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INCREASING FOREIGN TRADE ACTIVITIES OF THE SOUTH AFRICAN TELECOMMUNICATION INDUSTRY IN SUB-SAHARAN AFRICA

by

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submitted to the Faculty of
Economic and Management Sciences
Vista University

in accordance with the requirements of the degree

PhD

Supervisor: Prof. TI Fényes

October 1998

Pretoria



ACKNOWLEDGEMENTS

It has been my privilege to receive advice and encouragement from many people who have made important contributions to my study. I wish therefore to thank the following persons:

Firstly, my supervisor, Professor Tamas Imre Fényes DSc, for encouraging me to proceed with this topic, and also for his time and input in this study. Without his assistance and guidance, this study would not have been possible.

Dr. Nico Meyer, from the Development Bank of Southern Africa, to whom I owe debt of gratitude for his solid support and whose dedicated assistance in the construction of the model in this thesis is most appreciated.

Dr. Jeremy D. Berlyn, from the Development Bank of South Africa, for an exceptional effort in the proofreading and linguistic editing of this research.

Ing. Peter Tapaj CSc, from the University of Bratislava in the Slovak Republic, for his valuable comments and constructive support.

Cliff Ditapho, from the Botswana Telecommunication Corporation, for operational information on marketing.

Vernon Kretzschmar, from Transtel, for encouragement during this period.

Terrence Brocco and Dominique Mima Persi, from First National Bank of Southern Africa Limited, for their support in simplifying complex financial issues.

Mortimer Hope, from the South African Telecommunications Regulatory Authority, for many valuable consultations.

Ján Jančíga, from Alcatel Altech Telecomms, for his valid information, as well as tacit and moral support.

Susan, Hennie, Agnes and Jozef, my special friends, for their support at a time when I needed it most.

Further, I owe a debt of gratitude to my wife Marika and my two daughters Dominika and Veronika, who supported me and motivated me through many late nights and weekends. I would be most gratified if they look upon this dissertation, which I dedicate to them, as a small return on the many sacrifices that they have made on my behalf.

Finally, I wish to thank my parents in Slovakia for their continued encouragement and support.

MIROSLAV KOVÁČIK

Pretoria

October 1998

DECLARATION

I declare that

**INCREASING FOREIGN TRADE ACTIVITIES OF THE SOUTH
AFRICAN TELECOMMUNICATION INDUSTRY IN SUB-SAHARAN AFRICA**

is my own work, that all the sources used or quoted have been indicated and acknowledged by means of complete references, and that this dissertation was not previously submitted by me for a degree at another university.



MIROSLAV KOVÁČIK

October 1998

INCREASING FOREIGN TRADE ACTIVITIES OF THE SOUTH AFRICAN TELECOMMUNICATION INDUSTRY IN SUB-SAHARAN AFRICA

By

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Degree	PhD
Department	Economics
Supervisor	Professor TI Fényes

SUMMARY

The growth of the telecommunications industry has triggered one of the most significant world-wide export programmes. Telecommunications is part of the chain, who directly participated promoting the industry in Sub-Saharan Africa.

This thesis analyses the telecommunications industry and briefly reflects historical, political, economical and technical changes over time. It also highlights the potential for further stability.

Liberalisation and stabilisation of the telecommunications industry are the main goals in the thrust into Sub-Saharan Africa.

Major members of the industry that participate in the telecommunications sector are continually introducing new products and technologies. As they strive to increase business opportunities and build up the networks, they strive to develop rural areas, create jobs and educate masses of previously disadvantaged people.

In order to comprehend the growth of telecommunications in Sub-Saharan African countries, it is essential to understand the complex economic relationships that exist. Population, Gross National Product, GNP per capita, annual growth per country and the telecommunications market structure are used in this thesis to analyse the future growth of foreign trade to Sub-Saharan Africa.

Part of the research conducted also examined the various financial resources and explained how to maximise the telecommunications sector in poor countries. Foreign capital, coupled to special soft terms, is playing a role in restructuring the sector, where this is needed.

This study analyses some of the factors regarding export and import in relation to the development of the telecommunications industry in Sub-Saharan Africa. It incorporates special trade operations, the relationship between demand, offer, selling and production prices. A few statistical-mathematical models and indexes, which are part of this study, aim at analysing their relationship to each other and will reveal future growth and development possibilities.

The study of the non-stop movement of the economic factors shows that on the one side the costs must be minimised and, on the other side, export, quality and services must be adequately maximised.

Telecommunications has reached all economic sectors in African countries. It is envisaged that at the threshold of the new millennium, these telecommunications development procedures will continue and will be extended to every interacting industrial and non-industrial sector.

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CHAPTER 1

1. The problem and its setting

“The world has witnessed unprecedented growth in new telecommunications systems, services and technologies. In many countries, modern telecommunications are taken for granted as a key factor in economic, commercial and social activities and as a prime source of for cultural enrichment. However, in a majority of developing countries, the telecommunications systems are inadequate to sustain essential services. The absence of reliable services in developing areas of the world can quite clearly be considered as one of the most serious obstacles facing their socio-economic evolution.”

Butler, 1987

1.1 Introduction

Telecommunications (Telecom)^[1] is one of the world's most dynamic agents of change and, to an increasing extent, advances in telecommunications and telephony go hand in hand with cultural and social change. Responding to technological and economic forces, a growing number of countries are undergoing major changes in telecommunications sector policy, structure and regulation.

In recent years, telecommunications technology and business practices have changed very quickly. Firstly, a strong business demand has developed for better, more varied and less-costly communications services reflecting increased awareness of the economic importance of communications. Secondly, technological changes have greatly reduced the cost of information processing and transmission, and rendered advanced information and telecommunications services largely indistinguishable from each other. Thirdly, countries are responding to these factors through deregulation, privatisation and more competition.

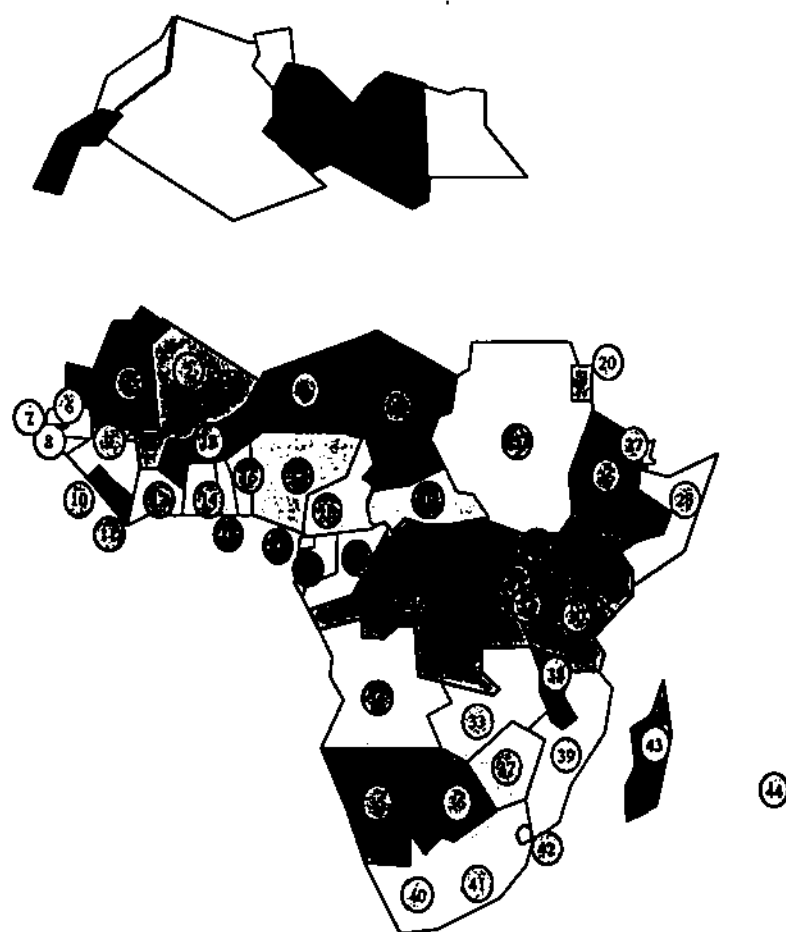
[1] The term's telecommunication, telecom and Telecomm's tend to be used indiscriminately in literature. Throughout this thesis, only "telecom" will be used unless circumstances require another version.

The growth in the field of electronic transmission of information has been one of the fastest and greatest achievements of this century. Underlining the important role of telecommunications in economic growth is the realisation that the development of an economy is often accompanied by regional inequalities that can result in a massive migration of workers to ill-prepared and overcrowded urban centres incapable of hosting them. However, the development of an intensive telecommunications system is shown to be associated with reduced regional income inequality, reduced economic reasons for migrating and alleviation of overcrowding (*Preece, 1987*). The magnitude of the telecommunications growth is measured in terms of the improvement and modification of products. Products are developed through research and the market response is determined by placing the products in the market and evaluating consumer response. According to *Preece (1987)*, telecommunications plays at least two major roles in the economy of any country: it is a consumer good and a basic productive input. In the productive process, telecommunications serves as a partial substitute for physical proximity, reducing location advantages associated with proximity to markets while allowing regional productive advantages such as low wages or rent to be reflected in business location decisions.

