP may be complex, and the infrastructural costs associated with acquiring VOIP-enabled handsets can be substantial. In addition, at present VOIP is less reliable than traditional voice. Companies for which voice communications constitute a mission-critical application will be less likely to convert fully to VOIP, and it is unlikely to be suitable initially for small companies without a large Information Technology (IT) implementation department. **Small, Medium and Micro Enterprises (SMMEs) are therefore unlikely to see any cost benefit from the change.**

A crucial issue is the fact that Telkom keeps its monopoly on international cable bandwidth. Satellite bandwidth is not suitable for VOIP, as it introduces an unacceptable delay on the line. Therefore the cost savings that can be realised on VOIP will be limited by the exorbitant pricing of international bandwidth.

- **Self-provisioning for VANS, and cession of telecommunications services by VANS**

In terms of the original announcement, from February 2005, VANS can self-provision their telecommunications infrastructure, can acquire or lease that infrastructure from other VANS, or can on-sell or rent their own infrastructure to a customer.<sup>5</sup> Again, Transtel and Estel will have a competitive advantage in selling or renting telecommunications infrastructure to VANS, due to their access to the rights of way. It may however be possible for certain VANS, who provide telecommunications services mainly via fixed lines, to argue that they are entitled to the rights of way as well.

Technically, it should also be possible for VANS to self-provision their international connections, and bypass Telkom's monopoly on the SAT-3 cable (South African Telecommunications Cable No. 3) bandwidth. In practice, however, this is unlikely to occur. **The legislative change is therefore unlikely to result in greater competition in the international bandwidth market.**

- **Optimising the use of private telecommunications network facilities**

Private telecommunications network (PTN) license holders will be able to provide data services without the benefit of a Public Switched Telecommunication Services (PSTS) license from February 2005, although the prohibition on providing traditional voice services remains. **This removes a large part of the attractiveness of the Second Network Operator (SNO) license for Transtel and Estel.**

<sup>5</sup> On February 1, 2005, the Minister of Telecommunications called into question whether VANS will be allowed to self-provision. However, it is not clear that this public announcement invalidates the original regulatory change, and can be regarded as legally binding. (Business Day, 1 February 2005, p 10)

## **CONCLUSIONS**

The pricing evidence clearly suggests that Telkom's pricing structure is excessive, and that some sort of intervention in the market may therefore be appropriate. More competition in the sector is critical at all levels, and all forms of competition should be encouraged. However, telecommunications is an industry characterised by natural monopolies. Thus, in certain sectors of the market, it may not be possible to increase competition, and prices will tend towards their monopolistic level. In these sectors it may therefore be necessary to introduce more effective regulation.

Although the proposed regulatory changes are welcome, and represent a step in the right direction, at least two crucial issues remain. Firstly, the high pricing of international bandwidth needs urgent attention. Secondly, the playing field between Telkom's VANS services and those of its competitors needs to be levelled. This could be accomplished by, for example, the establishment of a wholesale pricing division within Telkom.

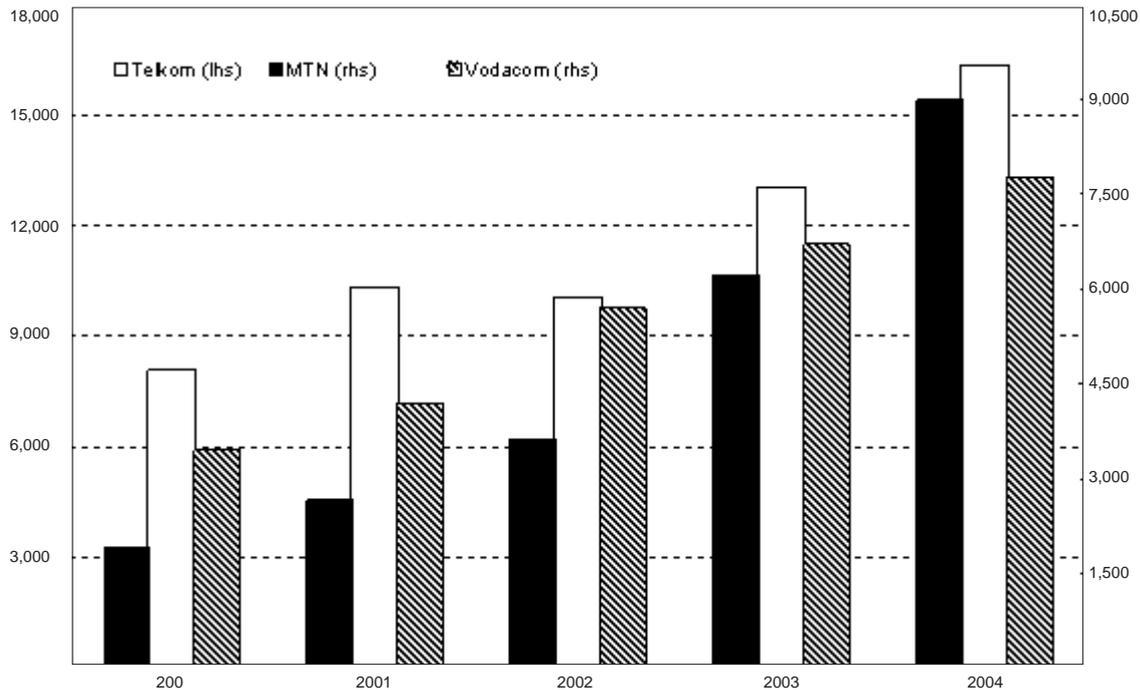
# 1. TELECOMMUNICATIONS IN SOUTH AFRICA

The cumulative importance of telecommunications for the South African economy was perhaps best summarised by former Minister of Posts, Telecommunications and Broadcasting, Jay Naidoo, in 1997:

“Better telecommunications will enhance our ability to deliver improved quality of life, electronic health and learning services to previously disadvantaged areas. It opens up great opportunities to train and equip our people with skills necessary to improve our ability to innovate. Innovation is a key factor in determining our global competitiveness. In an increasingly information-driven world, our competitiveness will depend on our ability to access and exchange information globally.”<sup>6</sup>

Ultimately, the penetration and usage of telecommunications products is largely determined by affordability and price. This paper reviews South Africa’s telecommunications costs, and finds compelling evidence that they are generally priced well above competitive levels. As demonstrated in Figure 2 below, the result has been high and rising profits for telecoms providers. Since 2000, Earnings Before Interest, Tax Depreciation and Amortisation (EBITDA) at Telkom alone have risen 102%.

<sup>6</sup>Address by Mr J Naidoo, Minister for Posts, Telecommunications and Broadcasting at the official launch of SATRA, 10 February 1997. Downloaded from <http://www.info.gov.za/speeches/1997/06034697.htm> on 9 December 2004.



**Figure 2: South African telecommunications providers EBITDA (earnings before interest, tax, depreciation and amortisation) growth**

Source: Telkom, Vodacom and MTN annual reports

The link between pricing and telecommunications access for the poor is a tight one, and is best illustrated by recent South African experience. In terms of the 1996 Telecommunications Act, in May 1997 Telkom was granted a five-year exclusivity period in fixed line telephony. This legislated monopoly was however associated with a number of obligations, including obligations to roll out new connections, modernise the network and improve service to underserved areas. Sustaining Telkom's monopoly was therefore seen as a mechanism for protecting profitability while ensuring that development goals were met.

During the monopoly period, Telkom did in fact roll out 2.8 million lines. However, during the same period Telkom undertook a tariff rebalancing exercise, which resulted in decreases in the prices of international calls while local call costs increased substantially. In fact, the cost of a peak-rate 3 minute local call increased by 316% between 1997 and 2003, or a compound growth rate of 26.8% per annum.<sup>7</sup> Meanwhile, the cost of peak-rate international calls fell by 32% between 1998 and 2002.<sup>8</sup>

**The cost of peak-rate local calls increased by 316% between 1997 and 2003.**

Economic theory suggests that an increase in price will be associated with a decrease in quantity demanded. It is thus not surprising that an estimated 70% of the new lines rolled out by Telkom were ultimately disconnected for non-payment.<sup>9</sup> In fact, the number of residential

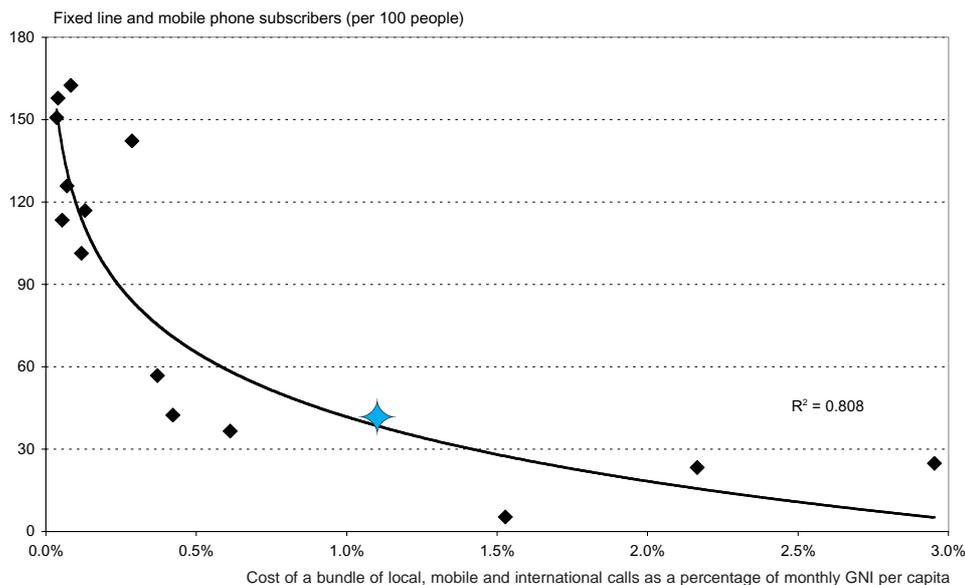
**70% of the new lines rolled out by Telkom were ultimately disconnected.**

<sup>7</sup>Hodge 2003, p 41.

<sup>8</sup>Makhaya and Roberts 2003, p 48.

<sup>9</sup>Finnie et al 2003, p 60.

lines per 100 people fell from approximately 6.5 in 1997 to 5.3 in 2003.<sup>10</sup> Figure 3 illustrates the relationship between cost and telecommunications roll-out, and suggests that the affordability of phone calls (measured as the cost of a bundle of local, mobile and international calls as a percentage of per capita national income) explains just over 80% of the country-by-country differences in total phone penetration levels (South Africa's position is given by the blue dot. The other fourteen countries shown are detailed in Table 2). Changes in fixed line pricing may therefore have undermined the development goals of the 1996 Telecommunications Act.



**Figure 3: Cost of a bundle of local, mobile and international calls (as a percentage of monthly per capita GNI) versus phone penetration rates (fixed plus mobile)**

Source: Company websites, telecommunications regulators websites, ITU, World Bank

High telecommunications prices have a negative effect on economic activity. The telecoms sector directly contributes approximately 6% of South Africa's Gross Domestic Product (GDP).<sup>11</sup> Indirectly, telecommunications are used as an input by the remaining 94% of the economy and so, if telecoms costs are high, this acts as a tax on production across the economy.

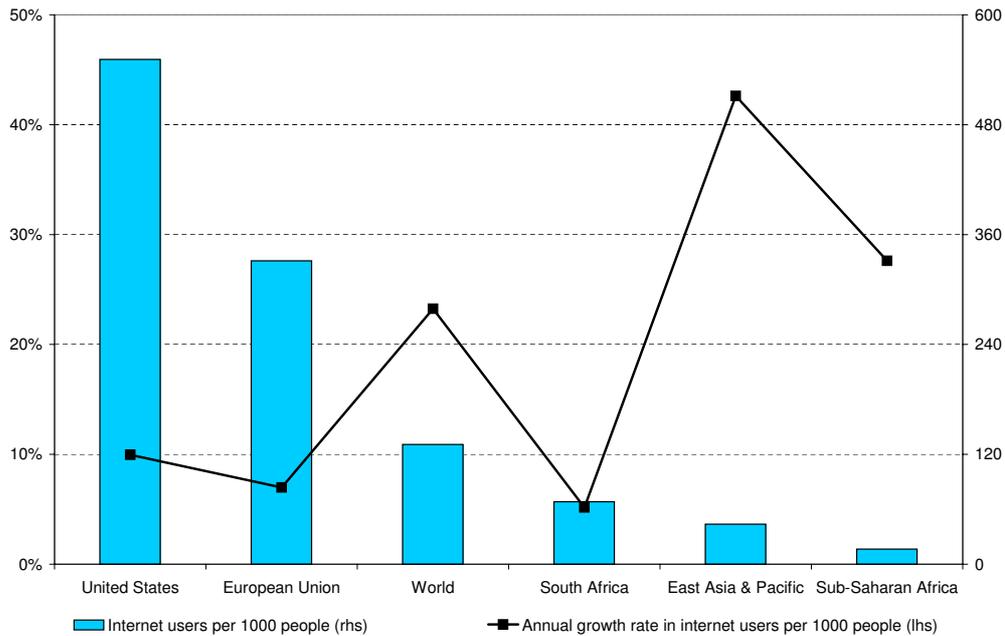
The impact of high telecoms prices is also evident at a sectoral level. For example, it seems likely that call costs are inhibiting the growth of the call centre industry, and thus its job creation potential. In 2002, the Department of Trade and Industry estimated that the call centre industry contributed 0.83% of GDP, and had the potential to triple its relative contribution by 2017. Alternatively, if international growth opportunities are missed, the industry will remain static in relative terms.<sup>12</sup> The cost of phone calls and data lines in South Africa will be a crucial factor in determining growth in the call centre industry.

<sup>10</sup> Ibid.

<sup>11</sup> Gillwald & Kane 2003, p 1.

<sup>12</sup> TISA 2004, p 57.

South Africa's engagement with the internet is also being held back. Figure 4 below shows the level of internet penetration (measured as the number of internet users per 1 000 people) and the growth in internet penetration, for a number of regions, in 2002. As can be expected, in mature markets with high penetration levels such as the United States (US) and the European Union, growth rates have begun to decline. In markets with low penetration levels, conversely, growth rates are high. The exception is South Africa, which exhibits both low penetration levels and low growth rates.



