

COMPETITION POLICY AND REGULATION: A CASE STUDY OF TELECOMMUNICATIONS

Rossana Achterberg
Department of Economics
University of the Witwatersrand

Undertaken as part of a Trade and Industrial Policy Secretariat project with the Wits University Economics Department examining competition and regulation issues in various sectors. I would like to thank Simon Roberts of Wits University Economics Department for his valuable feedback and guidance on the paper.

INTRODUCTION	5
FRAMEWORK AND APPROACH FOR ASSESSING REGULATION IN TELECOMMUNICATION	6
SECTION I:	
OVERVIEW	8
1.1 BACKGROUND OF THE TELECOMMUNICATIONS INDUSTRY	8
1.2 NEW DEVELOPMENTS	9
1.3 VARIETY OF SERVICES	11
SECTION II:	
TELKOM	11
2.1 SUBSIDIARIES AND JOINT VENTURE	12
2.2 OWNERSHIP STRUCTURE	13
2.3 TELKOM'S INTERESTS IN THE SADC REGION	13
SECTION III:	
STRUCTURE OF TELECOMMUNICATIONS SECTOR	14
3.1 ECONOMIES OF SCALE AND FIXED COSTS	14
3.2 DEMAND SCALE ECONOMIES	14
3.3 SUBSTITUTES FOR TRADITIONAL TELECOMMUNICATIONS	15
3.4 ALTERNATIVE PRIVATE NETWORKS	15
SECTION IV: VERTICAL RELATIONSHIPS AND BARRIERS TO ENTRY	16

SECTION V:

PRICING **18**

SECTION VI: PERFORMANCE EVALUATION AND REGULATORY FRAMEWORK **20**

6.1	NON-FINANCIAL PERFORMANCE	20
6.2	FINANCIAL PERFORMANCE	21
6.3	FUTURE INTERFACE BETWEEN COMPETITION POLICY AND REGULATION	21
6.3.1	WHAT HAPPENS AFTER THE PERIOD OF EXCLUSIVITY?	22
6.3.2	LICENSE ADDITIONAL SERVICE PROVIDERS	23
6.3.3	INCREASE SUBSTITUTES IN THE TELECOMM INDUSTRY	24

SECTION VII: CONCLUSIONS **25**

Introduction

Rapid technological change has impacted on the provision of telecommunications in South Africa, as in other countries. The increasing capacity of fibre optic networks, the growing powers of computers, the growth of satellite communications and other broadband developments are major factors influencing growth. Data to support an "information society" is a major driver of technology, with data traffic volumes growing exponentially as business requires more information. The South African telecommunications parastatal (Telkom) is investing heavily in fibre using SDH (Synchronous Digital Hierarchy) transmission systems and technologies such as ATM (Asynchronous Transfer Mode) in attempts to match growth in demand. Wireless local loop systems such as Digital Enhanced Cordless Telecommunications (DECT) are also making a major impact on connectivity in rural areas.

Telkom was granted a monopoly license for five years by the government in 1997 with the explicit objective of extending telecommunications services in South Africa to facilitate broad-based economic development. In 1997 penetration rates were just 4 percent in rural areas, while in the country as a whole there were 11 telephones per 100 people. A regulatory body (SATRA) was established to monitor Telkom's performance and service delivery milestones. As a result, the telephone monopoly has embarked on a mammoth internal restructuring exercise in an attempt to rectify its sub-standard levels of customer service and to improve communications support to historically isolated business units.

Section I of the paper examines the important telecommunications product areas. Vertical areas of operations are distinguished from the maintenance and extension of the network of fixed lines, the core telephone service and value added network services. Section II examines the corporate structure, ownership and control of Telkom. Section III assesses economies of scale in different areas, while Section IV examines vertical relationships and barriers to entry depending on control over access to the network drawing on an example from internet service provision. After outlining pricing trends in Section V, Section VI assesses Telkom's performance against both financial and non-financial criteria, and reviews the impact of regulation.

In this way, the research aims to provide the foundation for discussing the role of the legislated monopoly over basic telephone services, and the implications for the future interface between competition policy and regulation when the monopoly ends.

Framework and approach for assessing regulation in telecommunications

Historically telecommunication has been viewed as a natural monopoly due to the requirement of having a network of fixed lines. While this has been changing with the development of new technologies, there has also been a growing realisation that the many aspects and products of telecommunication service provision are not subject to the same cost conditions. This has stimulated reforms in many countries, which have changed the structure and ownership of the sector and introduced regulation.

A natural monopoly implies that the nature of the product is such that costs diminish over the whole range of feasible output. Typically this is where there are very high fixed or sunk costs and low marginal costs. In telecommunications there are very high costs associated with establishing the network, much lower costs in increasing the number of users connected to the network, and almost zero costs in increasing the number of calls made, subject to the capacity of the lines. Although technical change is altering the cost structure of the network (Section 1.2), there are still large economies of scale implying, at best, a very small number of viable operators. If the operators' profits maximise, prices will be raised above the costs of providing the service. In addition, the economically efficient level of service provision is where the price charged for a call is equal to the marginal cost of providing the call. As discussed, marginal cost is almost zero, suggesting that the efficient level of price and service provision may be where the company does not cover total costs (including the sunk costs).