The telecommunications industry has become increasingly prominent in the last 10 years, not only in South Africa but also in the rest of the continent. South Africa and its telecommunications sector to large extent shapes the development of the industry on the African continent. This is especially true for Sub-Saharan Africa encompassing some 44 countries (*see Figure 1.1*). The democratisation of South Africa has paved the way for a formalisation of the integration of the constituent economies of the region following certain global initiatives to promote international trade and co-operation such as GATT. Trade in telecommunications and information services is likely to be an important theme in the new round of GATT negotiations and others of direct relevance to developing as well as industrialised countries.

The world market for telecom services is growing very quickly. The principles applied in the history of GATT have evolved. However, according to *Henton (1997)* those applying to telecommunications include the following:

Figure 1.1: Spatial orientation: Sub-Saharan Africa



1 Mauritania	11 Liberia	21 Equatorial Guinea	31 Rwanda	41 Lesotho
2 Mali	12 Cote d'Ivoire	22 Gabon	32 Burundi	42 Swaziland
3 Niger	13 Burkina Faso	23 Congo	33 Zambia	43 Madagascar
4 Chad	14 Ghana	24 DR of Congo	34 Angola	44 Mauritius
5 Sudan	15 Togo	25 Uganda	35 Namibia	
6 Senegal	16 Benin	26 Ethiopia	36 Botswana	
7 The Gambia	17 Nigeria	27 Djibouti	37 Zimbabwe	
8 Guinea Bissau	18 Cameroon	28 Somalia	38 Malawi	
9 Guinea	19 Central African Rep.	29 Kenya	39 Mozambique	
10 Sierra Leone	20 Eritrea	30 Tanzania	40 R.S.A.	

Source: Survey, 1998

- Market access: means that foreign suppliers are allowed to market their products on the domestic market in question;
- National treatment: means that foreign suppliers receive treatment equal to domestic producers; and
- Most Favoured Nations (MFN): means that all parties to the Agreement receive equal treatment to another party.

The present liberalisation of the telecom industry around the world is opening countries up to foreign telecom investors. In the telecom services area there is an increasing internationalisation of the industry, based on the commercial presence of multi-national companies.

Internationalisation is no doubt an important element in the development of competition and is increasingly a reality in the telecom sector, where it is driven by three sets of factors as defined by *Mansell (1997)*, viz. **technology** (i.e. digitalisation, optical fibres, network access, standardisation), the **economy** (i.e. economics of scale, comparative advantages, transport costs and market convergence) and **policy** (i.e. liberalisation, competition and political convergence).

These conditions create opportunities for private sector telecommunications companies to compete in an open economy not regulated by government. Changes in sector policy and structure increase the number of firms and the competitive pressure in the telecommunications and information business. These changes also blur the boundaries between information service users and providers. Inextricably linked to the widespread adoption of information technology is the capability of new products and processes to capture, manipulate, communicate and store data. As a consequence, products and services are more easily integrated into systems comprising communications infrastructure and tradable information in a networked economy. Furthermore, these changes also expand telecommunications and information markets from national to world levels, unleashing aggressive competition. A veritable worldwide wave of change in telecommunications sector policy and structure has thus been set in motion.

It is within this context that the foreign trade operations of Siemens Telecommunications (Pty) Ltd., referred to as “Sietel” in this thesis, will be analysed in Sub-Saharan Africa context as a case study.

1.2 Problem statement and research objective

The external and internal environment in which the telecommunications sector operates has been subject to considerable turbulence resulting from the interaction between changing technology and consumer demand. There is a realignment of regional inter-relationships in an increasing global space economy. It is within this global space economy that Sietel has to find a comparative advantage in trade as the basis of regional comparative advantage is rapidly shifting as the existing relational distances between places are being re-defined by telecommunications-based computer innovations.

To remain competitive in this environment, Sietel needs to continually assess its cost structure, the market and changing demand and effective competition.

The telecom sector is characterised by very large *investment costs*. The most important factors of input to investment in telecom networks are electronic equipment, cables and wires. Prices of electronic equipment have decreased rapidly and are expected to continue declining in future. Improved technology and the introduction of optical fibres have reduced the cost of cables substantially. Technological improvements have changed the balance between services quite dramatically. However, the impact of macro-economic variables such as the exchange rates could increase these costs.

As a large proportion of costs of telecom can be attributed to long term investments in the access network equipment, so careful *forecasting of network requirements* is essential for cost-effective provision of telecom services. Although many new services have been introduced, telephony is by far the most important service and its demand has a very low sensitivity to changes in tariffs. More expensive services such as long distance telephony tend to be more sensitive than local telephony, which is more of a necessity. New services need to establish a critical mass of network subscribers before they really can become useful and the market can unfold. Telecom services are offered to two distinct groups of customers with different patterns of demand, namely business and residential customers. In economic theory, the notion of *perfect competition* is used to characterise an unregulated market where the forces of competition drive down prices to the level of production costs, and both price and production develop in such a way

that the social welfare of the community served is optimised. Such a market can be established if the following conditions are met: there must be a sufficient large numbers of independent suppliers, a sufficient number of independent consumers, free and easy entry and exit of suppliers and full market knowledge of market conditions. The most important barriers to the entry of new suppliers are:

- *Economics of scale*: the opportunities for reduced costs with increased output providing efficiency advantages; and
- *Economics of scope*: the savings related to supplying a number of different services by the same company. Three different types of economies of scope include:
 - ◆ Economies of horizontal integration (e.g. telephony and data);
 - ◆ Economies of vertical integration within the network (e.g. local and long distance, voice and value added network services); and
 - ◆ Economies of vertical integration beyond the network (e.g. information production and distribution).
- *Economies of density*: is related to the fact that network cost per connection decreases with increasing density of connections (*Falch, 1997*).

The market is becoming more diversified with an increasing range of services offered to new companies, most of which have not invested in their own physical infrastructure but rely on network capacity leased from other operators. The local industry has transformed itself into export-led companies with distinctive niche markets. Sietel needs to develop its niche market within the aforementioned framework.

The primary objective of this dissertation is to determine how Sietel, as a major player in the telecom sector, can optimise and increase its trade performance.

It is perceived that the expansion of the South African telecom industry into Sub-Saharan Africa is an important step in retaining the lead in the electronics industry in Africa and will consequently increase both opportunities and growth within the industry.

1.3 Aim and purpose of study

The declared aim of this thesis is to study the telecom sector in South Africa and Sub-Saharan Africa and to develop and propose a marketing strategy for Sietel. More specifically, the major objectives of this study are:

- To highlight the telecommunication sector's potential in both South Africa and Sub-Saharan Africa within the economic and political framework, telecom infrastructure, market structure and major competitors;
- To describe the institutional arrangements with specific reference to Sietel, human resources, and performance of the telecommunications sector in South Africa;
- To analyse the financing of the telecommunications sector in Sub-Saharan Africa;
- To model Sietel's imports and exports in a fluctuating market; and
- To propose and develop a framework for a strategic market planning model.

1.4 Methodology of study

As stated in *Section 1.2* above, namely to remain competitive in the Sub-Saharan Africa environment, the company needs to continually assess its cost structure, the market and changing demand and effective competition. Simple econometric models have been developed to demonstrate how these aspects could be addressed.

The methodology involves building a time-based mathematical optimisation model using the computer based solver program known as Quatro Pro-Solver to develop a purchasing plan that will minimise the costs of purchase of telecom equipment (i.e. optical fibre, cellular network and transmission equipment) and storage (including statutory costs) over a period of 12 months.

As import costs comprise a major portion of purchase costs, which are subject to exchange rate fluctuations, the company also needs to investigate the possibility of reducing of costs and the exchange rate risk by buying on the futures market.

This model can be linked to a sales-forecasting model using a simple exponential regression model to predict future sales (1 year ahead) based on historic time series data. The model can also be adapted to forecast sales by country and product.

A SWOT analysis of Sietel will be performed to determine the **strengths, weaknesses, opportunities and threats (SWOT)** that are expected to develop in future with the ultimate aim of identifying Key Success Factors (KSF's) and developing a logical framework for a strategic market planning model.

1.5 Outline of study

Chapter 1, i.e. this chapter, gives a brief overview of the telecommunications industry, of changing policy and highlights some of the major objectives to impact upon telecommunications. This chapter also contains the problem statement and details the purpose of this study, the methodology to be followed and the basic outline of this study.

Chapter 2 describes the telecommunications industry in South Africa within the context of its political and economic environment, the telecom market structure, infrastructure, policy framework and regulatory issues and major players.

Chapter 3 contains an overview of the telecommunications institutional arrangements in South Africa, identifying the major players with special reference to Sietel in the telecommunications sector in South Africa and also highlighting their role and activities.

Chapter 4 analyses the performance of the telecommunications sector in South Africa and the role of the telecommunications sector in the South African economy.

Chapter 5 describes human resources in the telecommunications industry within a changing operating environment with specific reference to the social aspects, education, as well as an affirmative action programme with specific reference to Sietel.

Chapter 6 contains country profiles of some selected Sub-Saharan countries and covers aspects such as the political and economic environment, communications infrastructure and their market structure. It will provide a baseline information base of

telecommunications indicators with which to analyse the future demand and supply of telecommunications products.