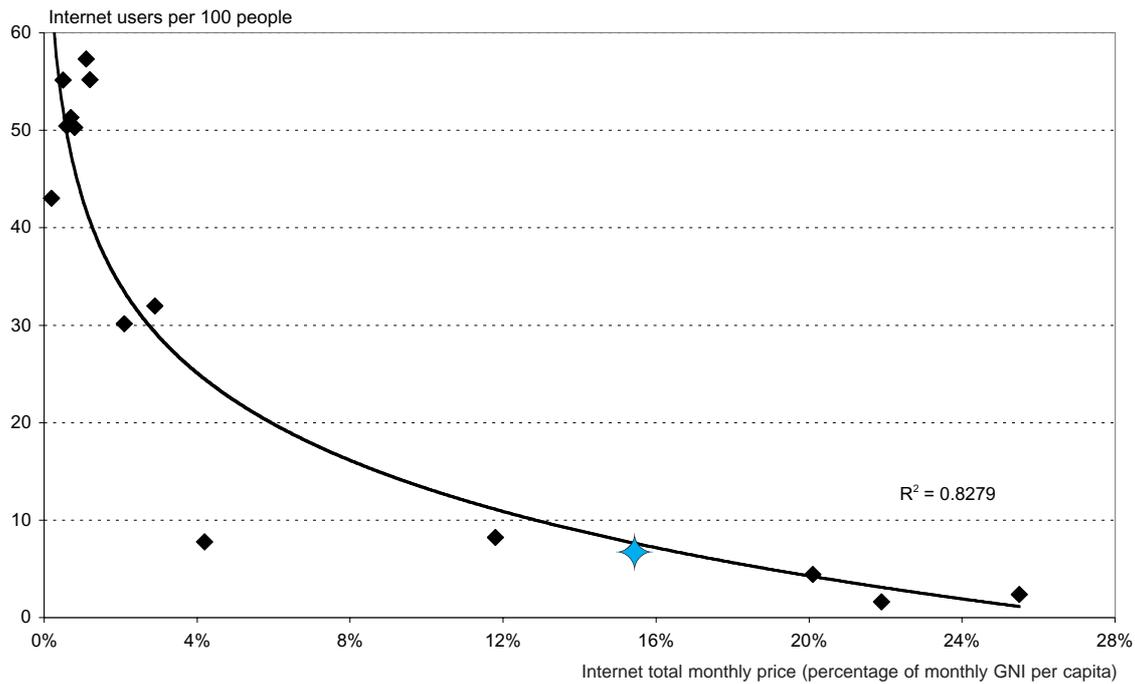
**Figure 4: Regional growth in and level of active internet users, 2002**

Source: [www.sima-ext.worldbank.org](http://www.sima-ext.worldbank.org)

Again, the data suggests that the affordability of the internet to a large extent determines

**High prices seem to be inhibiting the development of the internet in South Africa.**

internet penetration levels, and that South Africa's internet development seems to be impeded by relatively high price levels. This is illustrated in Figure 5 below.



**Figure 5: Internet penetration levels versus the cost of the internet as a percentage of per capita national income**  
 Source: World Bank

## 1.1 PREVIOUS RESEARCH

A number of reports on Telkom and its pricing behaviour have been conducted to date. A brief review of their conclusions follows.

### 1.1.1. YANKEE GROUP<sup>13</sup>

The Yankee Group report was prepared for the Department of Communications in December 2003, and is widely held to be the driving force behind the policy announcement made by the Minister of Communications, Ivy Matsepe-Casaburri, in September 2004. The report deals with the trend towards technological convergence in telecommunications, the domestic regulatory environment, and the current market situation, and concludes with specific recommendations on regulatory policy.

The report identifies anti-competitive behaviour in the telecommunications market as a central issue, and suggests that “there is a clear need to enforce existing legislation and competition law more effectively”, as regards Telkom’s behaviour in the Value Added Network Services (VANS) industry. Specific mention is made of Telkom’s pricing of wholesale services, and the need to enforce anti-competitive conduct rules in the wholesale market. Furthermore, the Independent Communications Authority of South

<sup>13</sup> Finnie et al 2003, p1.

Africa (ICASA) is characterised as lacking the capacity and financing required to perform its regulatory role adequately.

The Yankee Group report linked fairly low levels of internet penetration in South Africa to the high cost of connectivity. On business internet and data services, the report suggests that Telkom's Digital Subscriber Line (DSL) offering has been structured specifically so as to protect legacy data services, including frame relay and dial-up Public Switched Telephone Network (PSTN) and Integrated Services Digital Network (ISDN). Because DSL infrastructure can be used as a means of delivering Voice Over Internet Protocol (VOIP), it also functions as a threat to legacy voice products. Because of this potential threat, the report suggests, Telkom has structured its DSL offering so that it can not adequately replace business leased lines or Integrated Services Digital Network (ISDN), in terms of security, throughput or predictability.

#### **1.1.2. NUS CONSULTING<sup>14</sup>**

NUS Consulting is an international consulting firm with a branch in Johannesburg. In March 2004 it released a telecommunications report on cost conditions in the fourteen countries in which it operated. It found that South Africa had the second most expensive local calls, the most expensive national and international calls, the fifth most expensive mobile calls and was the ninth most expensive on 5km T1/E1 leased lines.<sup>15</sup> The sample of countries used was however simply a reflection of the NUS operating environment, and as such was not a particularly good comparison with South Africa. The countries included were largely European, together with Canada, the US and Australia.

#### **1.1.3. TARIFICA**

Shortly after the NUS Consulting report became public, Telkom released excerpts from a Tarifica report that seemed to suggest that Telkom's prices were in fact reasonable. Unfortunately, the body of the report was not publicly available, as the report was conducted by Tarifica on a confidential basis for a single client (with the identity of that client also being confidential).

The report analyses Telkom's pricing structure against a sample of twenty-six countries. Without access to the body of the report, it is not possible to interpret why the particular sample of countries was chosen. Some points are however worth noting. The sample only includes two of the countries which we have identified as international best practice countries, namely Sweden and Norway (see Appendix 1 for further details).

<sup>14</sup> NUS Consulting, March 2004.

<sup>15</sup> A T1 line has a speed of 1.5mbps, and an E1 line has a speed of 2mbps.

Only three of the countries chosen have a lower GDP per capita than South Africa, and only Turkey and South Africa are not European. Given these sample characteristics, it is thus perhaps not too surprising that Telkom's pricing structure compares fairly well.

Findings include the following:

- On local peak calls, Telkom is 15<sup>th</sup> most expensive out of 26.
- On local off-peak calls, Telkom is 3<sup>rd</sup> cheapest.
- On long distance calls, Telkom is 14<sup>th</sup> most expensive in peak times and 19<sup>th</sup> most expensive in off-peak times.

Similar results are achieved on installation and rental costs. Telkom did not release any results on comparisons of data line costs, so it is impossible to know whether the report contained any such results.

Telkom also released a short report by Tarifica comparing South African international call rates against a sample of four other African and Middle Eastern countries, namely Bahrain, the United Arab Emirates, Saudi Arabia and Namibia. The results suggest that South Africa's international call rates are among the lowest in this group. However, we would argue that it would be more appropriate to compare the prices of a basket of Telkom's services, rather than to isolate single services for comparison.

#### **1.1.4. EFFICIENT RESEARCH<sup>16</sup>**

Efficient Research was contracted by Solidarity in 2004 to provide a report on Telkom's charge structure, and a comparative analysis of Telkom's financial statements.<sup>17</sup> Efficient Research found Telkom's price structure to be very high. Using a sample of approximately thirty developed and developing countries, the cost of a 3-minute peak time local phone call was found to be the fourth most expensive in the sample. On a sample of seven countries, South Africa was found to have the most expensive 24-month Asymmetric Digital Subscriber Line (ADSL) contract.

<sup>16</sup>The report's limitations are acknowledged by its authors, who admit that "we conducted our research and concluded the report within a period of two weeks which is totally insufficient to come to well researched conclusions. Furthermore, a general lack of information as well as difficulties in comparability also hampered a clearer result."

<sup>17</sup>Ibid, p 1.

## 2. METHODOLOGY

Our focus in this paper is to compare prices in South Africa with prices in international markets.<sup>18</sup> Therefore South African telecommunications pricing should be compared both to overall best practice countries and to best practice countries with similar characteristics, including input costs, geographical dispersion of population, income dispersion and level of development.

Report compares South African prices with international best practice.

- Input costs: input costs vary between countries. For example, labour costs in the developing world are typically lower than in the developed world, which would make it more expensive to provide labour-intensive telecommunication services in developed countries. Capital-intensive telecoms services, in contrast, may be cheaper in the developed world where capital is more plentiful.
- Geographical dispersion: providing telecommunication services is cheaper per customer when customers are concentrated. For instance, it is relatively cheaper to provide telecommunications services in Hong Kong or Singapore due to their high population density levels.
- Income dispersion: high levels of income inequality in South Africa typically complicate any international comparison process. As service providers essentially have to deal with a number of very different markets, segmented by income, the argument could be made that their cost structure is inherently higher than in more equal income distribution countries.

Uncompetitive telecommunication markets have artificially high prices which make them a poor measure of whether South Africa's prices are relatively high. Furthermore, in contrast to South Africa, countries with highly regulated telecommunication sectors often increase prices for business in order to cross-subsidize other customers.

In order to identify an appropriate peer group, an index of telecommunications competitiveness was constructed. The lower the cost of telecoms services, and the greater the roll-out of those services, the higher the index score a country received. Countries which performed particularly well given their level of PPP-adjusted income per capita were then defined as "best practice" countries. Details of the construction of the index are provided in Appendix 1.

<sup>18</sup>Part of the complexity of analysing South African telecommunications is that data on the cost of providing services is hard to come by. In fact, ICASA itself only gained access to Telkom's regulatory accounts, which contain costing information, in late 2004. In the absence of this data, it is substantially more difficult to determine whether or not Telkom's price structure is reasonable. In the absence of detailed cost data, an international price comparison is a useful way of establishing whether Telkom is over-charging.

Table 2 shows the countries selected. Hong Kong, Canada, Israel, Norway, Singapore, Sweden, South Korea and the US represent international best practice, and are coincidentally also all high income countries. India, Brazil, Thailand and Malaysia represent peer group best practice, and Morocco is chosen to ensure an African contribution to the sample. The Philippines is included as it is widely regarded as having call centre industry potential.

	PPP-adjusted GDP per capita US\$	Population size	Population density per sq km	Gini coefficient
<b>South Africa</b>	10,000	45.3	37.1	59.3
<i>International best practice</i>				
<b>Canada</b>	29,003	31.6	3.4	33.1
<b>Hong Kong</b>	26,845	6.8	6,554.6	43.4
<b>Israel</b>	19,194	6.7	324.4	35.5
<b>Norway</b>	32,797	4.6	14.9	25.8
<b>Singapore</b>	24,389	4.3	6,967.2	42.5
<b>Sweden</b>	25,985	9.0	21.8	25.0
<b>South Korea</b>	19,497	47.9	485.3	31.6
<b>United States</b>	35,992	291.0	31.8	40.8
<i>Peer group best practice</i>				
<b>Brazil</b>	7,559	176.6	20.9	58.5
<b>India</b>	2,538	1,064.4	358.0	32.5
<b>Malaysia</b>	8,591	24.8	75.4	49.2
<b>Morocco</b>	3,844	30.1	67.5	39.5
<b>Philippines</b>	4,487	81.5	273.3	46.1
<b>Thailand</b>	6,937	62.0	121.4	43.2

**Table 2: International comparison countries**

Source: World Bank, Nationmaster.com

Of the countries selected, Brazil is probably the best comparison in terms of PPP-adjusted GDP per capita, population density and income inequality. Six of the fifteen comparison countries have lower PPP-adjusted GDP per capita than South Africa, and eight have a smaller population. South Africa has the highest income inequality in the sample.

## 2.1. PRODUCT COMPARISON

We examined pricing levels on a product-by-product basis in the countries selected. The product range was chosen with a bias towards services used by smaller businesses, with fairly small bandwidths chosen for the representative data products. Prices tend to be more standardised for small businesses, as they have less negotiating power, and the small business environment tends to be disproportionately important for growth and employment.<sup>19</sup>

For all the products examined, prices were measured in both US dollar and PPP terms.<sup>20</sup> US dollar prices are preferable where business is competing in international markets because they indicate whether or not South African businesses are at a cost advantage or disadvantage vis-à-vis their foreign competitors. PPP better reflects how affordable the service is relative to prices in the economy as a whole, and is thus a better indicator of domestic take-up.

Products were categorised roughly as voice or data, and business or retail (with VOIP, where voice is sent over a data line using the internet, representing a convergence between voice and data). Prices were then collected as follows:

- **Data, business and retail:** monthly fees on business broadband<sup>21</sup>; annual fees on domestic leased lines<sup>22</sup>; annual fees on international leased lines<sup>23</sup>; monthly fees on consumer broadband<sup>24</sup>; and ISP monthly fees.
- **Voice, business and retail:** business peak tariffs on fixed, mobile and international calls; monthly fees on mobile and fixed line business packages; off-peak tariffs on fixed, mobile and international calls; monthly fees on mobile and fixed line retail packages.

<sup>19</sup>The choice of products was also influenced by the industry interviews detailed in section 5. Given the widespread concern over international bandwidth prices evidenced at the interviews, particular focus was given to gathering price data for that product range. As the pricing of the ADSL broadband offering was also typically viewed as problematic, price data was gathered for ADSL as well. However, on other data products, we took the view that bandwidth was the product ultimately being acquired, and therefore that the specific technology used to deliver that bandwidth was not crucial. Although this may be a fairly contestable assumption, it greatly simplified the price comparison process.

<sup>20</sup>US\$ prices were calculated at the average exchange rate prevailing in the year ended 28 February 2005. PPP factors were sourced from the World Bank. Both are shown in Appendix 2.

<sup>21</sup>ADSL packages of approximately 512kbps (downstream) or more.

<sup>22</sup>E1 lines (ie: 2mbps), over a distance of 10km or under.

<sup>23</sup>E1 lines terminating in the US, or in the case of the US, terminating in the European Union.

<sup>24</sup>ADSL packages of approximately 512kbps (downstream) or more.