Provision of telecommunication services which use the networks have quite different cost characteristics and require different competencies. These services range from telephone calls (local, long-distance and international) to Value Added Network Services such as voice mail and call waiting, and Internet service provision. There is no intrinsic reason why the network operator

should be the only company providing these services, just as there is no reason why the entity that constructs and maintains roads should operate all the vehicles which travel on them. Regulation may involve separating the areas where there is potential entry and competition from those where effective provision implies one entity.

The network operation and service provision functions have been integrated, as the network was originally constructed for the sole purpose of providing telephone services. For these functions to change, access needs to be ensured and prices established. The vertical relationships between network operation where monopoly (or at least high levels of concentration) will persist, and service provision are therefore extremely important. Unregulated, the network operator will have an incentive to abuse its position, both by charging high prices for access to the network, and favouring service provision by its own subsidiaries or associated companies.

In addition, there are positive externality effects from the provision of telecommunications services. For example, extensive telecommunications connectivity improves local government's ability to provide services such as health and education and is a condition for small business growth in rural areas. Less tangibly, connectivity may also improve social cohesion, and the ability of people to participate in economic activity.

Private provision therefore implies both that market power may be exploited as a result of concentration, and that there will be under-provision of telecommunications services, especially in rural areas. It is therefore important to distinguish ownership, which determines the objectives under which the utility is run, and market structure.

Regulation does not necessarily imply a smaller role for government, nor will the need for it necessarily diminish over time. Instead, ongoing regulation is required to ensure competition. The different types of regulation and institutional arrangements governing the provision of telecommunications have implications for the development of the sector. The analysis will therefore involve weighing up the recent performance of Telkom against different criteria, both financial and non-financial, and then evaluating the implications of the regulatory changes in South Africa against the possible alternatives.

Section I: Overview

1.1 Background of the telecommunications industry

In describing the telecommunications industry a distinction needs to be made between network operation and service provision. Network operators provide the links and exchanges that enable communication to take place between one point and another. Service providers use network operations to communicate and use them to provide various communication services to end-users.

There are three main facilities used in telecommunications:

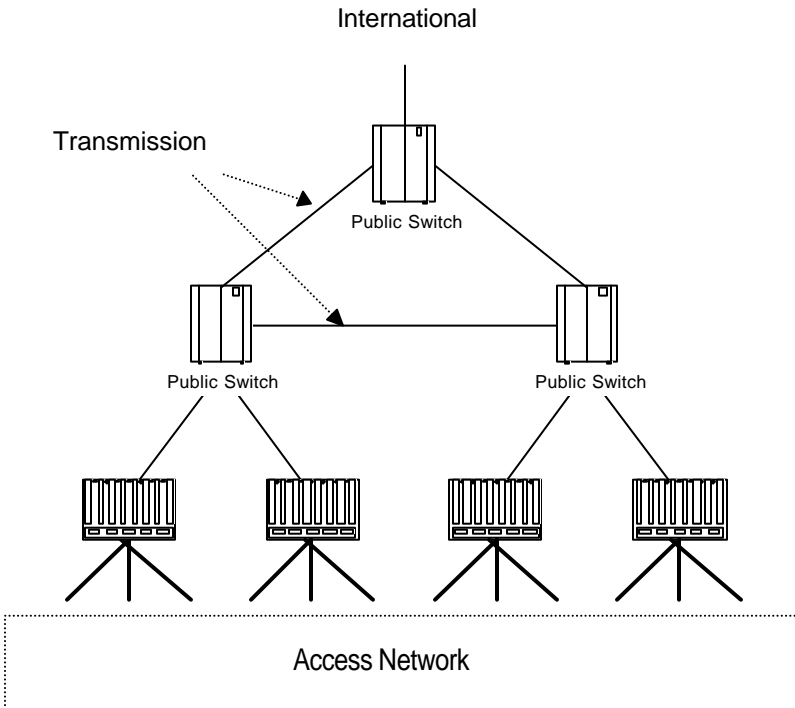
- Local loop (telephone to central switching office) - usually copper wires, but also cellular radio, fibre optic cable and microwave radio.
- Central switch (establishes communications path and reserves capacity for the duration of the call) - usually computer-driven electronic equipment.
- Interoffice transport (high capacity) - variously fibre-optic, microwave relay, satellites, or copper cables.

The basic components of a telecommunications network are exchanges and transmission links. Typically, the network is organised as a hierarchy. A link joins a user's telephone to a local exchange; local exchanges are connected to trunk exchanges by higher capacity transmission lines; trunk exchanges are mutually connected by a system of high capacity trunk links; and finally, certain trunk exchanges are connected to the international network via satellite or cable.