Chapter 7 highlights the paradoxes in the financing of the telecommunications industry in Sub-Saharan Africa and the integration of telecommunications into an Africa development programme.

Chapter 8 deals with the theoretical considerations and the construction and application of a spreadsheet model to optimise Sietel's purchases and minimise costs in a changing market. The use of a simple exponential regression model will be demonstrated as a method to forecast sales.

Chapter 9 contains the summary, conclusions and proposals to the research.

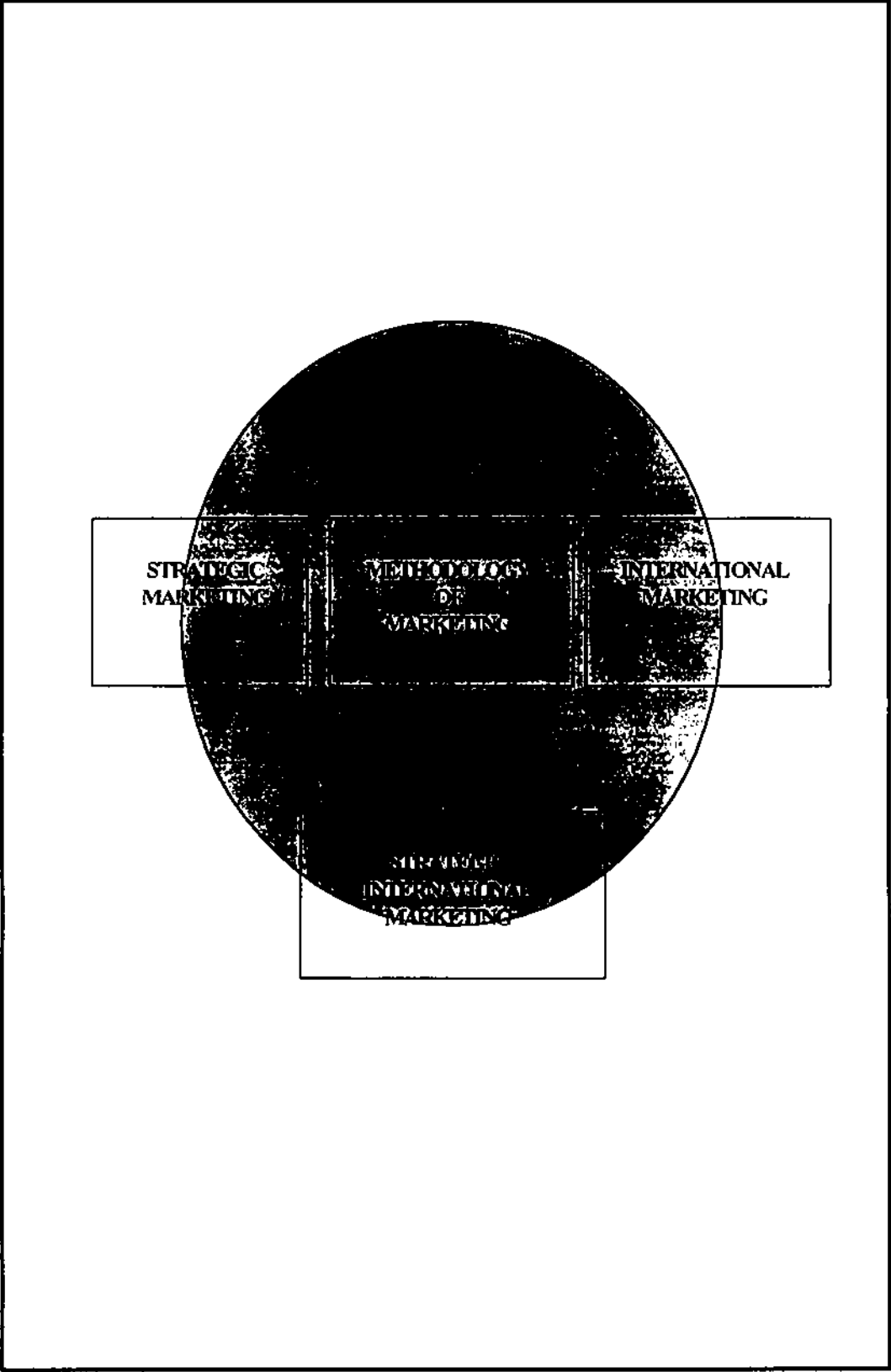
The extensive **Bibliography**, which is found after the concluding chapter, consists only of literature and sources consulted in the preparation of this thesis.

A list of **Conventions and Abbreviations** is appended to lighten the burden of technical and other telecommunications-related acronyms.

The **Annexes** contain information, which is pertinent but adjunct to the body of the thesis:

Annex A	GNP of the Sub-Saharan Africa countries
Annex B	GNP per head with PPPS 1992
Annex C	Cash flows
Annex D	Exchange rate against the US\$
Annex E	% growth in GNP
Annex F	Nominal GNP by region
Annex G	Competitor's annual sales growth
Annex H	South Africa demographics and economic indicators from 1994 to 1998

Figure 1.2: Strategy for Marketing



Source: Survey, 1998

CHAPTER 2

2. The telecommunications sector in South Africa in context

"We will use this [Global Information Infrastructure] to help our respective economies and to promote health, education, environmental protection and democracy ... [The ITU] adopted five principles for a GII which the nations of the world have been putting into practice: Private investment. Market-driven competition. Flexible regulatory systems. Non-discriminatory access. And universal service."

Gore, 1994

2.1 Introduction

The telecommunication's industry has become increasingly prominent in the last 10 years not only in South Africa, but also in the Sub-Saharan Africa countries as well as in the rest of the continent (ADB, 1998). The operating environment of the telecommunications sector consists of distinctive components, viz. the historical, economical, technical, institutional, political and technological resource components. All of these components impact on the telecommunications sector in terms of its operations, effectiveness and efficiency.

The aim of this particular chapter is to analyse the telecommunications sector within the context of its environment with specific reference to the historical, economical and technical resource environments to highlight the telecommunications industry potential in the development of the South Africa economy.

2.2 The economic and political environment in South Africa

The commercial sectors of South African economy rely heavily on one or, at best export to Africa countries. The bulk of trade occurs with industrialised nations, which require raw materials and sell industrial and consumer goods (Orley & Amos, 1987). Trade between African countries is limited by the competitive, rather than complementary, nature of their products and by trade barrier such as tariffs and the instability of

currencies. Most former British colonies in Africa continue to have close trade relations with Great Britain and keep some monetary reserves in London. Former French colonies have even closer ties with France and most are members of the French franc zone. In addition, most African countries have economic ties with the European Union and benefit from some tariff barrier reductions. Few successful intra-African economic systems have emerged. The most durable and successful are the Economic Community of West African States (ECOWAS) and the Economic Community of Central African States (ECCAS). The Organisation of African Unity (OAU) also promotes intra-African trade and economic development (*Mayer, 1979*).

2.3 Political changes

South Africa has completed a process of fundamental political change through negotiation. This political transformation has been gradual rather than abrupt, and largely peaceful, yet it has had a profound effect on the economic and social fabric of the country.

In April 1994, South Africa's political system changed from constituency-based representation, for non-blacks only, to proportional representation for all races. The final step to full democracy was the successful local government elections held in October 1995. The Government of National Unity (GNU) was an agreement for power sharing among parties, which polled more than 5 per cent of the April 1994 vote. A provisional constitution was agreed upon in 1993 while the final Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) was ratified in 1996 (*Republic of South Africa, 1996c*).

The most important macro economic events of the 1980s and the first half of the 1990s included the economic success of countries in Asia, the formation of regional trading blocs in the industrial north, the partial restoration of macro-economic stability in Latin America and the successful completion of the Uruguay Round of the General Agreement on Trade and Tariffs (GATT) (*Hopkinson, 1993*). The democratisation of South Africa has paved the way for a formalisation of the integration that has long existed between the constituent economies of the region. This formalisation requires

strong regional institutions that can be built on existing institutional infrastructure in the region.

However, the global economy has become integrated as a result of certain global initiatives to manage international trade and co-operation. The prime example of such rules is the GATT, which also includes rules governing regional trade agreements (*GATT, 1993*). These rules of international commerce are important for South Africa. They determine the way in which this country can interact with the industrialised nations, with its partners in other regional and global clubs such as the Commonwealth and the OAU, with other developing countries, with the bilateral and multilateral donor community and with our neighbours in Southern Africa. The integration of the global economy also places restrictions on the economic policy options that a country can exercise. This is the result, for example, of competition between countries for the global investable surplus resulting from the breaking down of international barriers to financial flows from both public and private sector sources (*Agrifutura, 1994/95*).

2.4 Economic Indicators

In May 1993, the South African economy emerged from its longest recession since the Second World War. The economic upswing faltered somewhat in the first half of 1994, due to political uncertainties around the time of the general election, but growth in the Gross Domestic Product (GDP) strengthened during the second half of 1994 and accelerated as it became apparent that the new political dispensation had been established in a peaceful manner.

Adverse weather conditions, the mining of lower-grade gold-bearing ore, and frequent disruptions of gold production led to a slackening of economic growth in the first half of 1995. The second half of 1995 saw fairly high rates of increase recorded in the output of all economic sectors, with the exception of agricultural production, which was still hampered by drought.