For the non-technical reader, some of the less common product types examined can be described as follows:

- **Broadband:** a broadband internet connection provides the user with substantially more bandwidth than an internet connection that utilises a standard (ie: an analogue) dial-up. This increases the speed at which the internet is accessed. Where an analogue connection will typically provide a maximum speed in the region of 50kbps, ADSL broadband in South Africa has a maximum speed of 512kbps. A number of different technologies can be used to provide a broadband connection, but the principal technology used in South Africa is ADSL.
- **Leased lines:** leased lines are used by businesses to transmit data and/or VOIP. Essentially they comprise a private line of a specified bandwidth connecting two points. Typically, a flat monthly fee for connection is charged, after which the lessee is able to use the full capacity of the line.<sup>25</sup>
- **Internet Service Provider (ISP) services:** provide customers with access to the internet “cloud”. The quality of internet access provided will depend upon the amount of domestic and international bandwidth the ISP has acquired, and how many customers share that bandwidth. Additional services such as web design, internet security or storage capacity may also be provided, often at an additional cost.

<sup>25</sup>Telkom has historically held a monopoly on the provision of leased line services. In September 2004, the Minister of Communications announced regulatory changes, to take effect on 1 February 2005, that should have ended this monopoly. However, recent press announcements by the Minister, which may or may not take precedence over the earlier announcement, have caused some confusion as to whether the Telkom monopoly remains or not.

### 3. IMPACT ON DATA SERVICES

The central finding of the price research was that data services are highly priced in South Africa. The pricing of international bandwidth in particular seems to be problematic, and unlikely to be justified by cost considerations on the SAT-3 cable (the South African Telecommunications Cable No. 3).

#### 3.1. BUSINESS DATA

Obtaining prices on business data services is a fairly complex task. In many circumstances, list prices do not reflect actual traded prices, as price negotiation may be commonplace in the market concerned. Product specifications also vary widely, so comparing like with like is not always possible.<sup>26</sup>

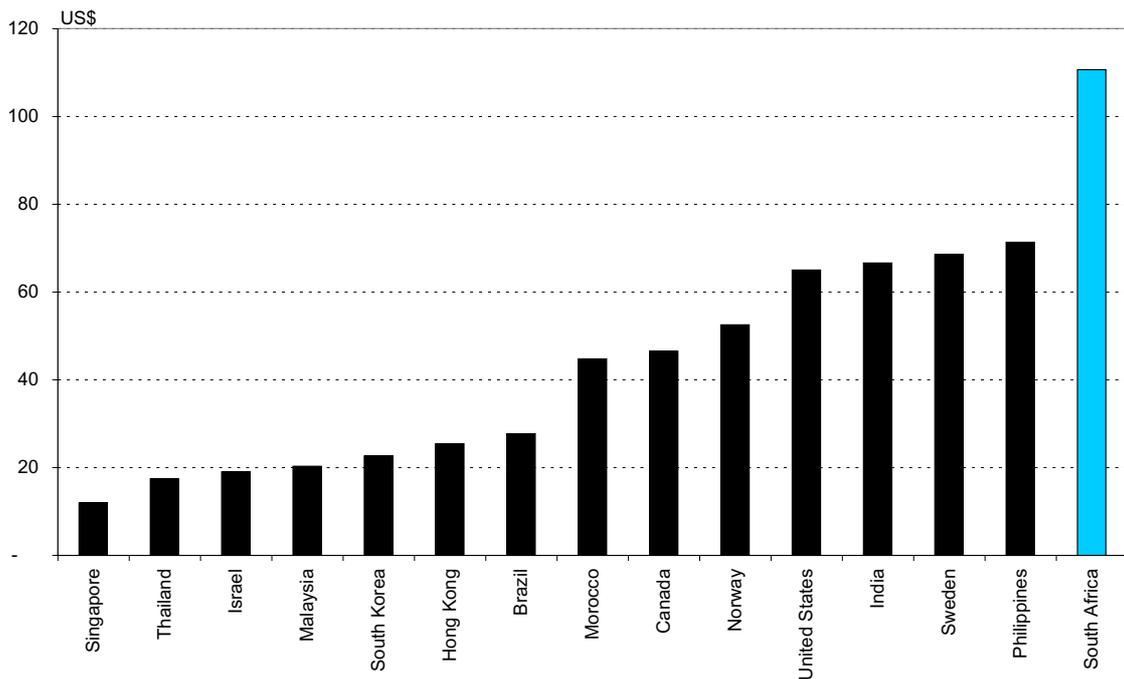
The graph below compares monthly fees on *ADSL broadband* with an average downstream speed of 512kbps or more. Despite the fact that a number of the products sampled have a substantially higher product specification than the Telkom ADSL offering, it was found that:

**South Africa's broadband was the most expensive of the sample group.**

- South Africa was the most expensive of 15 countries surveyed.
- South Africa was 9 times as expensive as the cheapest product.
- South African prices were 148% higher than the average price.

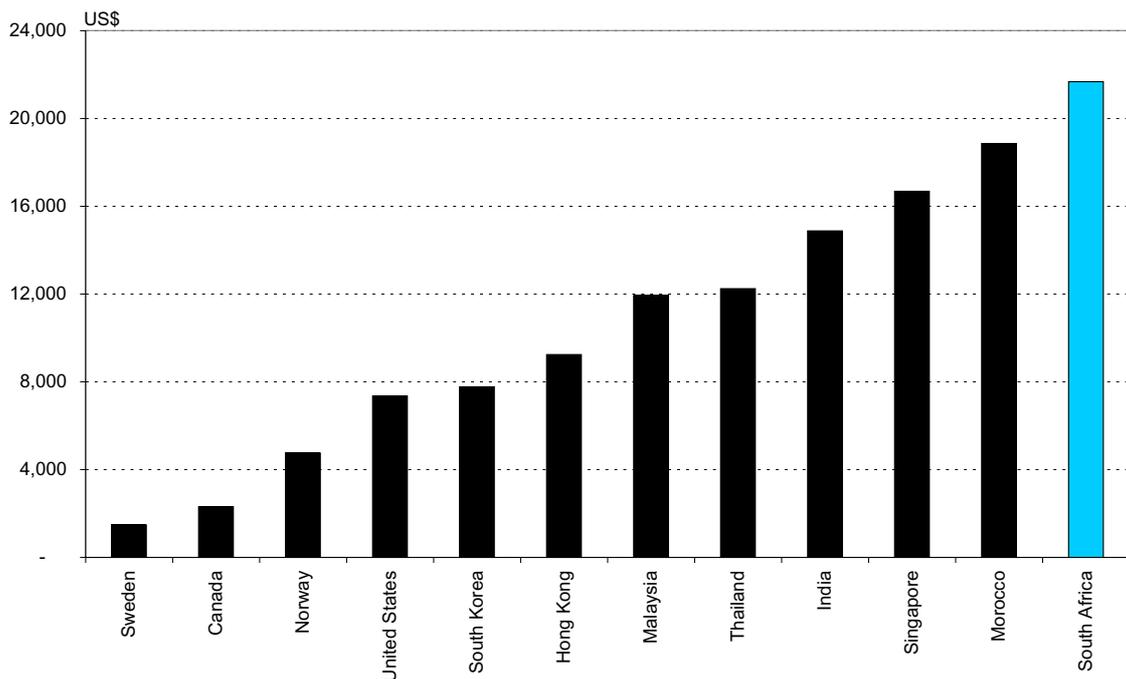
In addition, the price shown for South Africa excludes the ISP fee needed for ADSL connectivity (typically around R250 per month).

<sup>26</sup> The problem of comparing like with like is particularly acute when looking at business ADSL. At present, ADSL is only available in South Africa at a speed of 512kbps downstream and 256kbps upstream. We have used the Telkom ADSL prices, which are for a product which is capped at 3 gigabytes of international traffic. These product specifications are unusually restrictive when compared to international specifications, and it was not possible to match them in all comparison countries. Specifically, the following product speeds were included: Brazil 600kbps, Norway 704kbps, Sweden 1mbps, the US 1.5mbps, South Korea 4mbps, Hong Kong 1.5mbps, and Canada 3mbps. The remaining quotes are on 512kbps products.



**Figure 6: Business ADSL, monthly fee for approximately 512kbps**  
 Source: Company websites, telecommunications regulators websites, ICASA

*Domestic leased lines* are widely used for corporate data transmission, and are therefore an important part of corporate telecommunications purchases. However, because in many jurisdictions companies have substantial negotiating power on leased line prices, and prices obtained in this manner are then regarded as confidential, price comparisons in this market are fairly difficult. The prices used in the graph below are typically list prices, and may therefore tend to overstate actual prices. This is likely to be the case in South Africa as well, where anecdotal evidence suggests that large corporates in particular are able to negotiate on prices. All countries sampled represent an E1 or 2mbps circuit, connecting two points of not more than 10kms distance.



**Figure 7: Domestic leased lines, annual fee for 2Mbps under a distance of 10km**

Source: Company websites, telecommunications regulators websites, Telkom (telephonic quote for a circuit from the Melrose Arch interchange to the Benmore Gardens interchange)

Even given the above warning, it is still suggestive that **South Africa's prices are the most expensive of the domestic leased line prices sampled.**

Domestic leased line prices were 102% more expensive than the average price.

- South Africa was the most expensive of 12 countries surveyed.
- Its price was almost 15 times the cheapest price.
- It was 102% higher than the average price.

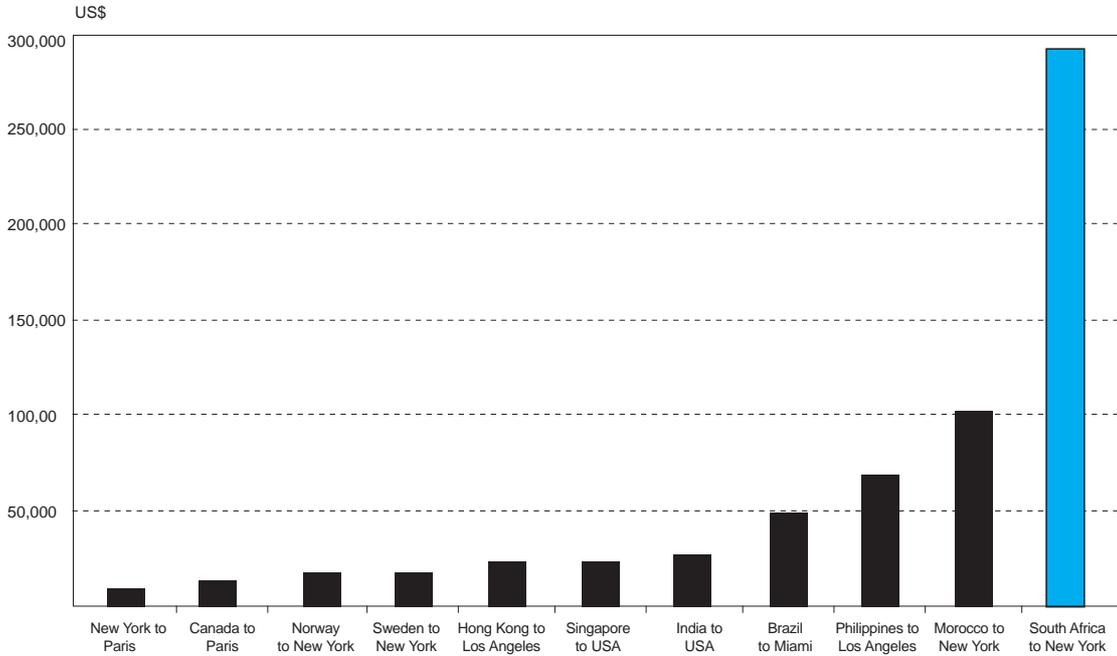
The most startling price comparison though is that of **international leased lines** shown in Figure 8 below.

- South Africa was the most expensive of 11 countries surveyed.
- It was 31 times as expensive as the cheapest country.
- South Africa was 399% as expensive as the average price.

In fact, South African prices were almost 3 times as high as the next most expensive country. In addition, anecdotal evidence suggests that Telkom does not allow price negotiation on international bandwidth prices, so the health-warnings applicable on the

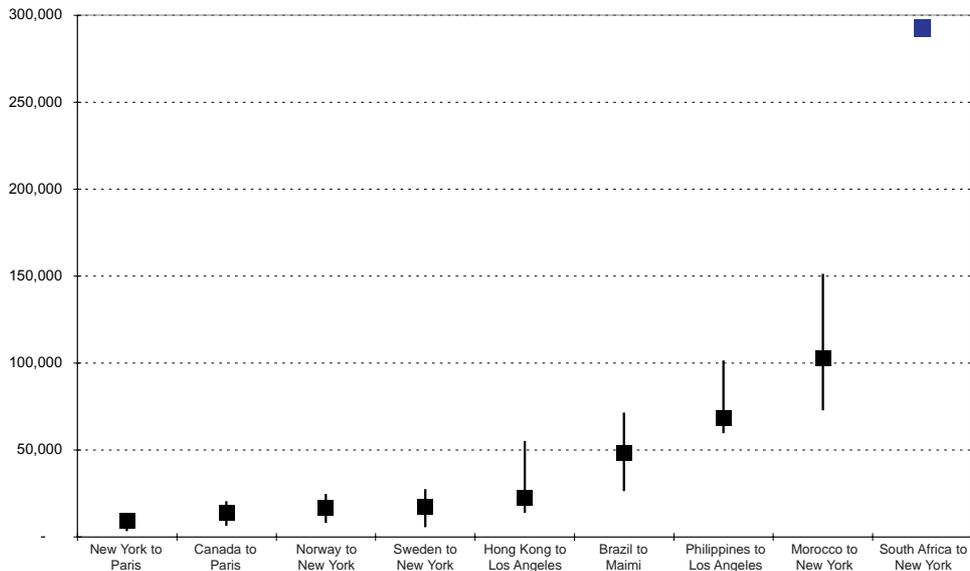
domestic leased line data do not affect the international leased line data. The other prices used in the graph also reflect actual market quotes rather than list prices.

International leased line prices were 3 times as high as the next most expensive country.