The principle architectural features of the public switched telephone network or PSTN are illustrated in Figure 1. The four exchanges are shown as squares, these serve as a set of subscribers in the exchange's catchment area. Each subscriber is connected to an end exchange port. The access network contains the subscriber lines and equipment. Second sets of exchanges called transit exchanges have no subscriber terminals but are interconnected to local exchanges and to other transit exchanges by high capacity links.

Transit exchanges are interconnected with the country's international exchange.

Figure 1. Hypothetical network showing the access, transmission or switching elements

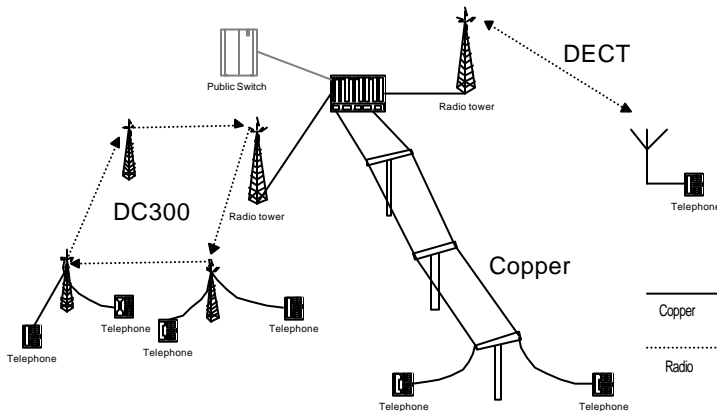


1.2 New Developments

Radio-based transmission links are the final connection to a user on a mobile network, although such links can also be used throughout a fixed network (even in a local loop). In South Africa local loop systems such as DECT are increasing connectivity in rural areas. The advanced DECT radio technology

has proven very successful for Telkom as an access network technology. The inherent characteristics of radio mean that the technology is unaffected by copper theft, quick to deploy, flexible for emerging markets and perfect for unanticipated demand within the coverage area.

Figure 2: Access Network / technologies



Globally, the first DECT systems were implemented during 1994. By 1997, there were approximately 6,5 million users world-wide. According to market projections, this number is expected to rocket to 30 million by the year 2000. Worldwide, DECT has gained acceptance by approximately 20 telecommunications operators in more than 40 countries, including the United Kingdom, France, Germany, Mexico, Australia, and most of South America and Asia.

DECT works as follows: customers are served from a base station, which is housed on a tall mast in the area it will serve. At each point a small antenna and transceiver are installed which connect with the base station by means of a radio. At each customer's premises an ordinary telephone is installed. Wireless Local Loop systems require to be mains powered and, although a small rechargeable battery is included in the system, a connection to an electricity main supply is necessary. The built-in battery keeps the system fully operational should main breaks occur. The unit needs to be connected to the mains supply (220V) but the system is not power hungry. In South Africa it

will add less than R1,50 a month to an electricity account. Moreover, the cost to the customer (installation, rental and unit charges) is exactly the same as for any Telkom telephone service.

1.3 Variety of services

There are a great variety of services that may be provided over a basic voice telephony whereby two people engage in a (two-way) conversation, which remains the most common use to which a public network is put. Enhanced services include electronic mail; premium rate services; on-line information services; Internet services; video-conferencing, and television services.

The four main sectors of the telecommunications industry are:

- local fixed network operation;
- local mobile network operation;
- long-distance network operation;
- service provision over combinations of the above networks.

Section II: Telkom

The telecommunications system managed by Telkom is impressive in many ways. It is by far the largest and most sophisticated network on the African continent, measuring approximately 100 million circuit kilometres, 80 percent of which are digital (Telkom 1993A). The network provides 3.5 million access lines, which makes it the 25th largest in the world (Horwitz 1993, p.16). The South African network is connected to the rest of the world via analogue and digital submarine cables and satellite link, and is sophisticated enough to allow for 98.5 percent of the 35 million annual overseas calls to be dialled directly (Telkom 1993A).

The company's businesses include:

- long-distance dialing services (LDDS);
- local telephone services;
- value-added voice services;
- telematics (Saponet, Diginet);
- value-added networks (Beltel, Easy Access);
- telex and teletex;

- cellular communications; and
- marine radio.

Under the new Telecommunications Act of 1996 Telkom is subject to a licence issued by the Minister and monitored by the South African Telecommunications Regulatory Authority (SATRA), a new regulatory agency set up by the Act. SATRA is now responsible for the regulation of the sector, which includes issuing licences, allocating roll-out targets and resolving disputes. The regulatory body has the right to take action against Telkom should it appear that it is giving undue preference to certain parties or causing undue discrimination.

In terms of the Act, Telkom received three 25-year licences from the Minister: one to provide public switched telecommunication services (PSTS), a second to provide value added network services, and a third to use the radio spectrum.

The PSTS licence gives Telkom an exclusive privilege to supply local, national and international telephony for five years. If it meets its laid down roll-out and service quality targets it may win a sixth year of exclusivity. The other two licences permit competition to Telkom, although Telkom has exclusive rights in its allocated radio frequencies. Telkom's value added network services (VANS) licence merely entitles it to be one of the players in the VANS market.