Despite these ebbs and flows of economic activity, 1995 saw an average of the Gross National Product (GNP) growth of 3,3 per cent, the highest rate since 1988. If the

mining and agricultural output, which accounts for about 15 per cent of GNP, is excluded, growth in the rest of the economy achieved 4,5 per cent. Domestic expenditure grew by more than 5 per cent. Within this, real private sector fixed investment rose by 16 per cent, the largest annual rise in 7 years. Consumption spending grew by more than 4 per cent (*ADB, 1998*).

Table 2.1 summarises major socio-economic indicators of the South African economy by province:

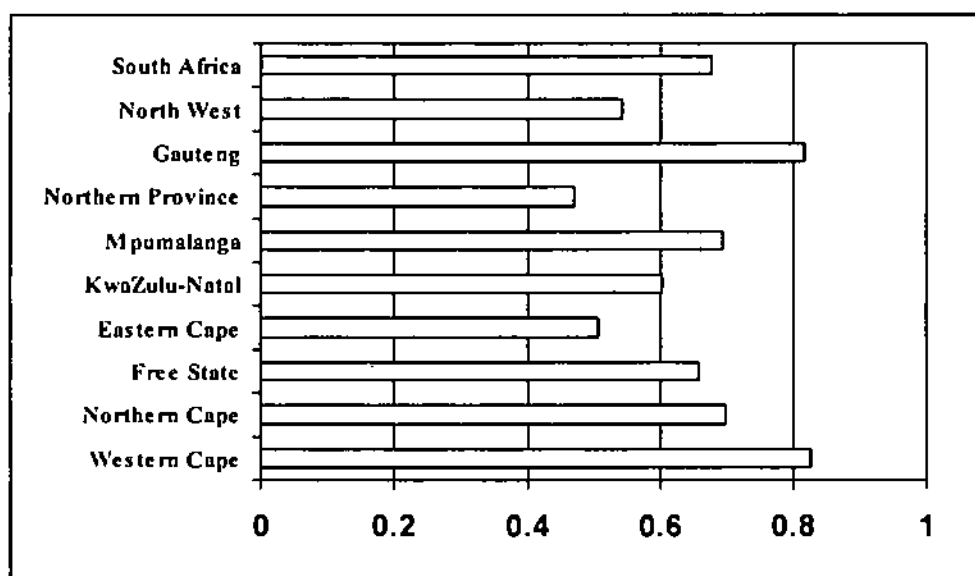
2.4.1 Population and human development

In 1994, the population of the South Africa numbered 43,09 million. Between 1985 and 1994 the population growth rate was 2,7 per cent (*DBSA, 1998*). The level of human development in a country is measured by the freedom of its inhabitants to choose, and to act on those choices. In order to make informed choices, people must first have some basic human capacities and, secondly, a reasonable range of opportunities.

The human development index (HDI) proposed by the United Nations Development Programme (UNDP) uses life expectancy and adult literacy as an indication of people's capacities, while income is used to symbolise their opportunities. In the UNDP's 1995 *Human development report*, countries were ranked according to the level of human development of their population in terms of these three indicators, affording equal weight to each.

The UNDP estimates South Africa's HDI for 1992 to be 0,705 out of a possible 1,0, while the Central Statistical Service (CSS) calculates a figure of 0,677 for 1991 (see *Figure 2.1*). This places South Africa in the ranks of medium human development countries (0,5 to 0,8). Countries with a similar level of human development include Peru, Uzbekistan and the Philippines. The HDI of the Western Cape is the highest of all nine provinces, (0,826), which would place it with Malaysia and Thailand (*DBSA, 1998a*).

Figure 2.1: Provinces: Human development index, 1991



Source: CSS, 1995

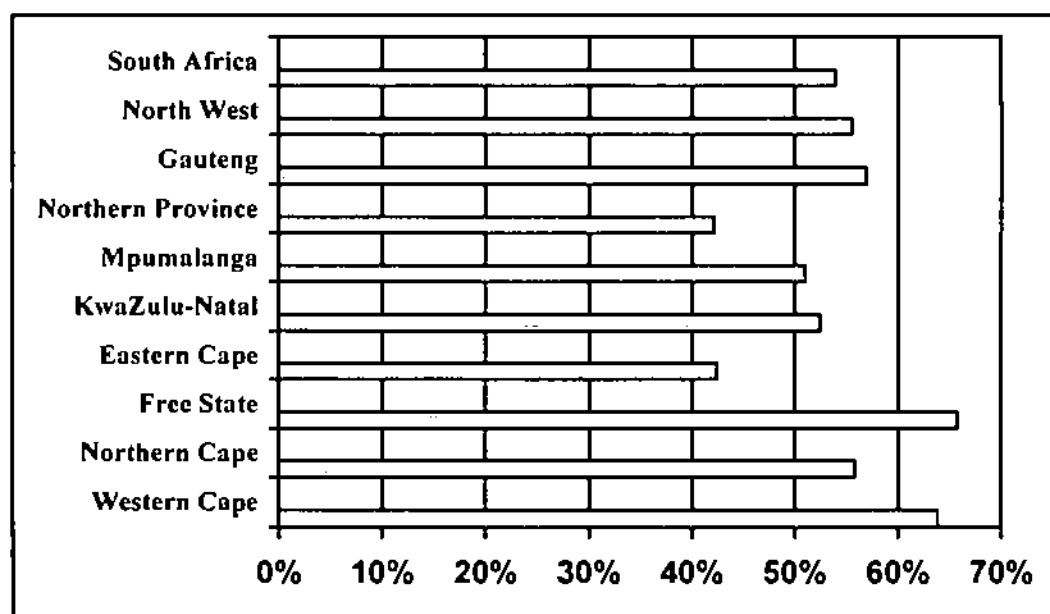
2.4.2 Labour force

Data on the labour force are drawn from the 1995 October Household Survey of the Central Statistic South Africa (*CSS, 1995*). The potentially economically active population of a region consists of all people in the 15 to 64 year age group. In 1994, 59,1 per cent of the potentially economically active population of the South Africa was actually economically active (i.e. employed, unemployed or in the informal sector).

The labour force (those in the formal sector, the unemployed and people in the informal sector) of the country numbered 14,4 million in 1995 and that of the 12 per cent of the country's total. It increased at an average annual rate of about 3,6 per cent between 1980 and 1995. This increase can be attributed to migration as well as to natural population growth. Despite relatively low population growth rates, about 50 000 people enter the labour market annually. The province attracts a number of migrants. On a 1:1 male to female ratio, male absenteeism (presence) was +3,1 per cent in 1994. Skilled labour remains in short supply. Organised labour insists upon raising the real standard of living of its members, resulting in costly formal sector labour. This has led to a demand for higher productivity levels by WTO while labour absorption has remained low, despite increased production. Education and training should ease the situation in the long term, but the short term is likely to see an increase in the informal labour pool.

The South Africa economy is unable to cope with this influx of people, let alone provide employment for those already unemployed. In 1994, only 53,9 per cent of all the people available to the labour market could be accommodated in the formal economy (*see Table 2.1*). Although the absorption capacity is higher than the national average, employment creation remains far from adequate. This is borne out by the unemployment rate in the South Africa, which measured 29,3 per cent in 1995 (*CSS, 1995*).

Figure 2.2: Provinces: Labour absorption capacity, 1994



Source: DIBU, 1998

2.4.3 General economic trends

By the end of 1995, the current upswing had been in progress for some 31 months. The consensus of economic opinion was that it would be sustained into 1996 and, indeed, a 4 per cent growth was forecast for 1996. Business confidence was buoyant. Inflation was at its lowest level in 23 years, stable in the range of 6,5 per cent up to 7,5 per cent boosted respectively by a 7,5 per cent rise in the gold price in January/February 1996.

According to a publication by the Organisation for Economic Co-operation and Development (*OECD, 1995*), reduced distortions in international commodity markets

coupled with economic recovery in member countries and increasing import demand in the non-OECD areas will contribute to a modest nominal rise in world market prices for telecommunications commodities by the year 2000. The major factor affecting this outlook is the high rate of economic growth anticipated in non-OECD countries, especially in Asia and certain Latin American countries. It is anticipated that this will lead to higher levels of telecommunications consumption (*Meyer, 1998a*).

The financial Rand was abolished in 1995 as a further step towards abolishing South African exchange controls, to form part of a process to create a climate friendly to foreign investment and enterprise. Other issues, which today must still be addressed in order to encourage investment, are the crime epidemic, remaining restrictions on the free flow of capital, and the high and inelastic cost of labour.

Capital investment entering South Africa in 1995 was in the region of R20 billion (*USDC, 1996*). The US Department of Commerce (USDC) lists South Africa as among the Top 10 emerging world markets. South Africa is a founder member of the General Agreement on Trade and Tariffs (GATT) and its successor, the World Trade Organisation (WTO) (*GATT, 1993 and 1995*). In addition, South Africa has a number of investment incentives in place.

A major restructuring of state assets, through partial or full privatisation, aimed at providing a more dispersed ownership of equity in South Africa. The empowerment of previously disadvantaged communities, job creation, and access of small entrepreneurs to capital are also matters receiving urgent attention by both government and private enterprise (*BMI-T, 1996*).