**Figure 8: International leased lines, annual fee for 2Mbps**  
 Source: Primetrica, telecommunications regulators websites, Telkom website

The graph above is based largely on data from Primetrica's Bandwidth Pricing Database Service. Prices shown represent the un-weighted arithmetic mean of all market quotes for 2004. It is, however, also instructive to examine Telkom's price performance relative to the range of prices in each market, as shown in the graph below. As can be seen, **Telkom's prices are roughly twice the next highest price quoted.**



**Figure 9: Range of international leased line prices**  
 Source: Primetrica, Telkom

## **BOX 1: INTERNATIONAL BANDWIDTH PRICES**

It seems unlikely that the cost of South African international bandwidth can be justified by some unique cost factor. South Africa is by international standards a fairly long-haul route, and is serviced by the SAT-3/West Africa Submarine Cable (WASC) and South African Far East (SAFE) cable systems. The cables were jointly financed by a consortium of 36 telecommunications companies, at a total cost of US\$650 million, and with a system design life of 25 years. Telkom is the largest capacity owner of all consortium members, with rights to approximately 20% of the combined capacity of SAT-3/WASC and SAFE, and has a monopoly on the cable landing rights in South Africa.<sup>27</sup>

Once the initial sunk cost of laying a submarine cable system has been made, it cannot be recovered. In order to maximise returns on a cable system, therefore, its operators typically attempt to “light” the cable as quickly as possible, by on-selling bandwidth. It is thus interesting to note how far from potential capacity SAT-3/WASC and SAFE are operating. Given current technology, and the appropriate switching infrastructure, it is possible to increase system capacity on SAT-3/WASC to 120Gbs and on SAFE to 130Gbs. At present both systems are operating at 40Gbs.

A simple back-of-the-envelope calculation suggests that there is a lot of room to decrease prices as they currently stand, without endangering Telkom’s return on investment. The total initial investment on SAT-3/WASC and SAFE was US\$650 million, which Telkom was partially liable for (given that Telkom has rights to about 20% of system capacity, it seems reasonable to assume that they were liable for approximately 20% of the total investment). At an annual price of approximately US\$0.3 million per 2mbps line, Telkom would need to sell about 2 200 2mbps private lines, or about 11% of total line capacity of 40Gbs, to cover the total initial investment of US\$650 million in only one year.

It does not seem likely that this pricing structure can be justified by operating conditions. Although Telkom has invested in upgrades to switching equipment on the submarine cable, and has presumably incurred some maintenance costs, the initial investment should comprise the bulk of its capital outlay. Customers buying bandwidth in larger quantities than 2mbps will receive some level of bulk discount, but customers buying smaller bandwidth will conversely be charged more. Finally, there is more than enough bandwidth remaining on the line to hold voice traffic. SAT-3 can handle 5.8 million simultaneous voice calls. In the year ended March 2004, Telkom only handled 427 million minutes of international voice traffic, or 1.2 million minutes a day. Given the strong assumption that Telkom’s international bandwidth prices cannot be justified by cost conditions, this raises the spectre of excessive pricing.

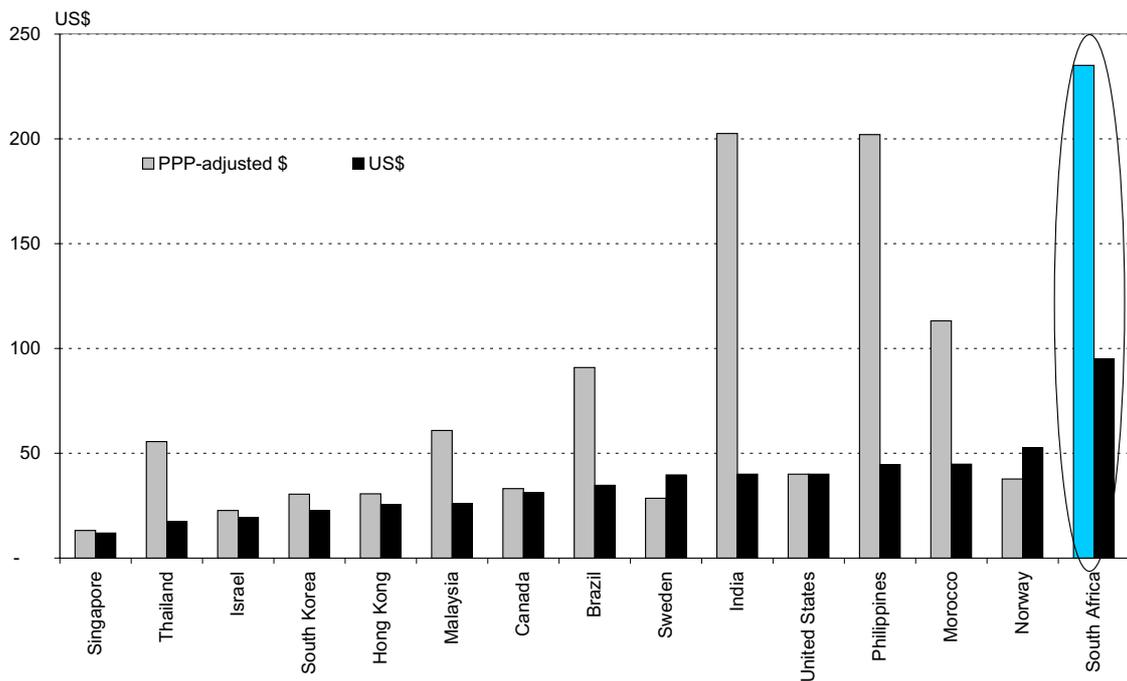
<sup>27</sup>September 2003, pp 54-57.

### 3.2. RETAIL DATA

South African retail prices for internet services do not compare well internationally. The graph below illustrates that **South African ADSL broadband:**

- is the most expensive of the 15 countries surveyed (in both US\$ and PPP terms).
- is 8 times the cheapest product surveyed.
- is 139% higher than the average price.

The ADSL price quoted does not include the ISP fee which is also necessary for ADSL connectivity, which would add approximately R250 to the monthly fee.



**Figure 10: Retail ADSL, monthly fee for 512kbps**

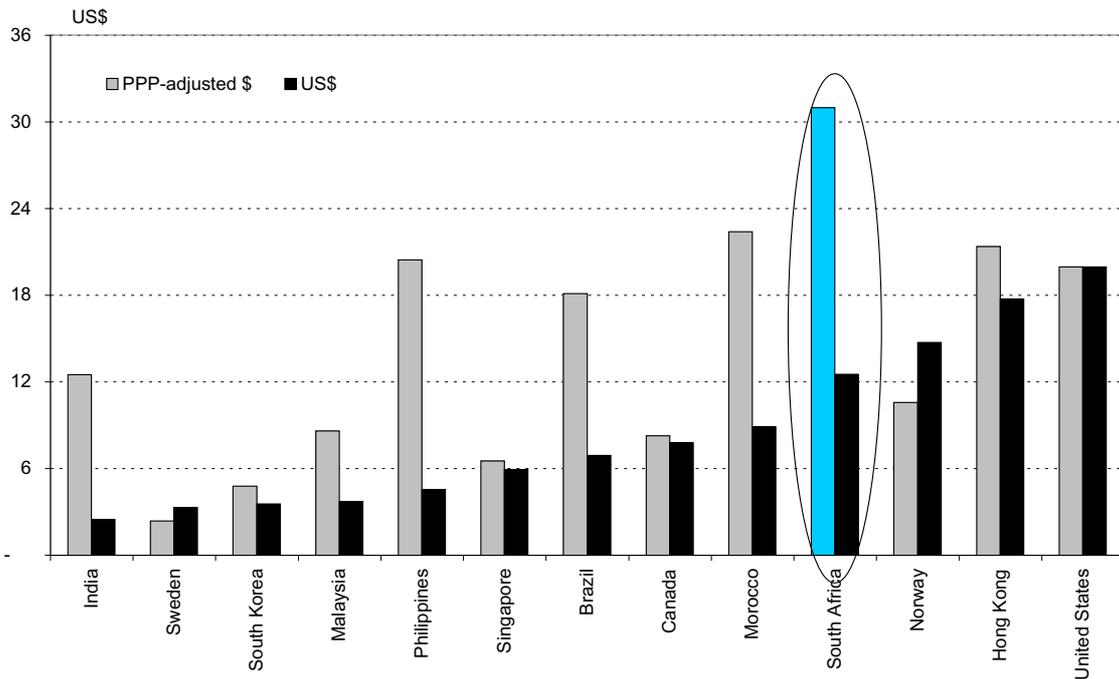
Source: Company websites, telecommunications regulators websites, ICASA, ITU

Despite high levels of competition in the ISP industry, **South Africa's monthly ISP fees are nevertheless the highest on a PPP-adjusted basis in the comparison group, or 13 times as expensive as the cheapest country surveyed on a PPP basis.**

South Africa's ISP fees were the highest on a PPP-adjusted basis.

On a US dollar basis they are:

- 4<sup>th</sup> most expensive out of 13 countries surveyed.
- 5 times as expensive as the cheapest product.
- 45% more expensive than the average price.



**Figure 11: ISP monthly fees**

Source: Company websites, telecommunications regulators websites, ICASA, ITU

The ISP industry, however, must acquire telecommunications services from Telkom. Industry insiders suggest that costs and charges due to Telkom comprise R33-R42 per month per internet connection, with the bulk of the fee attributable to purchases of international bandwidth. Considering that the average ISP fee is approximately R100 per month after VAT, these costs are sufficient to substantially affect pricing structure. On broadband ISP fees, which are typically in the region of R250 per month, the cost to the ISP of bandwidth acquired from Telkom is apparently in the region of R190 per month.

## 4. IMPACT ON VOICE SERVICES

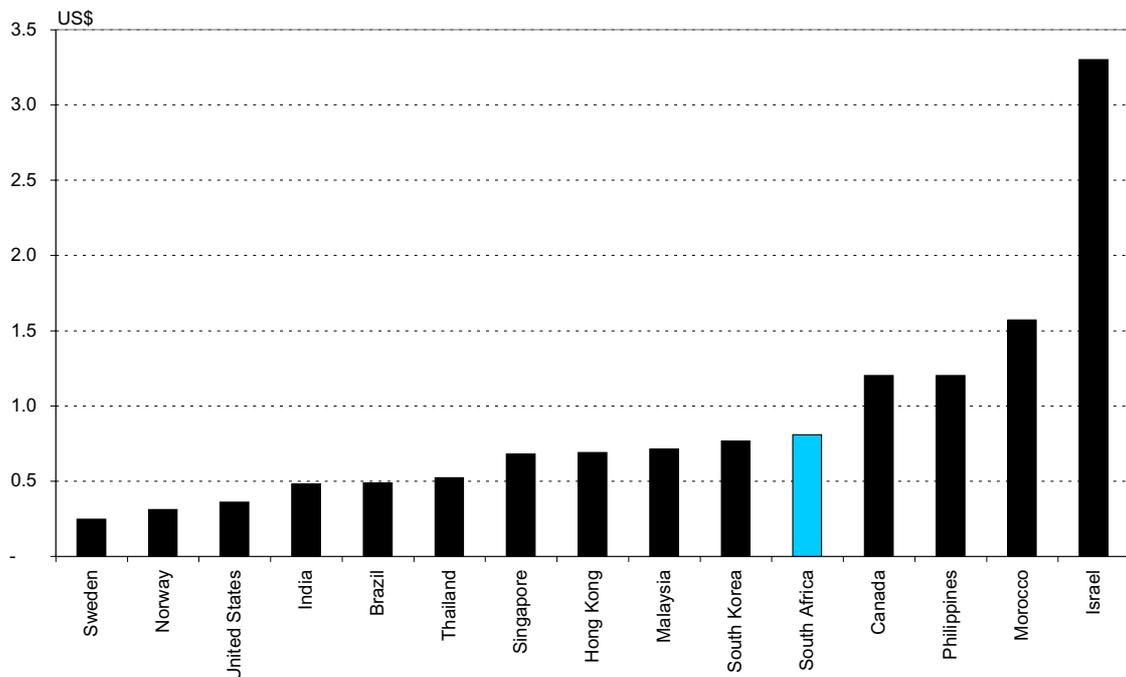
In international voice call costs, Telkom's pricing compares well internationally. However, as this is the segment of the voice market in which the company is most likely to face competition, it is perhaps not surprising that this is where prices are competitively structured. On other products, call costs look fairly high, particularly in PPP terms.

In international voice call costs, Telkom's pricing compares well internationally.

### 4.1 BUSINESS VOICE

As shown below, **South Africa performs fairly well on the cost of international calls:**

- It is the 5<sup>th</sup> cheapest of 15 countries surveyed.
- Only 3 times as high as the cheapest product.
- It is 14% lower than the average price.



**Figure 12: International calls, cost of a 3 minute call to the US**

Source: Company websites, telecommunications regulators websites, ICASA, ITU

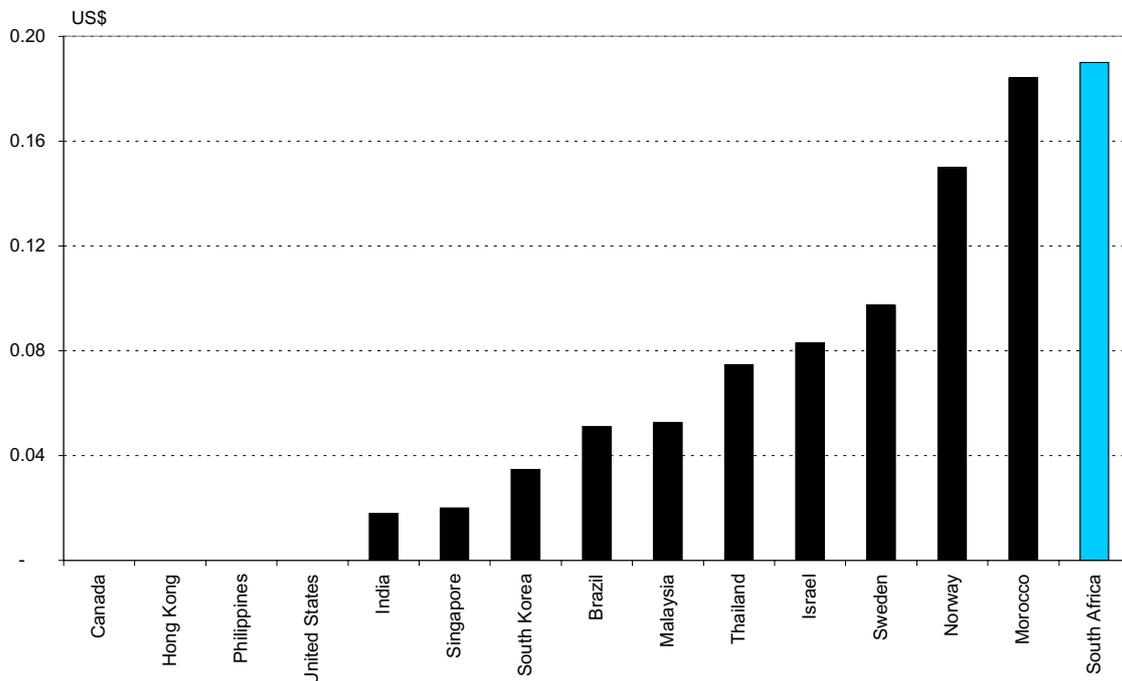
This is beneficial for domestic businesses which make fairly limited use of international voice services, and thus have no incentive to make a possibly expensive transition to VOIP. However, in businesses which make extensive use of international voice, the high cost of international bandwidth will continue to keep VOIP call costs above international levels.