Through the granting of the licence, the government has established targets for performance and service provision, which take into account development goals. Under Telkom's "Vision 2000" network build programme, at least 2,8 million new lines are to be added to the South African telecommunications network during the licence period. The intention is that within five years more than 50 percent of eligible households will have their own phones.

2.1 Subsidiaries and joint venture

Telkom has a 50% interest in the Vodacom Group (Pty) Ltd, which operates one of the two licensed cellular telephone networks and also acts as a service provider. Telkom also has a 100 percent interest in Q-Trunk (Pty) Ltd, which provides radio-trunking services, and a 100 percent interest in Swiftnet

(Pty) Ltd, which provides a fixed and portable radio data system. On 11 October 1996, Telkom formed a wholly owned subsidiary company, Intekom (Pty) Ltd, which acts as an Internet service provider. Together with the divisions of Telkom involved in providing other value added network services, this means that Telkom is vertically integrated from the telecommunications network to service provision.

2.2 Ownership Structure

On 14 May 1997 the South African Government sold a 30% stake in Telkom to a consortium, consisting of SBC Communications International Inc. and Telekom Malaysia Berhad, called Thintana Communications LLC, a limited liability company organised in the United States under the laws of the State of Delaware. The transaction led to a recapitalisation of R4.5 billion in the company.

2.3 Telkom's interests in the SADC region

Telkom is also one of the driving forces behind the establishment of the SAT-3/Southern Africa-Western-Africa/South Africa Far East cable system. This will be routed between Europe and South Asia with confirmed landings in Senegal, Cote d'Ivoire, Ghana, Togo, Benin, Nigeria, Cameroon, Gabon, Angola, Namibia, South Africa, Mauritius, Reunion, India and Malaysia. It is anticipated that the project will deliver on the telecommunications needs of the African continent for at least the next 25 years (Telkom, 1999: 35).

Telkom is part of COMTEL, an initiative formed by the Common Market for Eastern and Southern African telecommunications Administrations (SATA). The company participates in the working groups which are investigating the feasibility of establishing a regional telecommunications network. The primary objectives are to improve the connectivity of countries in the region and to mobilise resources to attract funds for the establishment of such a network.

Section III: Structure of telecommunications sector

3.1 Economies of scale and fixed costs

The act of telecommunications (except cellular and radio) requires that users be physically connected to each other by a system of cables and exchanges. This network requires substantial investment in switching equipment (exchanges), transmission facilities (wire or optical fibre lines) and terminals (subscriber equipment). The need for upfront investment creates sharply decreasing average costs: marginal costs per call are practically zero, and the fixed costs of the network are allocated to an increasing number of calls. This means that telecommunications has traditionally been viewed as a natural monopoly. In an unregulated market the competitive advantage in cost for an incumbent telecomm service provider is a sustainable and effective barrier to entry.

Telecommunications assets are highly site-specific, and would be of little value to businesses which are not directly competing in the telecomms market in which the equipment is installed. These high exit costs, which increase the risk of investment in a competing telecomms venture, heighten the barriers to entry. Many of the costs of the industry are therefore non-recoverable sunk costs due to the geographical location of the physical asset matters and the inter-temporal nature of capital assets. For entrants, these sunk costs must be covered by post-entry revenue.

3.2 Demand scale economies

The nature of the telecommunications network dictates that economies of scale will arise as additional consumers subscribe to telephone services. In addition, the expansion of the network by one subscriber increases marginally the utility of all incumbent subscribers, since their opportunities for telecommunication have been increased. On a decentralised basis, in an environment with non-zero transaction costs, the positive externality generated by an additional subscriber goes un-priced and uncompensated.

The supply-side manifestation of this market failure is the risk that service providers in a competitive environment will engage in "cream-skimming", or servicing only the lucrative markets. Areas that do not offer much profit

potential may not receive telecomm service, although society as a whole would benefit from higher penetration.

3.3 Substitutes for traditional telecommunications

Recent technological improvements have created a number of close substitutes (and complements) from outside the industry, which weaken the natural monopoly tendencies. The advent of cellular telephony and other wireless data communications technologies (pagers, personal digital assistants) have reduced dependence on network-based telecommunication.

Moreover, the imminent merger of digital telecomm systems and cable television systems provides scope for additional competition in both industries. The continued improvements in computer hardware and user-interface software are increasing the ease with which consumers can choose the most attractive means of receiving and transmitting information. The ever-increasing availability of these substitutes further reduces the remaining monopoly power of telecomm service providers.

3.4 Alternative private networks

During the period of exclusivity, licensed service providers and private networks users are required to use the Telkom infrastructure, including links and other associated equipment. Two other private networks currently exist, owned by Transnet and Eskom.

Transtel, which is a business unit of Transnet, is a primary supplier of telecommunication services to Transnet. As such it owns and operates a private telecommunication network. Transtel's network includes cable and microwave infrastructure, a direct dialling PABX voice network, and ISDN for data communications, trunked radio networks and other mobile systems and VSAT satellite systems.