Table 2.1 South Africa economy at glance

Indicators	Western Cape	North. Cape	Free State	Eastern Cape	KwaZulu Natal	Mpumalanga	Northern Province	Gauteng	North West	South Africa
Area (km ²)	129,386	363,389	129,437	170,616	91,481	82,333	116,824	21,025	118,710	1,223,201
Population, 1994	3,771,867	776,744	2,903,304	7,057,398	8,881,487	2,835,318	5,332,402	7,915,023	3,646,365	43,119,908
Population growth, 1985-1994 (%)	1,97	0,89	1,72	2,96	2,91	2,67	3,97	2,18	3,20	2,70
Density (persons per km ²)	29,2	2,1	22,4	41,4	97,1	34,4	45,6	376,5	30,7	35,3
Functional urbanisation level, 1994 (%)	89,4	77,0	62,5	43,3	45,9	49,5	32,4	97,0	49,8	57,9
Human development index, 1991	0,826	0,698	0,657	0,507	0,602	0,694	0,470	0,818	0,543	0,677
Personal income per capita, 1994 (R)	14,304	8,309	7,621	3,985	5,924	6,353	2,288	19,961	4,995	8,418
Literacy rate, 1994 (%)	95,41	80,55	85,18	73,11	85,01	76,20	74,27	93,77	70,05	82,77
Pupil/teacher ratio, 1994	23	25	34	39	37	36	35	27	24	32
Life expectancy, 1994	67,80	62,84	62,10	60,84	61,69	62,57	62,87	66,29	59,91	63,21
Infant mortality rate, 1994	26,28	30,89	44,53	57,09	43,84	40,41	55,91	34,53	42,47	41,0
Hospital beds per 1 000 people, 1995	3,58	4,29	3,5	3,07	4,13	2,29	2,9	6,35	3,91	3,93
Labour force, 1995 (000)	1,734	285	1,050	1 739	2,724	973	1,119	3,584	1,148	14,356
Labour absorption capacity, 1994 (%)	72,8	58,9	53,0	48,4	56,0	53,0	45,9	75,7	60,3	59,1
Unemployment rate, 1995 (%)	63,8	55,8	65,7	42,4	52,4	51,0	42,1	56,9	55,5	53,9
Male absenteeism rate, 1995 (%)	18,6	27,2	26,1	41,4	33,1	33,4	41,0	20,9	32,8	29,3
Male absenteeism rate, 1994 (%)	3,1	5,0	25,4	(28,8)	(15,5)	0,2	(24,1)	22,0	1,7	(5,3)
Dependency ratio, 1994 (No. of people)	1,2	1,8	2,0	3,0	2,2	2,5	3,0	1,3	2,1	2,0
Nominal GDP, 1994 (Rm)	53,873,8	7999,7	23,688,3	29,049,1	57,007,1	31,541,9	13,791,2	144,359,3	21,251,6	382562,0
Real GDP, 1994 (%)	34,337,8	5,288,0	15,688,3	18,535,5	36,628,7	21,664,9	9,129,0	92,183,9	14,260,5	247,716,7
Growth, 1980-1994 (%)	1,6	0,3	(0,3)	1,4	1,4	3,4	5,2	0,4	1,1	1,1
Contribution to GDP, 1994 (%)	14,1	2,1	6,2	7,6	14,9	8,2	3,6	37,7	5,6	100
Real GGP per capita, 1994 (R)	9,104	6,808	5,404	2,626	4,124	7,641	1,712	11,847	3,911	5,745
Real GGP per worker, 1994 (R)	31,322	33,892	24,799	24,799	25,521	44,955	17,836	46,569	21,585	32,161
Personal income/GGP, 1994 (%)	96,5	77,8	89,0	89,0	88,9	59,3	81,0	94,9	78,7	88,8

Source: DBSA, 1997

2.5 Key economic sectors

The level of manufacturing output in the first nine months of 1995 recorded an increase of 8,5 per cent above that of the corresponding period for 1994, with a slight slowdown in the fourth quarter. This growth can be attributed to the high level of export demand, owing in part to the normalisation of South Africa's international trade relations, and in part to the international economic recovery. Other factors include:

- Buoyancy in private sector domestic demand;
- Increased utilisation of existing production capacity in most manufacturing activities, especially mineral beneficiation;
- Commissioning of the new Columbus stainless steel plant; and
- An increase in productivity correlating to a decline in labour unrest in the manufacturing industry.

The expansion of the electricity network to the less-developed regions, as well as real activity in the economy, led to a 3,5 per cent growth rate in 1995 for this sector (*CSS, 1995*). Similar growth had been achieved in 1994. Activity in the retail, wholesale and motor trade was boosted by the positive consumer confidence, rising personal disposable income and the availability of credit.

The third quarter of 1995 saw the level of real output in the motor trade peak at levels 17,5 per cent higher than levels in the previous year. This demand for new and used motor cars and commercial vehicles was driven by higher levels of business investment, increased activity in the car rental sector, and by both business and tourism activity, more stable labour relations and improved productivity, and increased export of automotive components (*CSS, 1995; RDP, 1996*).

During 1995, the high growth in the transport, communications and financial services was supported by the general buoyancy in aggregate domestic demand, increased international trade, the sharp increase in foreign tourism and the further integration of South Africa's financial markets into the global financial network. Communications services have also been boosted by the successful establishment of the cellular telephone network in South Africa.

2.6 Communications infrastructure from 1991 to 1996

The period 1991 to 1996 saw the largest expansion of telecommunications services and related industries in the telecommunications sector of South Africa. The major changes that have occurred over this period are, according to Sietel:

- 1991 – The Department of Post and Telecommunications was unbundled and three separate entities were formed, viz.: the Department of Posts and Telecommunications (government ministry), Telkom SA Ltd. (100 per cent government owned) and the South African Post Office Ltd. (100 per cent government owned);
- 1991 – Licence requirements for the Value Added Network Services (VANS) industry were published. This started the true development of the VANS sector;
- 1993 – The radio-trunking licence requirements were published after years of lobbying with the Government. This saw the birth of the radio-trunking industry;
- 1993 – The licence requirements for the cellular industry were published. This saw the start of the rapid growth of the cellular industry in South Africa;
- 1995 – Launch of the “Green Paper” and “White Paper” process to develop a new Telecommunications Act. The Green paper process was completed by the end of October 1995 after public comment was received. The “White Paper” process then started when the revised “Green Paper”, which reflected public inputs, was introduced into Parliament for debate by both the house and portfolio committees; and
- 1996 – Publication of the draft Telecommunications Act, 15 November 1996 (*Republic of South Africa, 1996b*).

2.7 Telecommunications market structure

Telkom SA Ltd. has been given the mandate as the sole provider of fixed wire telephones. This mandate is set out in the Post Office Amendment Act of 1991. There is no legal competitor in the field of fixed wire telephony. The Cellular, Paging, VANS, Radio Trunking and Satellite sectors all operate in an open and competitive market where market forces shape the sectors (*Republic of South Africa, 1997*).

Telkom SA Ltd. needs to move from the monopolistic position to an open competitive environment in accordance with the international trend. Owners, investment and financing are issues, which are at present subject to the government's state asset restructuring process of the telecommunications industry.

The following points are steps of importance in the economic empowerment of historically disadvantaged South Africans:

- The provision of universal service through the extension of affordable and accessible telecommunications service to all communities, which will enhance social and economic activities in historically disadvantaged communities. Similarly programmes will be developed to appoint and promote qualified individuals in this sector and provide opportunities for broader participation through procurement mechanism and operator licensing conditions;
- Establishment of an independent telecommunications regulatory authority, the South African Telecommunications Regulatory Authority (SATRA);
- Creation of a balance between affordability and the needs of the operator to expand and upgrade its network;
- The degree of tariff regulation will be dependent upon the competition existing in the telecommunications sector;
- Restriction of the cross-subsidisation of costs;
- Develop affordability mechanism to ensure universal accessibility;
- A strong and vibrant telecommunications equipment supply industry is required to meet the telecommunications challenges faced by South Africa it she moves into the 21st century;
- Phased reduction of protection measures which violate the government's World Trade Organisation obligations-stimulation of the industry through supply side measures and creation of strategic partnerships through licensing conditions;
- Operators should be compelled to direct some of their purchases from SMME's; and
- Promotion of the industry's pro-active contribution to empowering historically disadvantaged communities (*Republic of South Africa, 1997*).

The Regulator SATRA will support the following five telecommunications focused human resource development areas:

- 1) Training and re-training of human resources;
- 2) Development and growth of the training of artisans and technicians;
- 3) Development and growth of undergraduate higher education;
- 4) Development and growth of postgraduate training and research; and
- 5) Promotion of interest in technology among school children (*SATRA, 1997*).

South Africa must participate fully in regional and international co-operation bodies as a leading player in Southern Africa. Existing licence holders should not be prejudiced by any legislation arising from the new telecommunications policy. All operators must be licensed to ensure effective regulation and the discharging of their obligations regarding universal service and access.

Table 2.2 depicts the leading Telkom telecommunications indicators in South Africa illustrating the industry's performance in 1994 to 1995.