A strong argument can however still be made that international calls in South Africa are over-priced. The fact that it is typically cheaper to call South Africa from an international

destination than to call that destination from South Africa is itself suggestive.<sup>28</sup>

Part of the reason that international call costs compare fairly favourably is that Telkom has undertaken a large scale tariff rebalancing since 1997. The ultimate result of the rebalancing has been to make local calls very expensive by international standards, as shown in the graph below. **Peak local calls in South Africa were:**

- the most expensive of 15 countries surveyed.
- almost 11 times as expensive as the cheapest product.
- 199% more expensive than the average price.



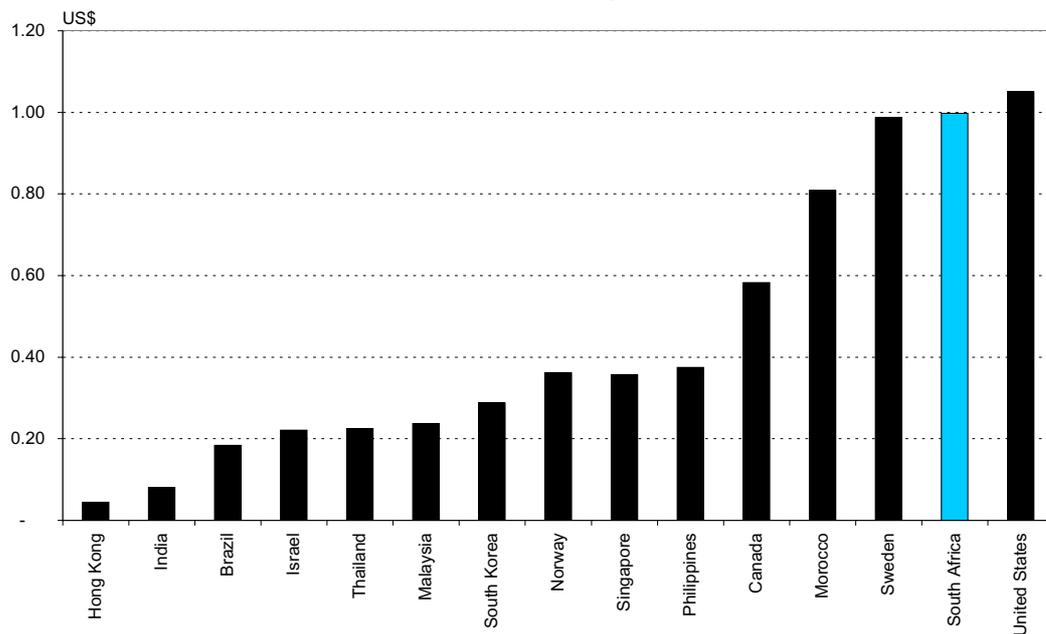
**Figure 13: Fixed line local calls, cost of a 3 minute call in peak times**  
Source: Company websites, telecommunications regulators websites, ICASA, ITU

Mobile-to-fixed call costs are to some extent affected by the price of termination onto the fixed line network. In addition, mobile operators are at present dependent on Telkom for the leased lines necessary to link mobile phone towers to the national telecommunications backbone. Therefore Telkom's pricing structure does impact on the ability of the mobile phone operators to price competitively.

<sup>28</sup> The profitability of the call-back model is probably the clearest argument to be made that international calls are still over-priced. The call-back model works as follows: when the South African user of the service calls an international number, a digital dialer recognises the number as being international, and immediately makes an unanswered call to an international service provider. The international service provider then automatically calls back the South African caller, and calls the final destination, and then connects the two calls. This model is fairly widely used by South African corporates, even though the caller can experience a significant delay as the various legs of the call are finalised, and quality may sometimes be impaired. The significance of the call-back model, however, is that even though two separate international calls are made to complete the single original call, the product can still be offered at a substantial discount to a Telkom call. In fact, when calling the US, market participants suggest that it is possible to offer a 70% discount on Telkom rates and still make a healthy profit margin.

However, there is also reason to suspect that price competition among the mobile network operators is not aggressive. Telkom owns 50% of Vodacom, which in turn controls the network on which Cell C operates (although Cell C is in the process of rolling out its own base station network, and plans to have 2 334 base stations by the end of 2005).<sup>29</sup> As discussed in section 5.2 below, simultaneous negotiation of interconnection fees among the three mobile operators and one fixed line operator is likely to decrease active competition on price. **South Africa's mobile call costs were:**

- 2<sup>nd</sup> most expensive out of 15 countries surveyed.
- almost 23 times as expensive as the cheapest product.
- 107% more expensive than the average price.



**Figure 14: Mobile calls, cost of a 3 minute call to a fixed line in peak times**  
 Source: Company websites, telecommunications regulators websites, ICASA, ITU

#### 4.2. RETAIL/OFF-PEAK VOICE

When examining prices on retail telecommunications products, it may be appropriate to include some analysis of the PPP-adjusted relative price. PPP prices are a better reflection of the affordability of the product for the consumer, and high PPP prices are likely to be associated with lower penetration levels. This is illustrated in Figure 3 and Figure 5 in section 1.

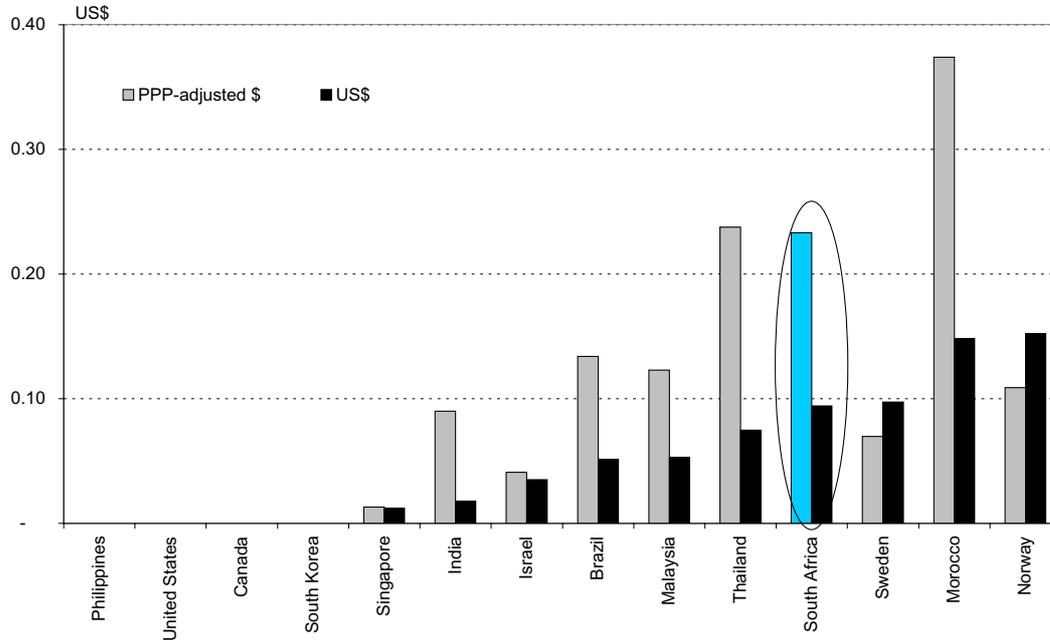
In US\$ terms, price performance on local calls were as follows:

- 4<sup>th</sup> most expensive out of 14 countries.
- almost 8 times the cheapest price found.
- 79% higher than the average price.

<sup>29</sup><http://www.cellc.co.za/renderxml.asp?sectionpage=latestheadlines&ANo+65>, 4 November 2004.

**If PPP adjustments are used, South Africa's performance deteriorates to third most expensive, or 129% more expensive than the average price.**

**On a PPP-basis, off-peak local calls are 129% more expensive than the sample price.**



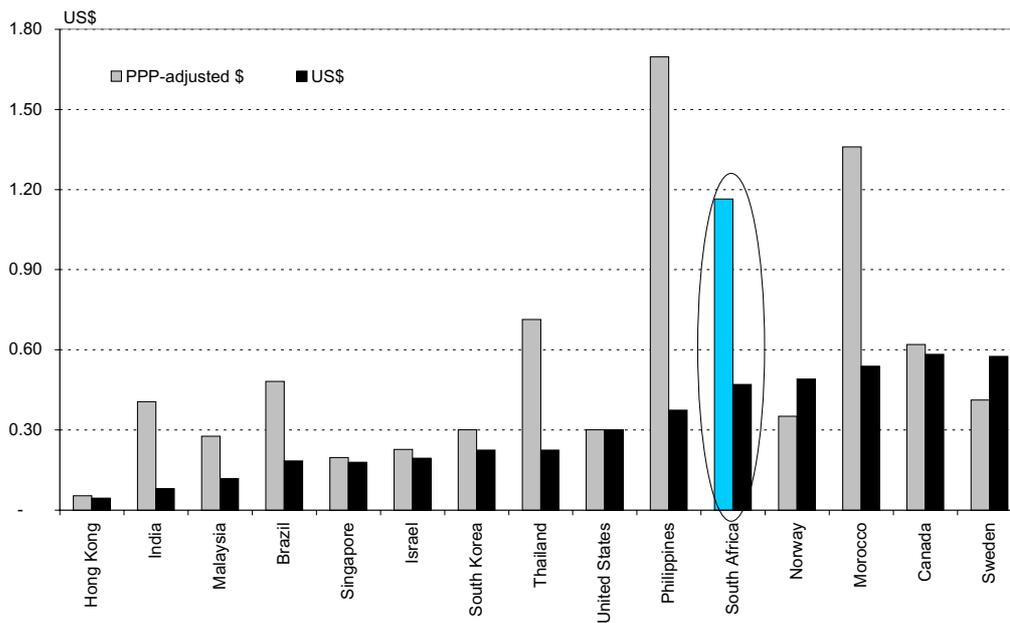
**Figure 15: Fixed line local calls, cost of a 3 minute off-peak call**  
 Source: Company websites, telecommunications regulators websites, ICASA, ITU

South Africa's relative position on off-peak mobile call costs is a little better. In US\$ terms:

**Off-peak mobile calls are 104% more expensive than the PPP-adjusted average.**

- South Africa is 5<sup>th</sup> most expensive out of 15 countries.
- It is almost 11 times as expensive as the cheapest product.
- South Africa is 37% more expensive than the average price.

**In PPP terms, our relative position rises to third most expensive (and 104% more expensive than the average PPP-adjusted price).** Our mobile and local call cost structures therefore are high enough to be a key factor in restricting phone penetration levels.



**Figure 16: Mobile calls, cost of a 3 minute off-peak call**  
Source: Company websites, telecommunications regulators websites, ICASA, ITU

The price findings are summarised in the table below. The higher the rank, the more expensive the product. As can be seen, South Africa has the most expensive product in 5 of the 10 product ranges surveyed. In only one category (business international calls) are South African prices lower than the average price surveyed.

	Rank	Out of: (number of countries surveyed)	Number of times more expensive than the cheapest price	% greater than the average price
Business ADSL	1	15	9.3	147.7%
Domestic leased lines	1	12	14.7	101.5%
International leased lines	1	11	31.4	398.6%
Retail ADSL	1	15	8.0	139.2%
ISP fees	4	13	5.1	45.3%
Business - local calls	1	15	10.7*	198.5%
Business - international calls	5	15	3.3	-13.6%
Business - mobile calls	2	15	22.7	106.8%
Retail - local calls	4	14	7.9*	79.3%
Retail - mobile calls	5	15	10.7	37.2%

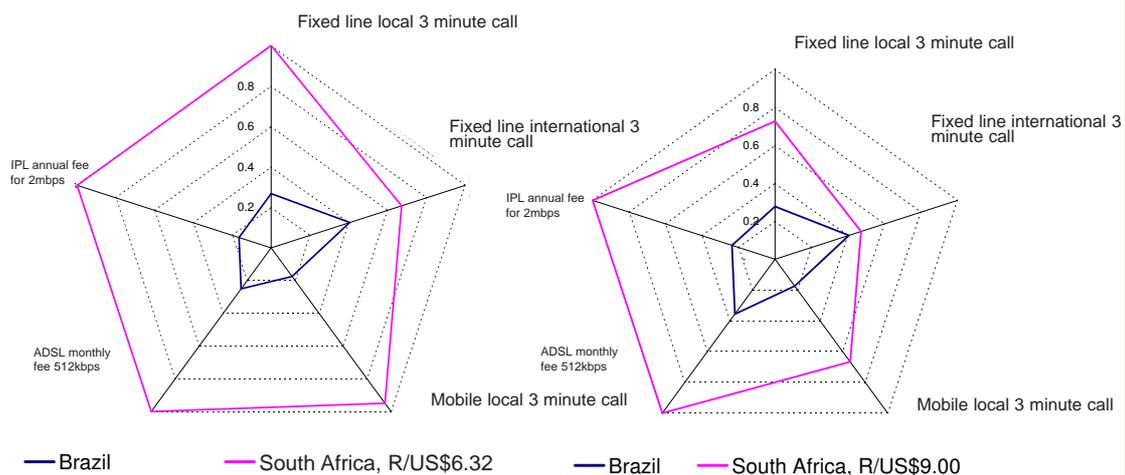
**Table 3: Summary of cost findings**  
Source: Company websites, regulator websites, Primetrica.

\*In some of the countries surveyed, the lowest price in these products was zero. Therefore the number in the table reflects the number of times more expensive South Africa is than the lowest non-zero price.

## BOX 2: CROSS-SUBSIDIZATION AND EXCHANGE RATE ISSUES

Two potential defences of South Africa's telecommunications pricing structure are cross-subsidization and rand appreciation. If Telkom is pricing aggressively in the business sector, for example, but using those returns to cross-subsidize poorer consumers, then it may be more appropriate to examine price performance on a basket of goods, rather than item by item. The substantial appreciation of the currency seen recently may also affect affordability on a US\$ basis.

In the graphs below, we examine South Africa's price performance on a basket of business goods, at the average exchange rate for the year ended 28 February 2005 (R/US\$6.32), and at a hypothetical exchange rate of R/US\$9.00. For each product, prices have been normalised so that the most expensive product in each product group has a price of one. The comparison country chosen is Brazil, which is the member of the comparison group which most closely resembles South Africa in terms of income inequality, geographical dispersion, and income per capita.