Eskom has built up its own telecommunications system, independent of those offered by telecommunication common carriers, as its power plants, transmission lines and substations are often in remote areas. Eskom's telecommunications network covers areas of the country not served by

Telkom's infrastructure. In terms of the current legislation, Eskom (like Transtel) may maintain and develop its telecommunications infrastructure only for its own operational business needs during Telkom's exclusivity period. A recent development in the telecom sector is the announcement that government plans to merge Transtel and Eskom's communications system to create a second national telecom operator.

Section IV: Vertical relationships and barriers to entry

Vertical relationships may create barriers to entry in the provision of various services, for example, internet service provision, depending on the control over access to the network. A complaint, lodged with the Competition Board in July 1996 by the Internet Service Providers Association (ISPA) on behalf of the 72 independent internet service providers, illustrates the issues which may arise. The concerns raised in the complaint against Telkom's subsidiary, the South African Internet Exchange (SAIX), are detailed below.¹

- **Predatory and discriminatory pricing** by Telkom and its subsidiaries. As Telkom's basic service enjoys a monopoly, unfair costing or cross-subsidisation may occur between these services and value-added services in the competitive domain. This would enable SAIX to charge artificially low prices. This is because internal accounting within Telkom means that it is not clear whether SAIX incurs the full cost of doing business in the Internet market. That is, it is not clear whether SAIX carries the full costs of international bandwidth, capital costs of equipment and labour, etc.
- **Inferior technical access** for independent ISPs to Telkom's underlying telecommunications infrastructure. If unequal access to Telkom exchanges is provided then SAIX may enjoy important cost-saving advantages. Tying directly into Telkom's exchanges affords SAIX scope to pass on potential cost savings to SAIX aligned ISPs. SAIX can house its connectivity hardware directly at the exchange and does not have to carry the costs of housing the equipment at separate locations. The economies of scope that this type of arrangement provides can be seen

¹ Submission of the ISPA of South Africa to the SATRA, 10 June 1997.

as a competitive advantage that benefits consumers. However, because ISPA members do not enjoy the same access to the PSTN and PDTN network, and have to keep separate facilities for their connectivity, these economies of scope can also be seen as a barrier to entry.

- **Non-price discrimination.** Competition also involves a variety of non-price elements. The Competition Board expressed concern that ISPA members could be placed at a competitive disadvantage in terms of access to installation and repairs of physical infrastructure. In the telecomm sector, access to the physical infrastructure is crucial. ISPA members could be placed at a competitive disadvantage in terms of having lines installed or maintained. There is a concern that SAIX could receive preferential treatment at the expense of other non-SAIX aligned ISPs.
- **Preferential access to end-user customers** and piracy of confidential customer information. Given the central role that Telkom plays in providing infrastructure for ISPA members, Telkom is placed in a privileged information position. Telkom can therefore identify who each of the ISPA's customers are, monitor their billing records and identify new customers that ISPA members are currently trying to recruit. The concern is that access to this sensitive information gained by SAIX would place it in an unfair competitive position. The validity of such a claim is very difficult to verify, but if it is occurring, then competition may be reduced.

It is not clear at this stage whether the ISPA grievance allegations can be verified, as the Competition Board conducted no formal investigation into the complaints made by ISPA. However, the concerns all illustrate issues which arise where the network operator also provides a range of services.

The legal context

Telkom has also contended that its exclusive privilege extends to internet access provision, yet there is no evidence to support this in the license issued to Telkom under section 36 of the Telecommunications Act. The Act contains a definitive licensing provision for value-added network services in section 40. Section 40(1) as read with section 40(2).

Section 40(1) sets out that Telkom's "exclusive privilege" extends only to the "construction, maintenance and use of telecommunications lines in the Republic of South Africa and to the wireless equivalent thereof. This does not extend to services which by their nature involve a value-added component, as the examples of "electronic data interchange, E-mail, protocol conversion, access to a database or managed data network services."

Section 6.3 of the White Paper on Telecommunications also clearly states that under no circumstances should cross-subsidisation from non-competitive to competitive services be permitted due to the fact that cross-subsidies result in market distortions².

Section V: Pricing

Telephone calls are separated into international, long-distance and local calls. At present, Telkom's local tariffs are subsidised by long-distance and international calls, with local calls representing 78 percent of voice traffic but generating only 32 percent of call revenue.³ With the corporatisation of Telkom and the new regulatory regime, SATRA approves tariff increases provided they comply with a government-imposed price cap of the inflation minus 1.5 percentage points. The price limit is therefore set in average terms allowing flexibility in the balancing between the rates charged for different types of calls.

Under this regime, international call charges (outside neighbouring states) are to be reduced significantly from an average of R5.17 per minute in 1997/98 to R2.17 per minute by 2001/02 (Table 1). In addition, a shift is being made to a per second billing system for these calls (Table 2). Long-distance call charges are also being reduced while, after an initial reduction, charges for local calls are to stabilise at R0.19 per minute. This will result in a narrowing in the ratio between local and long-distance call charges from 1:13 in 1997 to 1:7.8 in 1999. This compares with international norms of around 1:4.5. Installation rates will remain unchanged while rental rates will increase.