Table 2.2: Leading telecommunications indicators

	1994	1995
Teledensity (DEL'S/100 people)	9	9
Revenue per DEL*(Rand)	2339	2552
Revenue per employee (Rand)	137 209	162 109
Operating cash flow/DEL (Rand)	714	703
Net Income/DEL (Rand)	212	224
No.DEL's / employee	60	64
% Call completion	61	62
Waiting list for main lines	121 917	N/A

*Direct exchange lines (DEL)

Source: SATRA, 1997

2.8 Policy and regulatory issues

The Minister of the Post and Telecommunications and Broadcasting initiated the process of re-alignment by launching the Consultative Green Paper on Telecommunications Policy on 7 July 1995 and by inviting the public to respond to the

policy questions it posed. The Green Paper was itself the product of extensive consultation with the telecommunications sector. The network operators, labour, civic and black business groupings, the Electronic Industries Federation and the National Telecommunications Forum all participated in the formulation of the policy questions contained in the Green Paper. The Green Paper was drafted by a Technical Task Team, assisted by number of international experts and local Advisory Panel.

The Telecomm's Technical Task Team prepared an initial draft of the White Paper, which was tabled for discussion at the National Telecommunications Forum Plenary Conference on 5th February 1996. Recommendations arising from these discussions were then incorporated into a final draft, which was submitted to the Minister and Cabinet for approval. A White Paper was then tabled in Parliament on 19th March 1996. It is anticipated that the Telecommunications Bill as draft legislation will be submitted to Parliament during course of year. The White Paper which is statement of government policy on the future development of telecommunications in South Africa, is divided into ten chapters dealing with the following areas:

- *Telecommunications;*
- *Development and the establishment of a universal service agency;*
- *Market structures in the sector;*
- *Ownership, investment and financing;*
- *Economic empowerment of historically disadvantaged South Africans;*
- *Regulation of the telecommunications sector and the radio frequency spectrum;*
- *Affordability and tariff setting; the equipment supply industry;*
- *Human resources for the sector;*
- *Regional and international co-operation; and*
- *Legislative reforms (Republic of South Africa, 1996b).*

Prior to the 1990's, the only other licensed operators were the paging industry and land and mobile two-way radios.

Apart from managing the equity partner ship process, the Ministry for Posts and Telecommunications and Broadcasting has ushered in a new regulatory framework for

the South African telecommunications sector. In March 1996, the government issued a new regulator, the South African Telecommunications Regulatory Authority (SATRA), as well as a Universal Agency to promote affordable access to telephony (*Republic of South Africa, 1996b*).

2.8.1 Telecommunications Acts

South African communications is subject to Act 103 of 1996, which became law on 15 November 1996. In practical terms, the major influencing factors will be the regulations passed by the South Africa Telecommunications Regulatory Authority (SATRA), to the act gives force and effect, and Telkom SA's operating licences.

The new Act 103 (1996) states that its primary object is provide for the regulation and control of telecommunications in public interest and list a number of objectives consistent with which the minister and SATRA must exercise their powers and duties under the Act 103. These include promotion of universal service and encouragement of competition as well as the protection of interests of local communities (*Republic of South Africa, 1996b*).

Access to communications is identified as key to the government achieving its economic and social goals (*Republic of South Africa, 1996b*). Telecommunications will contribute to economic growth and stimulate growth in other sectors (*Republic of South Africa, 1996b*). Integrated high quality networks providing value-added services and access to the information superhighway is central to supporting South Africa's internationally competitive industries and linking the economy to the global system sectors (*Republic of South Africa 1996b*).

2.8.2 SATRA's Role

Under the Act 103 from 1996, SATRA has certain general powers as well as specific ones. Included in its general powers are:

- Conducting enquires into any matter which is relevant to the achievement of the objects of the Act and/or the performance of its functions under the Act;

- The control, planning, administration and licensing of the radio frequency spectrum;
- Prohibiting any uncompetitive actions which a telecommunications licence holder is, or may intend, taking and number of areas provided for in the Act;
- Preparing a frequency band plan with respect to the radio spectrum and issuing licenses and certificates with respect to radio use;
- Dealing with applications for telecommunications licences, including rejecting the application or in the case of certain licences, recommending that the minister grant it and, in other cases, granting the application itself;
- Resolving interconnection disputes;
- Prescribing the level of tariff-setting by operators in areas where no, or insufficient, competition exist;
- Issuing regulations restricting or prohibiting the ownership or control of operators; Specifically in relation to Telkom SA Ltd. an undue advantage over any person who in the future may be granted a licence in competition with Telkom (*Republic of South Africa, 1996b*); and
- Investigating and adjudicating on alleged contravention of the Act or any licence and, in the case of contravention, issuing orders, imposing fines or ultimately revoking the licence concerned (*Republic of South Africa, 1996b*).

2.8.3 Minister's Role

The minister's key roles under Act include:

- Issuing policy directions' to SATRA which must be consistent with the objects of the Act;
- Approving regulations made by SATRA under the Act, without which they will not valid;
- Regulating the introduction of competition in the sector by deciding when applications for certain key public licences, may be lodged or resale restrictions, etc. should be lifted; and

- Issuing guidelines, which will cover the first three years of Telkom's SA Ltd. licence governing the level of interconnection charges, which Telkom SA Ltd. may charge and the level of tariff setting which it may operate.

2.9 Major players in the telecommunications industry

A major player in the sector is The Electronic Industries Federation (EIF) which is an umbrella body representing private firms, public-sector corporations and industry associations. Together these organisations account for about 90 per cent of the South African electronics sector's activity, including telecommunications. The major players in the telecommunications supply sector in South Africa are all established companies with substantial investment in facilities and an outstanding skills base that is unrivalled in Africa and is, in many respects, world class.

The EIF's members are united in the conviction that the existence of a vibrant local electronics and telecommunications industry is essential to the future economic and social well being of all the people of South Africa. The reasons are fundamental: all other industries depend on electronics and telecommunications. Without high-level local capacity in these fundamental components of progress, Sub-Saharan Africa will be economically marginalised, relegated to permanent membership of the world under-class of losing nations, and all the problems of the consequent civil strife (*EIF, 1997*).

Member organisations of the EIF include:

- *Companies* – Allied Technologies (Altech); Analysis, Management & Systems (AMS); Atio Corporation; BMI-Tech-Knowledge; Conlog; Futek Electronics; Grinaker Electronics; National Advanced Technologies (Natech); Plessey South Africa; Reunert; SA Philips; SA Micro Electronic Systems (SAMES); Salbu; Siemens; Spescom Electronics; Tedalex Manufacturing and TI Technologies.
- *Public sector corporations and industry associations* – Armaments Corporation of SA (Armcor); Eskom; Industrial Development Corporation; Mikomtek; CSIR; South African Bureau of Standards (SABS); Sentech and Telkom SA Ltd.; and
- *Associations* – Association of Distributors of Electronic Components (ADEC); BEA Information Technology; Electronic Component Manufacturers Associations

(ECMA); Land and Mobile Radio Associations (LMRA); South African Institute of Electrical Engineers (SAIEE) and South African Institute for Measurement & Control (SAIMC) (*EIF, 1997*).

Members of the Telecommunications Manufacturers Association (TMA) are: Aberdale Cables; Alcatel Altech Telecoms; ATC; Grinaker Electronics; Plessey South Africa; Sietel and Telephone Manufacturers of SA (*TMA, 1997*).

2.10 Conclusion

South Africa has replaced the liberation struggle with political stability and a spirit of co-operation. After decades of political turmoil, South Africa currently enjoys a new equilibrium.

On 14 of June 1996, the government announced a new macroeconomic strategy to promote growth employment and redistribution. South Africa has a modern, sophisticated economy, albeit concentrated in a few urban areas. Physical infrastructure, transport and telecommunications are well developed, with a financial service industry and a state retail sector. Indications are that the economy was bottom out in the course 1997. A new period of growth, fuelled by restocking inventories, better export prospects, higher import substitution and increased infrastructure expenditure in support of development initiatives will be the main tasks of the following chapters of this study.

CHAPTER 3

3. Telecommunications institutional arrangements in South Africa

"We may live in dangerous times, but they are dangerous only if we do not respond to the dangers. It is my hope that African operators realize the consequences of a "divided house" very soon and that greater collaboration occurs across the continent to deal with the huge challenges ahead."