**Figure 17: Brazil - South Africa comparison, price on all items normalised to 1, average exchange rate for the year ended February 2005**  
Source: Company websites, ICASA, ITU

**Figure 18: Brazil - South Africa comparison, prices on all items normalised to 1, R/US\$9.00**  
Source: Company websites, ICASA, ITU

Figure 17 illustrates that at an exchange rate of R/US\$6.32, South Africa has the most expensive product of the sample group for three products (ADSL broadband, International Private Lines ("IPL") and local calls), and Brazil is less expensive than South Africa on all products. In Figure 18, the exchange rate is adjusted to R/US\$9.00. Although South Africa is no longer the most expensive country of the sample group for local calls, it remains more expensive than Brazil for all products. Cross subsidization and rand appreciation therefore do not explain South African telecoms prices.

## 5. THE IMPACT ON BUSINESS IN SOUTH AFRICA

In this section we consider the position of South African industries that rely heavily on telecommunications services. We identified five industries that rely extensively on telecoms inputs, namely the VANS industry, the mobile operators, financial institutions, the call centre industry and internet-based businesses (in other words, the South African dot coms).

### 5.1. VANS INDUSTRY<sup>30</sup>

The VANS industry is affected both by Telkom's pricing structure and by its role in the VANS market. VANS compete with Telkom on most of the services they provide, and allege that Telkom has been able to use its supply monopoly to place pressure on VANS' competitive position in the market. It is claimed that the fact that Telkom is now the largest service provider in many VANS markets is largely as a result of its use of these practices.

The interface between Telkom and the VANS can be illustrated by examining the ISPs. An ISP's subscribers typically all share the same bandwidth, and contend for capacity on that bandwidth. If the bandwidth is over-contended (in other words, if too many subscribers are using a connection with too little bandwidth), the speed of the connection drops. The ISPs claim that the high price of international bandwidth makes it difficult to provide a quality internet service at affordable prices. Because the bandwidth is so expensive, the temptation is to allow it to become over-contended, which results in a slow connection to international sites.

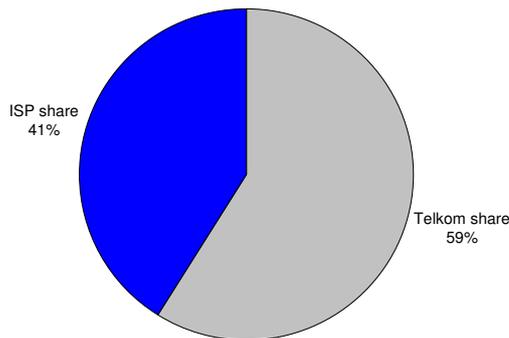
The ISPs also compete with Telkom's internet offering. Because Telkom does not have a separate internal wholesale department, Telkom's internet provider does not pay the same price for bandwidth as the independent ISPs. This implies that the competitive playing field in the ISP market is not level.

**The competitive playing field between the VANS and Telkom VAN services is not level.**

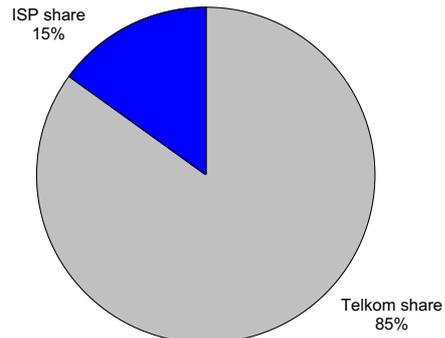
<sup>30</sup> ICASA's definition of a value added network service is "a telecommunications service provided by a person over a telecommunications facility, during which value is added for the benefit of the customers, which may consist of-

(a) any kind of technological intervention that would act on the content, format or protocol or similar aspects of the signals transmitted or received by the customer in order to provide those customers with additional, different or restructured information;  
(b) the provision of authorised access to, and interaction with, processes for storing and retrieval of text and data;  
(c) managed data network services" (www.icasa.org.za).

Increases in the price of *local phone calls* have impacted negatively on the retail market for internet service provision. The greater expense of spending time online has both decreased growth in the customer base of the ISPs, and put pressure on ISP fees. As shown in the graphs below, ISP fees comprise an increasingly small proportion of the cost of spending time online. During the period 1993 to 2003, ISP fees increased by an average of 2.3% a year, while the charge from Telkom of spending 20 hours online in peak times rose at 20.3% a year.<sup>31</sup>



**Figure 19: The relative contributions of ISPs and Telkom to the cost of spending 20 hours a month online in 1993 (peak times)**  
Source: ISPA



**Figure 20: The relative contributions of ISPs and Telkom to the cost of spending 20 hours a month online in 2003 (peak times)**  
Source: ISPA

The pressure on ISP fees can also be illustrated by examining the pricing of ADSL broadband. The monthly Telkom fee on a business ADSL connection is R699. In addition, the subscriber must acquire an ISP connection, at an average monthly cost of R250. The ISP pays Telkom R190 for bandwidth and R40 to conclude peering arrangements with South African Internet Exchange (SAIX) (needed to deliver email rapidly). Thus, on a product which costs a total of R949, Telkom keeps R929, leaving the ISP with R20 in revenue.<sup>32</sup>

**The greater expense of spending time online has decreased growth in the customer base of the ISPs, and put pressure on ISP fees.**

<sup>31</sup>Internet Service Providers' Association.

<sup>32</sup>Email correspondence with MWeb.

## 5.2. MOBILE INDUSTRY

The three mobile network operators rely heavily on the provision of services by Telkom and are thus vulnerable to Telkom's pricing structure. The cost structure of the mobile phone operators is affected by Telkom as follows:

- **Leased lines:** the majority of mobile phone calls are made between parties who are not within range of the same base station. In order to route calls between base stations, the mobile phone operators must make use of leased lines provided by Telkom.
- **Interconnection:** calls made on the mobile network to a landline or to an international destination have to be terminated onto or routed through Telkom. The mobile operator is thus affected by the termination fee charged by Telkom.

The cost of leased lines may be positively affected by the policy changes announced by the Minister of Telecommunications in September 2004, in terms of which the mobile operators should be able to self-provision (in other words, provide their leased line facilities themselves, rather than relying exclusively on Telkom – see discussion in section 6). Interconnection fees also remain an issue.

The cost of leased lines should be positively affected by the policy changes announced by the Minister of Telecommunications in September 2004.

It is by no means certain that competition among the mobile operators is strong. In fact, market participants suggest that all three mobile operators, together with Telkom, negotiate termination rates simultaneously. This to some extent is a result of the ICASA interconnection guidelines, which include:

- Non-discriminatory treatment: interconnection rates must be the same for all interconnection seekers.
- Maximum charges: interconnection fees can't be larger than the equivalent retail service.

In order to implement these guidelines, it is therefore probably necessary for some degree of co-operation in the negotiation of termination rates to take place. However, this kind of market contact greatly increases the risk of co-operation, and makes the case for effective price regulation quite pressing.

### 5.3. FINANCIAL INSTITUTIONS

Although telecommunications costs do not comprise a large proportion of financial services industry costs, telecommunications are essential to provide a number of critical services, such as customer contact and disaster recovery centres. Ensuring that systems have enough redundancy so that services can be maintained even if substantial infrastructural problems are experienced is another central concern.

On both data and voice, the central complaint of industry participants concerns the pricing of international services. On data in particular, apparently, it is impossible to obtain a bulk discount on international bandwidth, and in many instances pricing is simply

On both data and voice, the central complaint of industry participants concerns the pricing of international services.

prohibitively high. On domestic products, financial market participants confirmed that Telkom does offer discounts to large clients. However, they suggested that Telkom is typically more willing to offer discounts if they are allowed to manage a line end-to-end (for example, if they not only provide a Diginet line, but also the routing equipment for the line). They also suggest that it is easier to negotiate with Telkom in areas where it faces some competition, such as in the satellite market, where competition from Sentech seems to constrain Very Small Aperture Terminal (VSAT) prices.

### 5.4. CALL CENTRE INDUSTRY

The call centre industry relies heavily on data and voice products. The industry participants we spoke to identified two main issues:

- **Price:** our discussions took place before the deregulation of the VOIP market, when international VOIP calls had been made available to South African call centres, but in a fairly restrictive and costly way. All international calls had to be put onto the Telkom VOIP system by means of a Point of Presence (“POP”) in London. Therefore the cost of the call to London (which could be substantial if the client is based in Germany or the US for example) was over and above the cost of the VOIP call to South Africa. Finally, the VOIP call to South Africa itself remains fairly costly by international standards. This is simply a reflection of the high cost of international bandwidth in South Africa, and will remain an issue post-VOIP deregulation.
- **Service:** although Telkom’s response to technical faults was not seen as problematic, the company’s ability to provide structured bundles of telecommunications goods, innovative solutions and the necessary information on the product for the client to make an informed decision was seen as weak.

A key point emphasized by the interviews is that although VOIP offers call centres a way of bypassing the additional cost of long distance calls, for example, the industry must still face the obstacle of expensive *international bandwidth*.

**Cost of international bandwidth limits the cost savings that can be achieved by using VOIP.**

As long as Telkom retains a monopoly on the SAT-3 submarine cable, call centres must utilise that bandwidth for international calls. Although Sentech provides international bandwidth through satellite connections, this is not an option for the call centre industry. Voice, whether transmitted in VOIP format or not, is particularly sensitive to delays in transmission. Satellite technology is characterised by substantially longer delays than is cable, and is thus not an appropriate method for transmitting high quality voice communications.

## **5.5. INTERNET-BASED BUSINESSES**

Low levels of internet penetration in South Africa, associated with high telecoms prices, inhibit the growth of many internet-based businesses. Online publishers depend heavily on revenues from advertisements placed on their sites. If the online

**High telecoms prices, inhibit the growth of many internet-based businesses.**

market is quite small, the fee that can be charged for an online advert will be small, and the range of advertisements will also decrease (for example, mass market products like personal grooming products or food will not be advertised online). In the US, where the online community is substantial, internet advertising revenues comprised just over 3% of total advertising revenues in 2003.<sup>33</sup> In South Africa, in contrast, internet revenues comprise only 1% of total advertising spend.<sup>34</sup> The growth potential of online media is therefore curtailed by low internet penetration levels.

Internet-based businesses also rely on 24-7 connectivity in order to stay in contact with their clientele. Anytime transacting ability is often a key offering of e-commerce transacting models. Ideally, therefore, a number of these businesses would prefer to have access to a second telecommunications provider, operating off a completely separate backbone infrastructure, in order to minimise the risk of significant downtime.

<sup>33</sup>Internet Advertising Bureau, Internet Advertising Revenue Report, PricewaterhouseCoopers 2003 Full-Year Results, p 13.

<sup>34</sup>Neilsen Media Research, June 2004.

## 6. THE PROPOSED LEGISLATIVE CHANGES

The policy announcement by the Minister of Communications on 2 September 2004 should assist the introduction of much-needed competition into some sub-sectors of the telecommunications market. However, not all sub-sectors will be affected by the announcement, and some issues will require further clarification. A useful exercise at this stage is therefore to discuss both the implications of the legislative changes, and what the result in the market should be. Below we analyse the central policy changes announced.<sup>35</sup>

### 6.1. SELF-PROVISIONING FOR MOBILE OPERATORS

On self-provisioning by mobile operators, the announcement states that *“as of 1 February 2005 mobile operators may utilise any fixed lines that may be required for the provision of the service including fixed lines made available by Telkom or any other person providing a public switched telecommunication service”*.

The principal fixed line service used by mobile operators is the leased line network which connects mobile phone towers with the national telecommunications grid. At present, these lines must be leased from Telkom. From February 2005, the mobile operators can install lines themselves or rent lines from another operator (although it is probable that that operator will need to hold some form of telecommunications license).<sup>36</sup>

**Estel and Transtel already have a fairly substantial telecommunications infrastructure in place, and in addition, hold the rights of way to lay cable. They may therefore be a central beneficiary of this policy change,** as they will be able to on-sell their telecommunications facilities. It is not clear whether the mobile operators will be interested in laying cable themselves. Some price effects on leased lines should be seen, although as noted in section 3.1, domestic leased line prices are not the central issue in the business data environment.

### 6.2. PROVISION OF VOICE BY VALUE ADDED SERVICE PROVIDERS

The announcement states that *“as of 1 February 2005 value added network services may carry voice using any protocol.”* Any one of the over 120 licensed VANS should therefore be able to offer VOIP or other voice VANS in competition to Telkom (but not traditional voice).<sup>37</sup>

<sup>35</sup> Our analysis of the regulatory announcement relies heavily on a September 2004 memorandum by Lisa Thornton Inc.

<sup>36</sup> It is possible that unlicensed operators would be able to provide dark fibre, as the provision of dark fibre may not fall under the license definition of a telecommunications service.

<sup>37</sup> Lisa Thornton Inc. 2004, p 16.

VOIP offers companies substantial cost savings over traditional voice. Such savings are attributable to a number of factors, including:

- Call costs: industry participants estimate that VOIP is associated with a cost savings of 40-50% on a typical basket of local and international calls.
- Infrastructure costs: instead of running both a PABX (Private Automatic Branch Exchange) system and a server, VOIP can be run off the server alone. Savings on infrastructure costs are therefore possible. Mitigating against these savings, however, is the current high cost of VOIP-enabled handsets.
- Personnel costs: if only one pipe is needed to transmit both voice and data, a savings on personnel costs is likely.
- Bandwidth costs: VOIP calls use substantially less bandwidth than traditional voice calls, and thus imply a savings on total bandwidth costs.
- Administration costs: VOIP has a number of administrative advantages, in terms of remote system management and greater flexibility, for example on changing the location of extension numbers. Industry participants estimate that in managing a corporate telecommunication network a cost savings of 40-50% on adds, moves and changes is possible.

However, the implementation of VOIP systems is not necessarily without its drawbacks. Industry participants who are in the process of implementing VOIP for internal phone calls have emphasized the complexity of the transition to VOIP, and the infrastructural costs associated with acquiring VOIP-enabled handsets, for example.