² White Paper on Telecommunications, p.30

³ BMI- Techknowledge Communication Handbook 1998, p.513

Table 1: Proposed rates for basic telephone services (1996/97 Rand)

	1997/98	1998/99	1999/00	2000/01	2001/02
Installation					
Business	R175	R175	R175	R175	R175
Residence	R175	R175	R175	R175	R175
Monthly line rental					
Business	R55.37	R62.01	R69.46	R69.46	R69.46
Residence	R47.20	R51.68	R55.82	R55.82	R55.82
Local usage per minute	R0.41	R0.17	R0.19	R0.19	R0.19
Long distance					
Band 1	R0.41	R0.39	R0.36	R0.36	R0.36
Band 2	R0.74	R0.77	R0.73	R0.68	R0.67
Band 3	R1.00	R0.80	R0.68	R0.68	*
Band 4	R1.15	*	*	*	*
International calls per minute (average)					
Neighbouring states	R1.85	R1.75	R1.49	R1.42	R1.33
Rest of world	R5.17	R3.95	R2.96	R2.49	R2.17

Note * Service moved to other price bands

Source: BMI Techknowledge Communication Handbook, 1998

Telkom's tariff adjustment for 1999 indicates that it has increased its average call charges for 1999 by 5.5 percent, which will result in an effective increase of 7.3 percent on the average account. At 5.5 percent, the average increase in charges is 3.3 percentage points below the increase in the consumer price index which was projected at 8.8 percent. However, with consumer inflation falling to 7.3 percent in June 1999 (and expected to fall further) the impact on the average account will not result in significant real cost savings in practice for 1999.

On average charges for long-distance calls remain unchanged, while international call rates have been declining. March 1999 was the fifth time in the past two years that Telkom reduced the price of calling abroad,

effectively reducing telephony charges to more than 86 countries. Entry is expected to be most effective in the area of international calls once Telkom's monopoly expires. Table 2 indicates a detailed breakdown of how the latest drop in charges to some of the international destinations affected will benefit consumers.

Table 2: International calls rates cut: new per- second billing method

	Std time (per minute)	Std time saving global off-peak	Off-peak (per minute)	Off-peak saving
Germany, France, Portugal Netherlands, Switzerland	R5.65	22.5%	R5.06	10.5%
Italy	R8.65	14.1%	R8.05	9.7%
India	R9.35	19.4%	R8.72	15.7%
Malawi	R1.88	6.5%	R1.76	4.7%
Israel	R7.88	11.6%	R7.39	1.8%
Belgium	R7.89	21.7%	R6.94	22.1%

Source: Corporate Communication, Telkom news article, March 1999.

SATRA plans to prescribe a new tariff regime for Telkom once its monopoly period in fixed lines expires.

Section VI: Performance Evaluation and Regulatory Framework

6.1 Non-financial performance

Telkom's temporary exclusivity period has been granted conditionally subject to the achievement of stringent license conditions including targets in the areas of service quality, modernisation and expansion of telecommunication services. If the company fails to meet its service quality obligations, the regulator is responsible for levying heavy financial penalties.

To date, Telkom has met the targets in modernisation and expansion of services but, in 1998/99, failed to fully meet 2 of the 10 service quality targets (Telkom, 1999: 28). It achieved an 85 percent and an 82 percent success rate respectively in clearing business and residential faults within 48 hours.

6.2 Financial Performance

Over this period, Telkom's financial performance has been relatively strong (Table 3). While the rates of return (on assets and equity) have been declining, Telkom reports that this is largely due to heavy investment in network rehabilitation over recent years. This increases the value of Telkom's assets and its ability to compete when entry becomes possible. The rehabilitation drive reached a peak in 1998/99 when the company spent R1.436 billion on network rehabilitation, R632.7 million more than in 1997/98.

Overall capital expenditure has increased by 64 percent in 1999 to R10.5 billion. Eighty percent of this expenditure was to upgrade the internal IT systems and improve telecommunications systems for corporate and urban customers, while the remaining 20 percent was invested to expanding services in under-serviced areas (Telkom, 1999: 28).

Table 3: Financial performance of Telkom (year ended 31 March)

	1996	1997	1998	1999
Return on total assets	19.9%	23.9%	23.4%	15.1%
Return on equity	27.3%	28.4%	19.1%	15.6%

Source: Telkom *Annual Report 1998/1999*: pages 8 and 9

6.3 Future Interface between Competition Policy and Regulation

The main components of telecommunication reform initiatives commonly identified are: unbundling or separating the network elements and the service provision; introducing competition and ensuring interconnection of networks; ensuring equal access; and privatisation of the state-owned monopoly provider (Wallsten, 1998; Van Siclen, 1999). These all require strong regulation to prevent the incumbent from exploiting its advantage.