Smit, 1998

3.1 Introduction

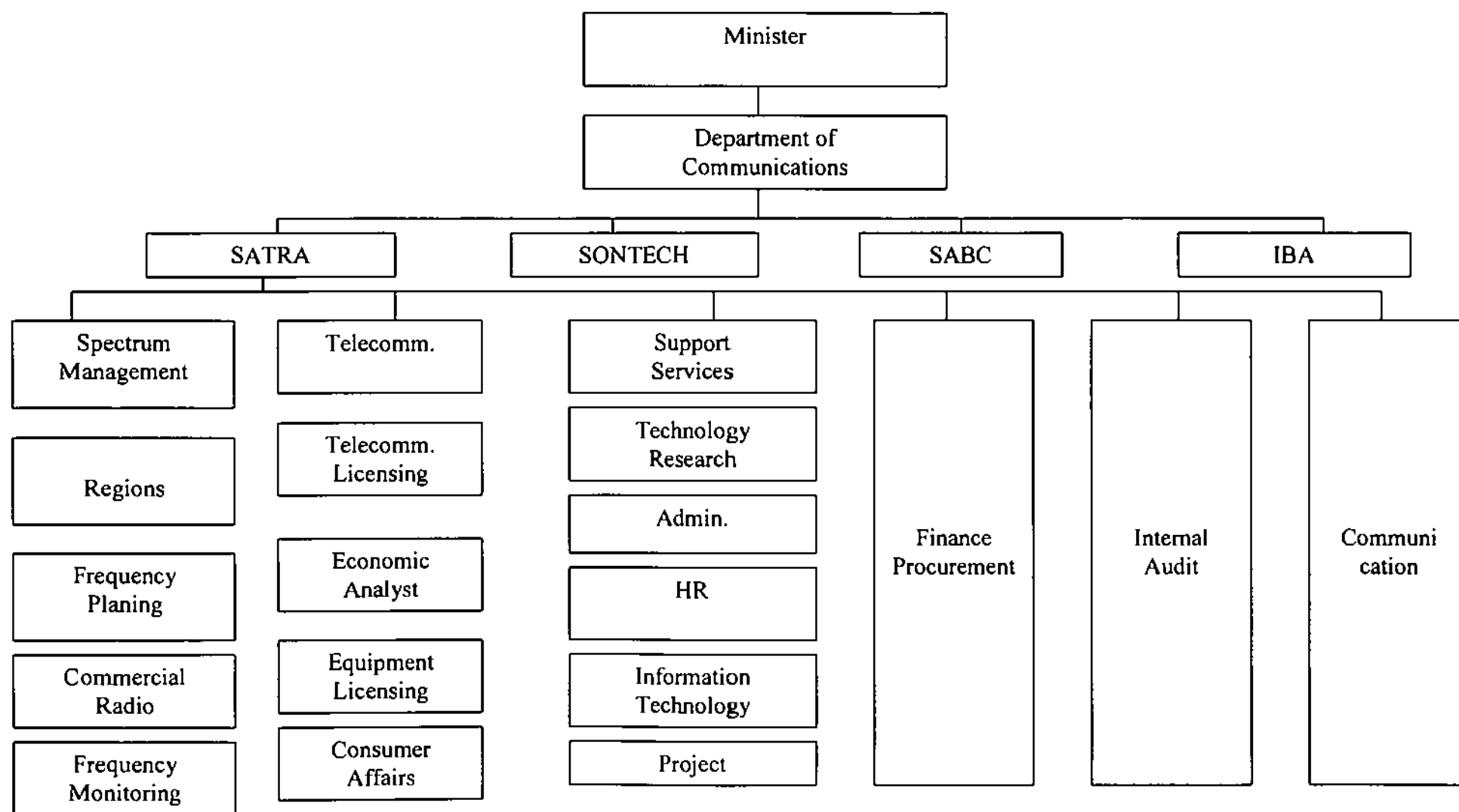
The framework within which the telecommunications sectors was radically changed in the 1990s (*refer to Chapter 2*). The regulatory framework created by the 1996 Telecommunications Act (103) embodies the policy objectives set forth in the Telecommunications Green Paper and the White Paper and will smooth the transition to robust competition among a variety of service providers in regulated environment. The key objectives of the Telecommunications Act are the following:

- Establishment of a clear set of rules that give certainty to potential investors;
- Promotion of fair competition within the telecommunications industry;
- Promotion of universal and affordable telecommunications services;
- Promotion of telecommunications services that are responsive to needs of users and customers; and
- Creation of Human Resource Fund and a Universal Service Fund (*Cooke, 1998*).

3.2 Institutional framework of the South Africa Telecommunications Industry

As mentioned in *Chapter 2* Telkom is the sole provider of fixed wire telephones. The Cellular, Paging, VANS, Radio Trunking and Satellite sectors operate in an open and competitive market where market forces shape the sectors. *Figure 3.1* shows the overall telecommunications institutional framework with the exception of the new regulatory body.

Figure 3.1 : South African telecommunications operators



3.3 Companies, organizations and service providers within the telecommunications industry

The following companies, organizations and service providers, according to viz. Telecommunications Manufacturers Associations (TMA) in (1997), manufacture or supply telecommunications equipment in South Africa:

- Autopage;
- EDS Africa;
- Eskom;
- FirstNet;
- FleetCall;
- Mobile Telephone Network (MTN);
- Orbicom;
- Project SABRE;
- Q-Trunk;
- Sentech;
- Siemens;
- Telkom;
- Trafix;
- Transtel;
- Vodacom;
- Alcatel;
- Ericsson;
- Philips;
- Atio Corporation; and
- NEC.

3.4 Telkom as a leader of the telecommunications industry in South Africa

According to *Hope, (1998)* on 14th May 1997, the Department of Posts and Telecommunications was divided to form four separate entities, namely the present Department of Communications: South African Telecommunications Regulatory Authority (SATRA), South African Broadcasting Corporation (SABC), SONTECH and Independent Broadcasting Authority (IBA). SATRA has remained in the government fold and is responsible for frequency management and regulatory functions, and the fully state-owned companies. Telkom SA Limited that operates under the laws and

regulations pertaining to a company registered in terms of the Companies Act (*Refer to section 3.1*).

Telkom SA Ltd. operates the largest and most modern telecommunications network on the African continent. The provision, installation and maintenance of all services are managed on a decentralised basis. To accommodate this, the country was divided into nine regions in 1994: Western Cape, Northern Cape, Free State, Eastern Cape, KwaZulu Natal, Mpumalanga, Northern Province, Gauteng and North West (*Refer to Chapter 2, Table 2.1*). The regions, with a staff complemented of 57 836, provide 3 524 000 telephone lines to business and residential clients. These regions are complemented by corporate divisions responsible for international services and telematic services, viz.:

- International telephone service;
- Undersea cable system;
- Maritime radio;
- Satellites (communications in space);
- Mobile phone;
- Cables;
- Switching equipment; and
- Optical fibre cables (*Sietel, 1998*).

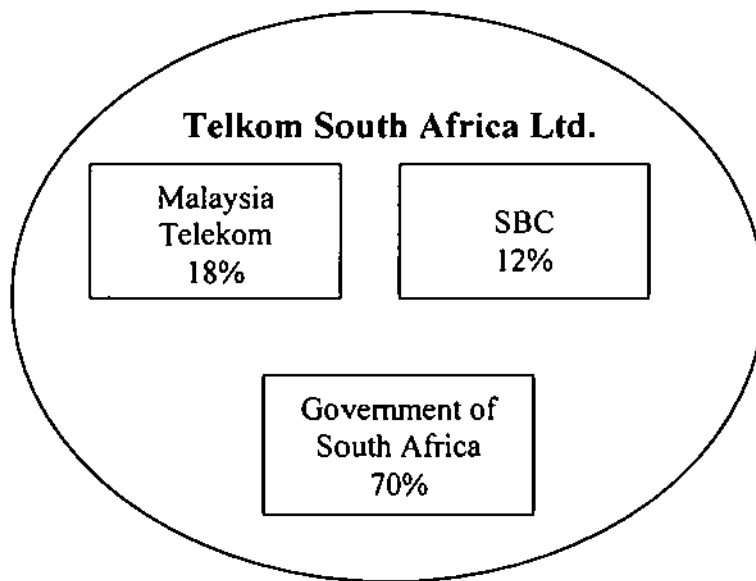
3.4.1 Overview of Telkom South Africa's activities

On 14 May 1997, Telkom SA Ltd. became the first state-owned enterprise in South Africa to acquire a strategic equity partner. The consortium of SBC and Telecom Malaysia has purchased a 30 per cent equity stake in Telkom for almost R5,6 billion, of which some R4,4 billion is being injected into the company to fund network expansion. A further 10 per cent equity stake has been earmarked for the economic empowerment of disadvantaged communities and workers in telecommunications sector (*Cooke, 1998*).

The current shareholding in Telkom SA Ltd. is shown in *Figure 3.2*.

Telkom SA Limited has since shifted its strategy, to also focus on core businesses that involve the provision of telecom services.

Figure: 3.2: Shareholdings Telkom SA Ltd.



Source: Global Communications Africa, 1998

The key elements identified in the strategy encompass the following:

- Operating national and international telecom networks;
- Stimulating or growing network traffic;
- Providing value-added voice and data services;
- Providing mobile communications services and infrastructure; and
- Becoming the telecom hub in Sub-Saharan Africa (*Republic of South Africa, 1997*).

Telkom SA Ltd. has launched the following initiatives to achieve its strategy, these are:

- Restructuring the organisation;
- Redesigning internal operations;
- Vision 2000 project;
- Equity restructuring; and
- Out-sourcing of non-core business (*Republic of South Africa, 1997*).

International business consultants Gemini have worked closely with Telkom SA Ltd. in 1997 to evaluate the business structure and identify priority processes that require redesigning to enhance Telkom's SA Ltd. competitive advantage. Telkom SA Ltd. has

adopted a customer focus strategy to achieve its objectives and has therefore restructured itself into four business units. Telkom SA Ltd. is currently allocating staff to the various business units to be more effective. The Telkom SA Ltd. Vision 2000 project aims to install and commission 4 million connections into various areas by telecommunications suppliers viz. Siemens, Alcatel and Ericssons (*Sietel, 1998*).