A number of additional issues arise when VOIP is used for external calls. On a traditional voice call, Telkom's infrastructure is typically used for all stages of the call. Telkom therefore can ensure that quality of service is maintained. However, a VOIP call is typically transmitted through a fairly complex infrastructure, involving the servers of both call participants, and the systems of the ISP involved. These systems may not necessarily be interoperable. Ensuring that the quality of the call is maintained therefore becomes more difficult. In addition, there is still typically more downtime on the average corporate computer network than on Telkom, and more than one network is often involved in the call. The likelihood that a VOIP call will fail is therefore much higher than for traditional voice. Finally, interconnection agreements between VOIP and traditional voice networks are still needed.

**Therefore, although VOIP will potentially be able to fully replace traditional voice, at present it is not a complete substitute for traditional voice. Companies for which voice communications constitute a mission-critical application will be less likely to convert fully to VOIP, and it is unlikely to initially be suitable for small companies without a large IT implementation department. Therefore SMMEs (Small, Medium and Micro Enterprises) are unlikely to experience cost savings from VOIP.**

VOIP is not a perfect substitute for traditional voice, and is unlikely to be used by SMMEs.

A successful regulatory change on VOIP would therefore not necessarily be associated with a large-scale transition from traditional voice to VOIP. What is more likely is that initially only large corporates will transfer to VOIP, and that where phone connectivity is mission-critical, some traditional voice back-up systems may be kept in place.

A crucial issue, however, is the fact that Telkom keeps its monopoly on international cable bandwidth. Satellite bandwidth is not suitable for VOIP, as it introduces an unacceptable delay on the line. Therefore the cost savings that can be realised on VOIP will be limited by the high pricing of international bandwidth. In addition, unless Telkom begins to differentiate between wholesale and retail pricing on international bandwidth, Telkom's VOIP service will have a cost advantage over the VOIP service offered by VANS. Some regulatory issues on the provision of VOIP therefore remain.

The cost savings that can be realised on VOIP will be limited by the high pricing of international bandwidth.

### **6.3. SELF-PROVISIONING FOR VANS, AND CESSION OF TELECOMMUNICATIONS SERVICES BY VANS**

The announcement states that *“as of 1 February 2005 value added network services may also be provided by means of telecommunications facilities other than those provided by Telkom and the Second National Operator or any of them”*. In addition, VANS *“shall be entitled to cede or assign the right to use, or to sublet or part with control or otherwise dispose of the telecommunications facilities used for the provision of the value added network service”*.

In other words, VANS can self-provision their telecommunications infrastructure, can acquire or lease that infrastructure from other VANS, or can on-sell or rent their own infrastructure to a customer. However, on 31 January 2005, the Minister announced the following in a press conference:

“The issue of self-provisioning was issued in the government’s policy determinations only in relation to mobile cellular operators in terms of fixed links, to give full meaning to the intention to reduce the costs of telecommunication services in SA. It is the intention that VANS operators may obtain facilities from any licensed operator and as specified in the determinations. It is not the government’s intention to license every single activity that can be provided by a VANS operator, as this would lead to an absurd result. I can assure the sector that the Convergence Bill, when tabled, will bring much needed certainty to the sector in this regard.”<sup>38</sup>

This statement by the Minister of Communications implies that VANS cannot in fact self-provision. However, while the first announcement definitely holds the force of law (as it was sufficient to trigger certain provisions in the Telecommunications Act), the second announcement does not seem to hold any legal weight. The discussion below therefore works on the assumption that VANS can self-provision from 1 February.

Transtel and Estel will again have a competitive advantage in selling or renting telecommunications infrastructure to VANS, due to their access to the rights of way. However, a legislative loophole may exist as regards the access of the VANS to the rights of way. At present, rights of way are provided to fixed-line operators, who are defined in the Telecommunications Act as either Public Switched Telecommunications Services (PSTS) licensees or “any other person who provides a licensed telecommunication service by means of a telecommunication system consisting mainly of fixed lines”. It may therefore be possible for certain VANS, who provide telecommunications services mainly via fixed lines, to argue that they are entitled to the rights of way as well.<sup>39</sup>

Technically, it should also be possible for VANS to self-provision their international connections, and bypass Telkom’s monopoly on SAT-3 bandwidth. In practice, however, this is unlikely to occur. As discussed in Box 1, SAT-3 is already sufficient to provide South Africa’s bandwidth at present. Any additional cable would therefore be an enormously expensive (in the region of US\$650m, the cost of SAT-3) and unnecessary duplication of infrastructure. There would also be the very real possibility of Telkom starting a price war in response to an additional cable investment. This increases the investment risk of such a project. The legislative change is therefore unlikely to result in greater competition in the international bandwidth market.

**Legislative changes are unlikely to result in self-provisioning on international bandwidth.**

<sup>38</sup><http://www.itweb.co.za/sections/telecoms/2005/0501311147.asp?S=Internet&A=INT&O=FRGN>  
<sup>39</sup>Lisa Thornton Inc. 2004, pp 22-33.

#### 6.4. OPTIMISING THE USE OF PRIVATE TELECOMMUNICATIONS NETWORK FACILITIES

The announcement states that *“as of 1 February 2005 private telecommunications network operators shall be entitled to resell spare capacity and facilities or to cede or assign his or her rights to use such facilities or to sublet or otherwise part with control thereof”*.

The Private Telecommunications Network (PTN) license holders can therefore provide data services without the benefit of a PSTS license, although the prohibition on providing traditional voice services remains. **This removes some large part of the attractiveness of the Second Network Operator (SNO) license for Transtel and Estel.**

Changes decrease the attractiveness of the SNO license.

#### 6.5. NET EFFECTS OF THE REGULATORY CHANGES

The regulatory announcement substantially erodes the Telkom monopoly, and therefore in addition decreases the attractiveness of holding a PSTS license. Regulatory changes are therefore likely to be associated with a substantial decrease in the value of the SNO license. However, Telkom (and the SNO, when the license is finalised) still has a monopoly over the provision of traditional PSTS voice services. As VOIP is as yet not a perfect substitute for traditional voice, the company should maintain some pricing power in the voice market.

The regulatory changes will benefit the VANS industry both directly, by opening new market sectors to them and indirectly. Indirect benefits should flow largely from the reduction in Telkom’s market power, which has to date been substantial. In the words of the Competition Commission *“Telkom has abused its dominant position by engaging in a pattern of anti-competitive practices. These include Telkom imposing unreasonable conditions for it to provide telecommunication services to the VANS. Telkom refuses to provide these facilities unless the VANS providers conclude contracts which subject them to Telkom’s dictates. As the VANS cannot operate without these facilities and must obtain them from Telkom, they have no choice but to subject themselves to Telkom’s dictates. The effect of these practices, including legal actions and threats of service termination, has been to chill competition in the VANS market.”*<sup>40</sup> The ability of VANS to self-provision,

Changes will decrease Telkom’s market power, and therefore improve the competitive position of the VANS.

<sup>40</sup> Competition Commission, Media Release No 6 of 2004, February 2004.

or to acquire telecommunications services from third parties, should be associated with a large decrease in Telkom's bargaining power.

The greatest weakness of the regulatory announcement is, however, the fact that it fails to address monopolistic practices in the international bandwidth market. This substantially decreases the benefit of the announcement to the call centre industry, for example. Although the freeing-up of the VOIP market is beneficial to the industry, international VOIP call costs cannot be brought in line with off-shore competitors' price structure while the cost of international bandwidth remains so high.

Part of the reluctance to address SAT-3 prices may be due to the fact that Telkom's monopoly on SAT-3 has arisen due to a commercial agreement with the cable consortium rather than due to a legislative monopoly. However, as the industry regulator, ICASA should be able to intervene even in a commercial contract. It may also be fruitful to explore whether or not SAT-3 can be regarded as an essential facility in terms of competition legislation, and whether the pricing of international bandwidth can be regarded as excessive.

**SAT-3 monopoly and international bandwidth pricing remains to be addressed.**

**Possible that SAT-3 can be regarded as an essential facility in terms of competition legislation, or that the pricing of international bandwidth can be regarded as excessive.**

The announcement also fails to address the issue of a separate wholesale pricing division within Telkom. The establishment of such a division is explicitly recommended in the Yankee Group report,<sup>41</sup> and is necessary to ensure a level playing field between Telkom's VANS services and those of its competitors. Hopefully this issue will be dealt with in forthcoming legislation.

Ideally, the current regulatory environment will be largely replaced in the near future by the Convergence Bill. The concept behind the Convergence Bill is that, as technology leads to increasing practical convergence between voice, data, and broadcasting it becomes necessary to integrate the existing regulatory regimes into a single act. However, early indications are that the South African broadcasting industry will be excluded from the Act. In addition, the date on which the Convergence Bill is expected to be finalised is still uncertain. Although the early introduction of the bill probably represents the first-best legislative outcome, the September 2004 regulatory announcement brings some much-needed urgency to the table.

<sup>41</sup>The Yankee report states the case as follows: "Data service markets continue to grow, but largely to the incumbent's benefit the absence of separate pricing for retail and wholesale services in particular means that competitive operators continue to struggle to build margin into the limited services that they can provide. Indeed, the 'Network Services' in the VANS market appears to be largely limited to the IT services and the wide area telecommunications services are sold as a loss leader." (Finnie et al 2003, p 6.)

## 6.6. ON-GOING ISSUES

Although the regulatory announcement represents a step in the right direction, it leaves a number of issues unaddressed. These include the following:

- **International bandwidth pricing:** the Telkom monopoly on the SAT-3 cable, which seems to be associated with prices that are above their competitive level, has not been addressed.
- **Competition with VANS:** the competitive playing field in the VANS market must be addressed. In particular, the establishment of a wholesale pricing division within Telkom would ensure that Telkom VANS services faced the same cost structure as other VANS.
- **Local voice calls:** the cost of local calls remains high, and Telkom's de facto monopoly in this area remains in place. As VOIP is an imperfect substitute for traditional voice, the regulatory changes do not fully address this issue.

## 7. CONCLUSION

The 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. To reiterate, the key price findings were as follows:

- **Business data products**
  - ADSL broadband: the most expensive broadband of fifteen countries sampled, and more than nine times as expensive as the cheapest country surveyed.
  - Domestic leased lines: the most expensive of twelve countries surveyed (102% more expensive than the average price sampled, and almost fifteen times more expensive than the cheapest country surveyed).
  - International leased lines: approximately 3 times higher than the next most expensive country sampled, and 31 times more expensive than the cheapest country (out of eleven countries).
- **Retail data**
  - ADSL broadband: in both US\$ and PPP terms, the most expensive of the fifteen comparison countries, and more than eight times as expensive as the cheapest country surveyed.
  - ISP fees: monthly ISP fees are the fourth most expensive in the comparison group of thirteen countries, and five times as expensive as the cheapest country surveyed.
- **Business voice**
  - International peak calls: South Africa is the fifth cheapest out of 15 countries sampled, and 14% cheaper than the average price.
  - Peak local calls: the most expensive of the fifteen countries sampled, and 199% more expensive than the average price.
  - Mobile-to-fixed calls: the second most expensive out of fifteen countries, and 107% more expensive than the average price.
- **Retail voice:**
  - Off-peak local calls: the second most expensive of fourteen countries surveyed, and 79% more expensive than the average price.
  - Off-peak mobile calls: the fifth most expensive of fifteen countries surveyed, and 37% more expensive than the average price.

Given these results, it seems reasonable to assume that Telkom's pricing structure is substantially above the competitive benchmark. The recent regulatory announcement should go some of the way towards providing greater competition in the telecoms market, and thus lower prices for consumers. However, key issues remain unaddressed. The pricing structure of international bandwidth is a central concern, and will probably remain so until the Telkom monopoly on the SAT-3 cable is addressed. The establishment of a wholesale pricing division within Telkom would greatly facilitate the levelling of the competitive playing field in the VANS market. Finally, the cost of local calls remains high, and Telkom's de facto monopoly in this area remains in place.

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## **APPENDIX 1 – INDEX COMPONENTS**

The methodology used in index construction was loosely in line with competitiveness indices designed by institutions such as IMD International.<sup>42</sup> The following eight factors were used to construct the index:

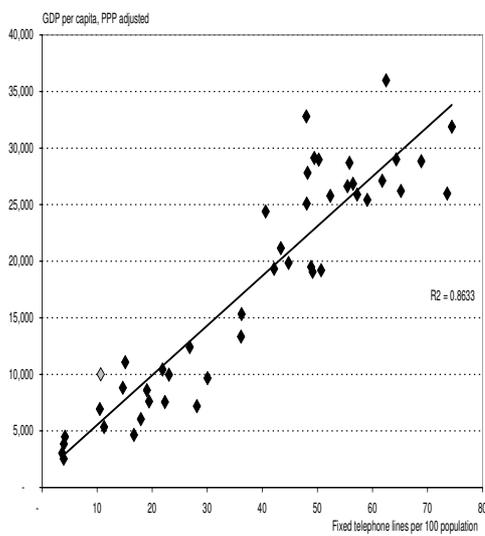
- Total investment in information and communications technology, expressed as a percentage of GDP (3 year average)
- The number of fixed telephone lines per 100 inhabitants
- The cost in US\$ of a 3 minute phone call to the US in peak hours (for the US, itself, the cost of the same call to the European Union was used)
- The number of mobile telephone subscribers per 100 inhabitants
- The cost in US\$ of a 3 minute mobile phone call in peak hours
- The number of internet users per 100 people
- The cost of 20 hours of dial-up internet use per month, in US\$
- The number of broadband subscribers per 100 inhabitants.

Each factor was given equal weight in the index, which was constructed for a random sample of 46 countries.

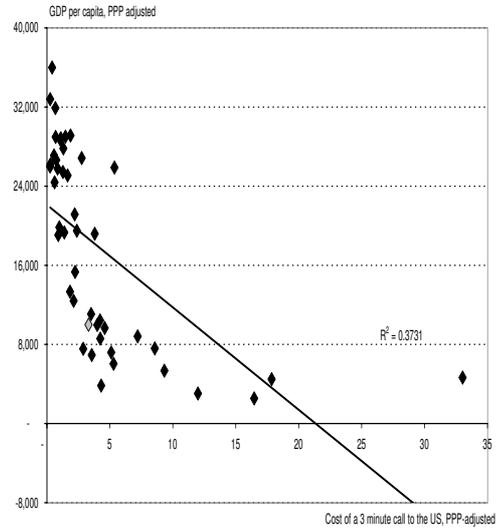
<sup>42</sup><http://www.02.imd.ch/wcy/>

The graphs below show the impact of PPP-adjusted GDP per capita on fixed telephony penetration levels. As can be seen, the level of penetration of fixed telephone lines seems to be closely tied to per capita income. For the sample selected, 86% of fixed line penetration can be explained by income levels. For South Africa's PPP-adjusted GDP per capita income level, fixed line penetration is fairly low (shown by the grey dot).