There is broad agreement that competition is most likely to be the most effective method of promoting improvements in the telecomm sector. Wellenius *et al.* (1992) observes that "A single monopoly operating enterprise, whether state-owned or private, is increasingly unable to meet the large,

varied, and rapidly changing demands of all types of users. Competition, or a credible threat of competition, is likely to spur established operating enterprises to focus attention on customers, improve service, accelerate network expansion, reduce costs, and lower prices." However, competition is distinct from privatisation, which may also stimulate improvements, but only if it is combined with effective regulation (Ambrose, 1990).

Wellenius *et al.* (1992) have cautioned, based on their developing countries case studies, that the single most disturbing issue in recent telecomm reforms is slow progress in developing regulatory capabilities. In addition, Galal *et al.* (1995) studied the effects of regulatory reforms by comparing the performance of the telecom sector in several countries before and after regulatory reforms. They attempted to explore how well countries were able to balance the regulatory objectives of commitment, addressing information asymmetry, and pricing. They found that Chile, which had resolved all three issues, achieved the greatest performance improvement, while the Philippines, that did not resolve these issues, experienced the worst performance. This further highlights the importance that regulation plays in developing countries in terms of increasing performance in the telecomm sector.

These issues have been illustrated in South Africa in the case of competition in value added network services, with the example of internet service provision (section IV). A vertically integrated incumbent can use its position to favour service providers with which it is associated. Regardless of regulatory changes at the end of the exclusivity period granted to Telkom, equal access in areas which are not covered by the exclusive license should be enforced.

6.3.1 What happens after the period of exclusivity?

The two central purposes of the period of exclusivity are to allow Telkom a grace period to roll-out the network and to prepare for competition by rebalancing its tariffs. This may also include aspects which will increase the strength of Telkom's incumbent position. If this is not to occur, the regulator will have to maintain and strengthen its monitoring function.

A further option, which must be carefully considered, is whether Telkom should be unbundled to separate the value added network services from the

network operation. While this may seem desirable, the synergies as well as the rate of technological change mean that product definition is not necessarily clear-cut. For example, with voice-over IP, telephone calls can be provided via the internet. The key remains ensuring equal access and inter-connection.

The end of the exclusive monopoly period implies that continuing extension of telephone services to meet reconstruction and development goals can no longer be funded out of cross-subsidisation. A universal service fund is already being established for this purpose. Service provision requirements may also be included in the license conditions of new entrants.

6.3.2 License additional service providers

Additional providers of voice telephony may be licensed by the end of the monopoly period. It is likely that these entrants will focus on sectors with high returns, namely international and long-distance calls. A pricing system must therefore be established for additional license holders in voice telephony for access to Telkom's network. The access price should be based on 'efficient component pricing (ECR)' if it is to compensate Telkom fairly and be consistent with allocative efficiency. This requires that the price equals the marginal cost to the network (primarily wear and tear) plus the opportunity cost of allowing access to the competitor's call at that time (Baumol and Sidak, 1994). In practice this is not necessarily easy to establish.

If competition is substantially increased, much of the struggle to improve telecomm in South Africa will be complete. Moreover, new entrants will encourage the creative-destruction dynamic of technological innovation and allow it to flourish. The global trend indicates that competitive forces are pushing for open markets around the world. An example would be Britain. With more than 150 telecomm operators, including six cellular operators, Britain offers one of the cheapest phone rates in the world. Over the past decade, British Telecom (BT) service has improved, and call prices have halved.⁴ However, competition has focused on providing value-added

⁴ Another example is New Zealand. The Minister of Communications, Maurice Williamson was recently quoted in the Financial Times, saying that telephone deregulation was a factor in New Zealand's strong gross domestic product growth.

services and on international calls, and there have been several important instances where the regulator has come into conflict with BT, as the dominant provider and network operator, and has had to resort to court action.

The existence of alternative networks in the cases of Transtel and Eskom means that competition may also be possible at this level of operation. With two networks, the sector will still be concentrated and incentives for competition may not necessarily be great. In addition, issues of inter-connection between the networks, given their different coverage, will have to be resolved to allow call completion. In China, the Ministries of Electronics, Railways and Power formed a new competitor in 1994. China is now laying new lines at a rate of 14,5 m/year.

6.3.3 Increase Substitutes in the Telecomm Industry

As discussed, substitutes for the traditional telecommunications industry are increasing due to technological improvements. These thereby reduce traditional concerns about natural monopoly and market failures, as the economic paradigm of telecommunications being a discrete and unique industry is becoming obsolete. The trend towards greater competition is likely to continue as technology improves and is dispersed across the globe.

The continued improvements in computer hardware and user-interface software are increasing the ease with which consumers can choose the most attractive means of receiving and transmitting information. The ever-increasing availability of these substitutes, such as "voice over IP", further reduces the remaining monopoly power of telecomms service providers. The narrow-band voice traffic requires 64KB/second in order to transmit voice. In comparison, "voice over IP", compresses voice to 8KB/second. Thus data traffic is far more efficient as it allows eight people to transmit voice over a 64KB/second data stream rather than one person through the narrow-band voice-traffic stream.

Section VII: Conclusions

The paper has detailed the different levels of operations in telecommunications. Each of these levels has differing cost conditions and, while technological developments are reducing economies of scale, they are still significant in the operation of the network. This implies that there are major incumbent advantages, especially in controlling access to the network and enabling call completion. These issues have been highlighted by the case of internet service providers, in which Telkom does not have a monopoly.

New entrants seeking to provide telephone services will only succeed if regulation is able to effectively address these issues. Given the information asymmetries involved, where the firm has much more information than the regulator, this implies that strong regulatory capabilities are necessary. Unregulated, the network operator will have an incentive to abuse its position, both by charging high prices for access to the network, and favouring service provision by its own subsidiaries or associated companies. Without economic regulation in the telecomm sector, Telkom, as the dominant provider of the fixed network service in South Africa, may therefore seek to set prices to independent service providers in a way designed to weaken and ultimately eliminate competition from other possible network operators after its period of exclusivity.

After the period of exclusivity one would expect to see a general reduction in prices of network services for independent service providers, primarily as a result of the possible entrance of other network operators. Prices should be fair, with tariffs charged by network operator(s) with significant power being cost-oriented. Private networks and services over the network should be encouraged, as they facilitate sophisticated and essential tools for business and other users. The question dominating the opening up of the telecomm market in 2002 is how many competitors the government will license, with news of a potential second operator welcomed.

The interface between SATRA, as the sector-specific regulator, and the Competition Commission, with the broad mandate for ensuring that companies do not exploit market power, must be carefully established. The

aim must be to ensure that their roles are complementary and reinforce each other rather than being potentially in conflict. This is particularly important given the potential entry of Transtel/Eskom.

References

Ambrose, Hennemeyer and Chapon. "Privatising Telecommunications Systems: Business Opportunities in Developing Countries." *IFC Discussion Paper Number 10*. 1990.

Armstrong, M., S. Cowan and J. Vickers (1994) *Regulatory Reform – Economic Analysis and British Experience*, MIT Press, Cambridge, Massachusetts.

Baumol, W. and G. Sidak (1994) *Toward Competition in Local Telephony*, MIT Press, Cambridge, Mass.

BMI TechKnowledge, "Communication Technologies", *Handbook 1998*.

Durchslag, Scott, and Arvind Puri and Tino Rao. (1994) "The Promise of Infrastructure Privatisation" in *McKinsey Quarterly 1994*, New York.

Fine, B. (1995) 'Privatisation and the RDP: A critical assessment', *Transformation*, No.27, pp1-23.

Galal, and Nauriyal. "Regulating Telecommunications in Developing Countries." *World Bank Policy Research Working Paper Number 1520*. October 1995.

Helm, D. and T. Jenkinson (1997) 'The Assessment: Introducing Competition into Regulated Industries', *Oxford Review of Economic Policy*, Vol.13, No.1, pp1-14.

Horwitz, Robert. (1993) "South African Telecommunications: History and Prospects" in Eli Noam (ed.) *Telecommunications in Africa*.

Horwitz, Robert. (1992) "Regulation of Parastatals" in Peter Baird "Telkom and the South African Economy: Achieving the optimal relationship", 1995.

Joskow, P.L. (1998) 'Regulatory priorities for Reforming Infrastructure Sectors in Developing Countries', paper prepared for Annual World Bank Conference on Development Economics, April 20-21, 1998.

McKinsey & Co. (1991) "The 1991 Report on the Computer Industry" New York: *McKinsey & Co.*

New York Times (1994) "Johannesburg Journal", 21 December 1994, p A4 in Peter Baird "Telkom and the South African Economy: Achieving the optimal relationship", 1995.

Oster, Sharon, M. (1994) "Modern Competitive Analysis" (2nd ed.) Oxford Press: New York.

Petrazzini, Ben. "Global Telecom Talks: A Trillion Dollar Deal", *Institute for International Economics*, 1996.

Wallsten, Scott, *Competition, privatisation, and regulation in telecommunications markets in developing countries*. World Bank, 1998.

Telkom, Annual Report, 1998/1999.

Telkom, Annual Report, 1997/1998.

Telkom, Annual Report, 1996/1997.

Telkom, Annual Report, 1996.

Telkom, The First Annual Report, 1991-10-01 to 1993-03-31.

Van Siclen, S. (1999) mimeo, paper for workshop on regulation and competition for Competition Commission workshop, Pretoria, August, 1999.

Vickers, J. (1997) 'Regulation, Competition, and the Structure of Prices', *Oxford Review of Economic Policy*, Vol.13, No.1, pp15-26.

Wellenius, et al. "Telecommunications: World Bank Experience and Strategy", *World Bank Discussion Paper*, December 1992.

http://www.polity.org.za/govdocs/white_pepares/telewp.html 21/June/1999.

http://www.ispa.org.za/interim_ruling.html 20/June/1999.

<http://satra.gov.za/interconnect-guides.htm> 24/June/1999.

<http://www.ispa.org.za/submission2.htm> 24/June/1999.

<http://www.fm.co.za/96/050796/LA.1.htm> 5/July/1999.