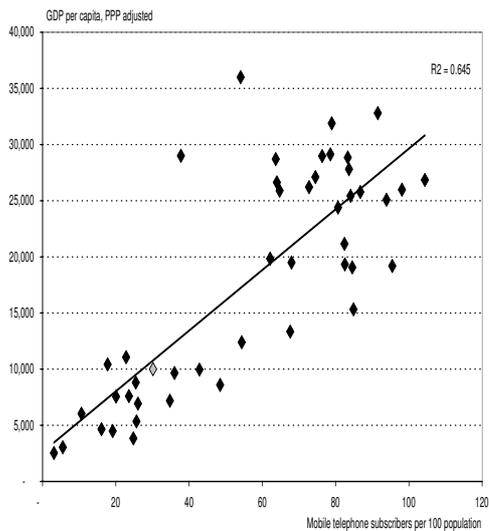
Figure 22 illustrates the relationship between income and international call costs. Some of the cheapest international call costs in the sample (in PPP terms) are in the wealthiest countries. South Africa's international call costs compare fairly well.



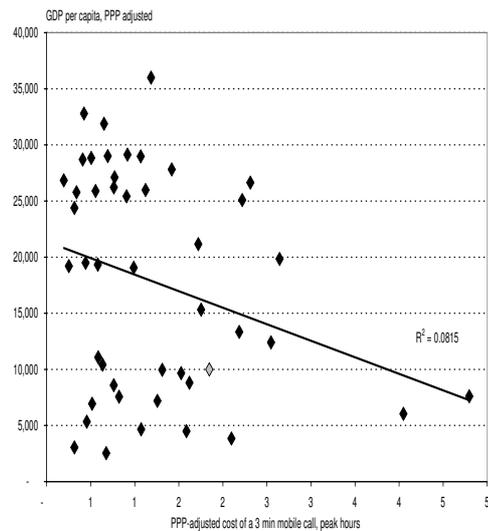
**Figure 21: Fixed line penetration rates versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites



**Figure 22: International call costs versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

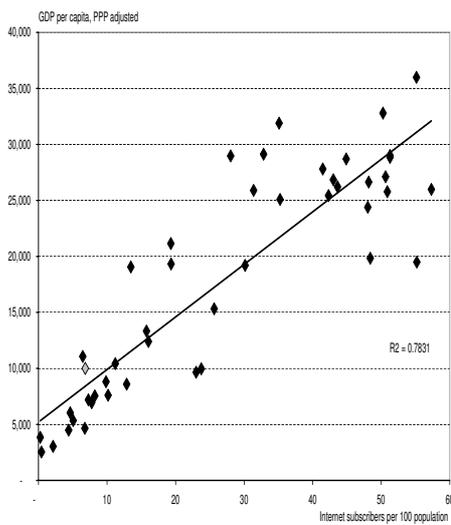


**Figure 23: Mobile phone penetration rates versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

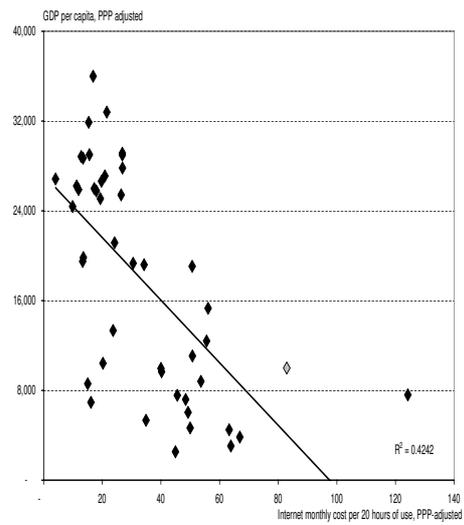


**Figure 24: Mobile phone call costs versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

Mobile phone penetration levels are also largely determined by income levels, although the relationship is not quite as strong. Mobile phone call costs, like international call costs, are negatively related to income levels on a PPP-adjusted basis, although the relationship is much weaker. South Africa's mobile penetration rates are roughly in line with its income per capita. Given the weak relationship between income and mobile call costs, no clear conclusion on South Africa's performance on call costs can be drawn, although they do seem to be within a similar range to the other countries sampled.

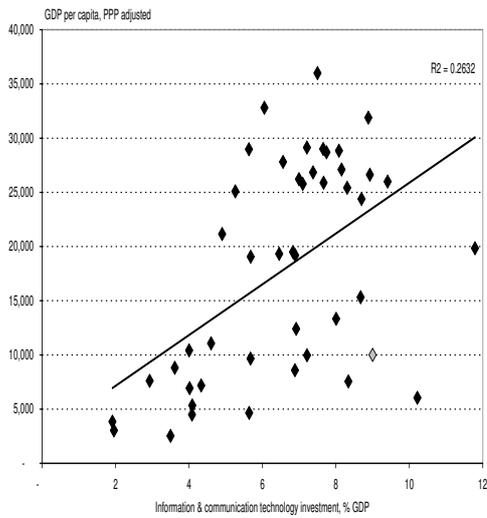


**Figure 25: Internet penetration levels versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

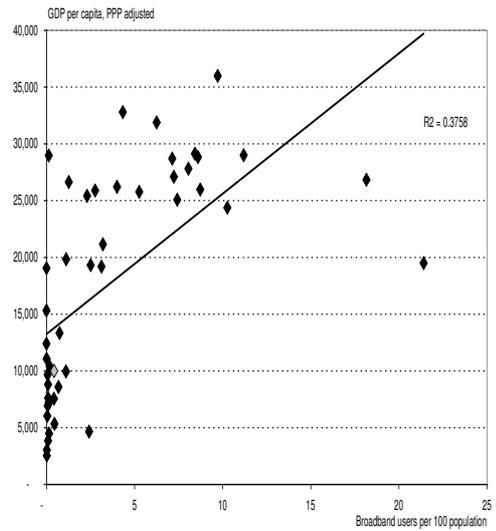


**Figure 26: Internet costs versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

Internet penetration levels again seem to rise with per capita income levels, and South African penetration levels are again in line with the sample average. The cost of time spent on line is quite strongly related to per capita income, and declines as income rises (on a PPP-adjusted basis). South Africa was the second most expensive country surveyed, in terms of the peak time, PPP-adjusted cost of dial-up internet access.



**Figure 27: Information and communication technology investment versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

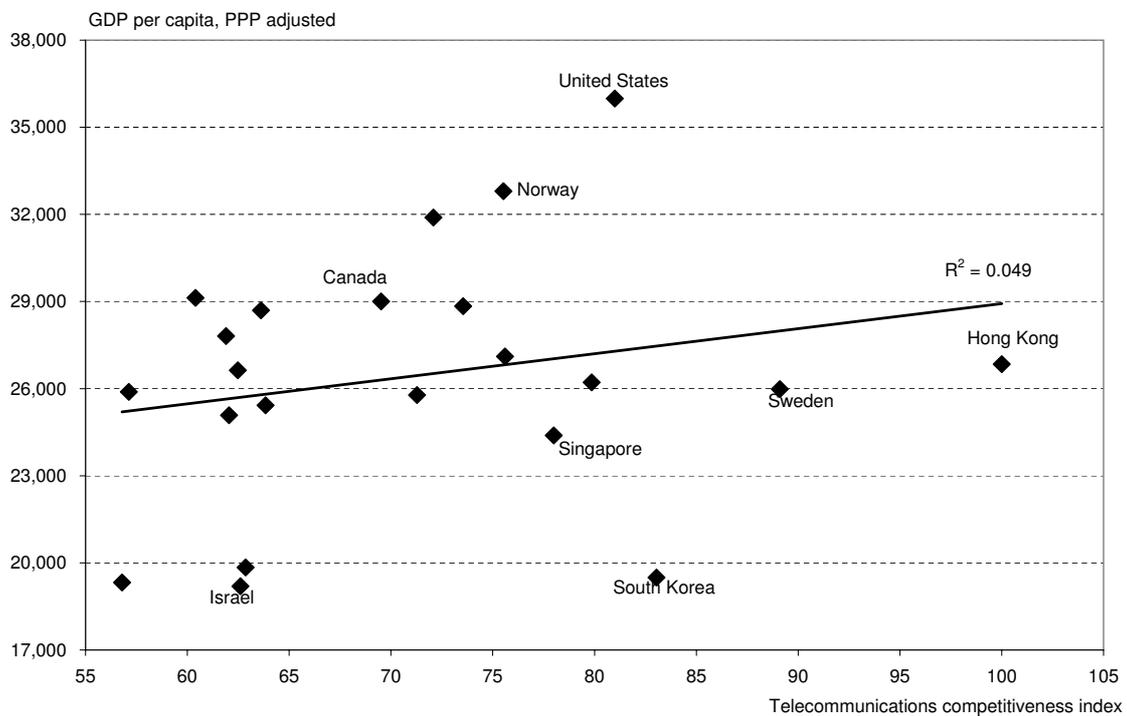


**Figure 28: Broadband penetration levels versus PPP-adjusted GDP per capita**  
 Source: International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

Information and communications investment has a loosely positive relationship with per capita GDP, with a fairly low R2 value of 0.26. South Africa has a particularly high level of investment for its level of GDP per capita, with the fourth highest level of investment in the sample.

Broadband penetration levels, on the other hand, seem to have a non-linear relationship with income per capita. Below PPP-adjusted per capita income of approximately US\$13 000, broadband penetration levels are in most cases negligible. This includes South Africa. However, in countries with significant broadband penetration levels, the relationship with income levels is fairly weak. For example, South Korea has achieved broadband penetration of 21.4 per 100 population, with income per capita of only US\$19 497.

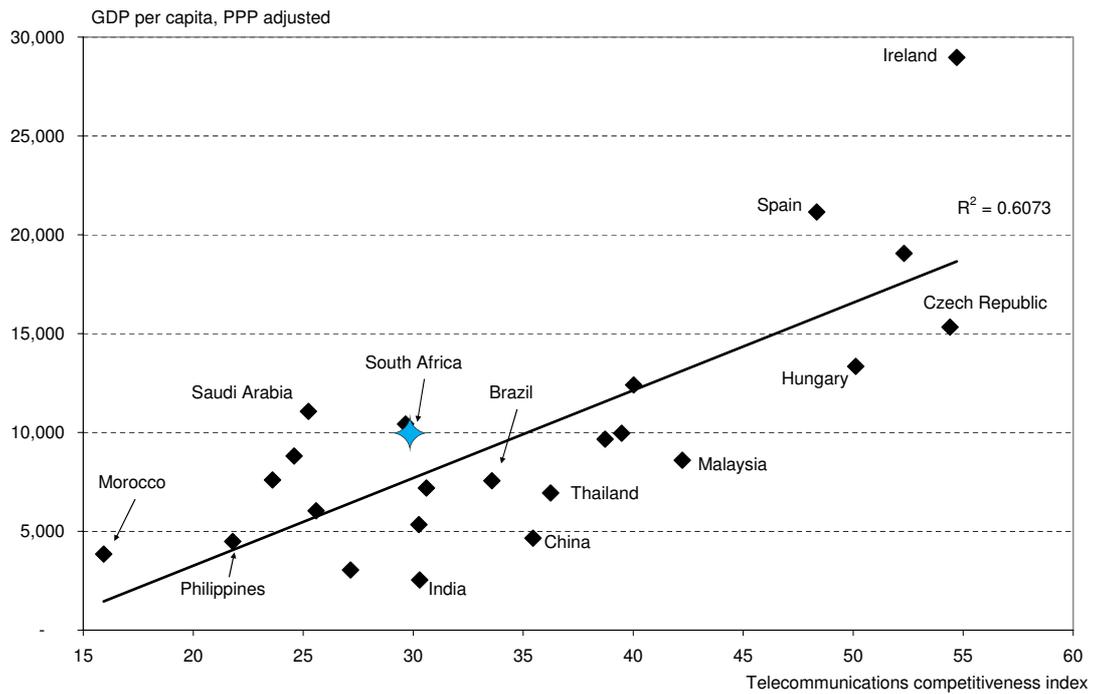
The telecommunications index ranks 47 randomly selected sample countries from 100 to zero. The graph below shows the top 22 countries, who all score above 55 on the index. As can be seen, there is no clear relationship between PPP-adjusted GDP per capita and index ranking for this group. Hong Kong out-performs all other competitors by a large margin, followed by Sweden, South Korea and the United States. Crucially, however, these best practice countries offer poor comparisons to South Africa. On measures such as income per capita, income inequality, labour costs and geographical dispersion they tend to differ substantially from South Africa. Therefore, although an examination of telecommunications in these markets is useful as it illustrates what international best practice looks like, analysis should be supplemented by also examining and comparing South Africa to a group of “peer countries”.



**Figure 29: Telecommunications competitiveness index versus PPP-adjusted GDP per capita**  
 Source: Genesis calculations, International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

These peer countries are to be found in the second group of sample countries, who rank below 55 on the telecommunications competitiveness index. As shown in the graph below, there is a much stronger relationship between PPP-adjusted per capita income and telecommunications performance at lower income levels. Countries below the line can be thought of as over-performing for their income level, while under-performers sit above the line.

South Africa is a relative under-performer for its income level, as are Morocco and, to a lesser extent the Philippines. In contrast, India, China, Brazil, Thailand and Malaysia are all over-performers.



**Figure 30: Telecommunications competitiveness index versus PPP-adjusted GDP per capita**  
 Source: Genisis calculations, International Telecommunication Union, NationMaster.com, Oanda.com, World Bank, telecommunications regulators and telecommunications company websites

## APPENDIX 2 – EXCHANGE RATES USED

	Exchange rates*	PPP conversion factors**
Brazil	2.89	1.10
Canada	1.29	1.21
Hong Kong	7.79	6.46
India	45.06	8.89
Israel	4.48	3.83
Malaysia	3.80	1.63
Morocco	8.91	3.53
Norway	6.65	9.28
Singapore	1.68	1.53
South Africa	6.32	2.55
South Korea	1,127.12	840.70
Sweden	7.30	10.19
Thailand	40.23	12.63
Philippines	56.10	12.38
United States	1.00	1.00

**Table 4: Exchange rates used**

Sources: \*oanda.com, arithmetic mean for the year ended 28 February 2005; \*\*World Bank