Telkom SA Ltd. commissioned advisers (*BMI-T, 1997a*) to provide solutions to:

- Increase the phone-penetration in under-serviced areas by one million lines;
- To achieve an increased telephone penetration in the under-serviced areas in South Africa;
- To modernise the network requires a huge capital injection, which will be used to finance capital expenditure developments; and
- To enhance skills and introduce new technologies.

Table 3.1, summarises the revenue earning businesses within Telkom South Africa Ltd.

Table 3.1: Financial statistics (R million), the revenue earning businesses within Telkom SA Ltd.

	1993	1994	1995
Total telecommunications revenue	7 081	8 360	9 642
Income from telephone service	5 612	6 588	7 647
Income from Telematics	389	490	527
Income from informatics	124	158	156
International services	956	1 144	1 312
Income from national services	6 125	7 236	8 613
Income from international services	956	1 144	1 312
Total capital	1 836	2 227	2 669
% of total Telecom services income	25,9	26,6	27,7
Expenditure on Telecom. infrastructure	1 676	1 946	2 449
% of total Telecom services income	23,7	23,0	25,4
Total employees	61 999	60 174	58 793

Source: Telkom Int., 1998

3.4.2 International loans in the telecommunications industry

Up to the late 1980s, the direct involvement of the international donor in South Africa was limited. In the context of international sanctions and apartheid regime that was

hostile to the progressive programmes being pursued by international donors. At the present, a large number of international public and private funding agencies launching South Africa telecommunications programme.

South Africa telecommunications industry and Telkom SA Ltd. secured a US\$ 450 million offshore medium-term loan facility from 1997 to 1998. The financing loan was syndicated through nine international banks (*IDRC, 1998*).

3.5. Sietel as a manufacturer and supplier of the telecommunications equipment in South Africa

Sietel has long been synonymous with the development and manufacture of leading edge systems and products in the communications arena. The demand for innovative local solutions has enhanced the ability of Sietel and associated companies to export South African made products throughout the world, while the high standard of local manufacture has ensured international acceptance.

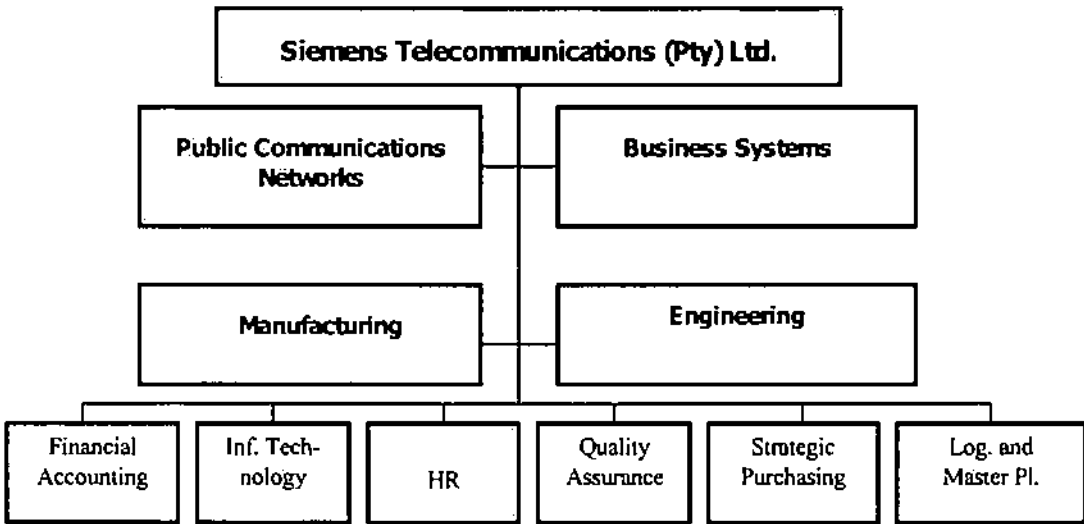
The organisation chart (*viz. Figure 3.3*) for Sietel has been established according to business unit requirements. Some of the units operate as profitable cost centres while others are non-profitable.

Sietel provides infrastructure to telecommunications network operators locally and elsewhere on the African continent. Its extensive range of systems and products include voice and data networks, switching and transmission systems, mobile digital cellular systems and rural radio. The Siemens Group world-wide is among the leaders in the field of electrical and electronic engineering with representation in 193 countries.

373 000 employees world-wide contribute towards a turnover of R 240 billion.

Siemens Ltd., South Africa, as part of the Siemens Group, is owned by Siemens AG with 52 per cent investment while the rest of equity is held by Siemens Beteiligungen Zurich (32 per cent), and the Industrial Development Corporation (16 per cent). Against this background, Sietel in Southern Africa is deploying its entrepreneurial spirit to make available engineering solutions to a broad range of applications.

Figure 3.3: Sietel Group Organization, South Africa (May 1998)



Source: Sietel, 1998

Sietel have persevered in accommodating the challenges set by authorities and its customers and has every intention of continuing with the program of growth through grassroots participation (Siemens, 1997h).

Sietel claims to have a well-focused and committed work force. Extensive modernised and automated manufacturing facilities maintain high environmental and safety standards. Sietel has the will and ability to provide solutions adapted to the needs of its customers. The development program of indigenous African products and systems has found favour around the world. The agenda for local content is therefore not only to create employment, but also to further strengthen the economic position of South Africa. Sietel will continue with the supply of technology infrastructure, which will help to put Africa on the road to becoming competitive on world markets, not only through its mineral wealth, but also through technologies, which cater for growth. These extend from telecommunications, power generation and distribution, health and transportation to mention a few. Sietel will participate in the process of change and continue with the investments in plant, equipment, training programmes and initiatives that benefit work

3.5.1.2 Initial experiences in Africa and the Middle East

Werner Siemens' interest in technology and his willingness to embrace innovations led him to Africa and the Arab nations, and he was soon fascinated with the region's natural attractions. From 1856 to 1857, Siemens acted as adviser to the British cable-laying project from Cagliari, Sardinia to Bona, Algeria. In 1859, he was appointed technical director for another British project to lay a cable under the Red Sea. He traveled extensively for this project, from Suez, Egypt to Aden, Yemen and on to Karachi, and from there to India (*Siemens, 1997m*).

Siemens gained a great deal of experience with marine cables early in his career, thereby laying the foundation for his later fame. The increasing importance of deep-sea cables led Siemens to construct a cable plant in Woolwich, England, in 1863. In 1864, Siemens headed yet another cable-laying project, this time from Cartagena in Spain to Oran, in Algeria.

3.5.1.3 International activities and the Indo-European Telegraph Line

Strategic considerations led to the founding of a subsidiary in England, "Siemens Brothers", which headed by Werner's brother William. The installation of the Indo-European telegraph line (1868-1870) was a considerable breakthrough for the company, establishing it as a major multinational enterprise. The 11,000 km stretch from London, England to Calcutta in India was an engineering marvel of its time and it remained operational until 1931 (*Siemens, 1997m*).

Deep-sea cable projects were a remarkable success, so in 1873, a cable-laying ship, the "Faraday", was constructed to further enhance operational capabilities. A year after its launching, this ship was instrumental in laying the first Transatlantic cable from Ireland to New York, USA. Following the installation of this first direct cable to the "New World", five more cables were laid in the following few years (*Siemens, 1997m*).

3.5.1.4 Telephony, high-speed telegraphy, long-distance call processing

The first telephones appeared in Germany in 1877. Werner Siemens quickly recognised the vast potential of this new communications medium. He markedly improved the range and speech quality of the Bell telephone and added this new mode of communication to the Siemens product line. Just a year after the introduction of the telephone in Germany, "Siemens & Halske" reached a daily production rate of seven hundred units; an especially remarkable achievement in light of the fact that a telephone network did not yet exist (*Siemens, 1997m*).

Werner Siemens' impressive achievements were honored by Kaiser Friedrich III in 1888, when he bestowed the rank of nobility on Siemens. After Werner von Siemens died in 1892, his sons Wilhelm and Arnold and uncle Carl headed the company.

In 1908, Siemens contributed to the introduction of Germany's first automatic public telephone switching system. Werner von Siemens established a tradition of innovation and revolutionary new technology, which remains the focal point of present-day company philosophy (*Siemens, 1997a*).

3.5.1.5 Achievement of Sietel in Sub Saharan Africa and South Africa

Siemens celebrated 150 years in business in South Africa. *Table 3.2* depicts chronological order Siemens achievements since 1860.

Table 3.2: Milestones of Siemens achievements in Sub-Saharan Africa

1860	Siemens and Halske complete the telegraph line between Cape Town and Simonstown;
1888	Installation of a Siemens and Halske telephone for President Paul Kruger;
1896	"Siemens and Halske" South African Agency founded;
1910	Completion of the first "Siemens House" at the corner of Simmonds and Anderson Streets, Johannesburg;
1913	First in-ear hearing aid available in South Africa;
1923	Siemens (S.A.) (Pty) Ltd founded;
1929	Installation of the first automatic telephone exchange serving 8 000 subscribers in Windhoek (in present-day Namibia);
1932	Establishment of a Durban Branch;
1935	Establishment of a Cape Town Branch;
1958	Signing of a 10 years contract between Siemens and the Minister of Posts and Telegraphs for the supply of telephone switching systems and telex equipment;
1961	Official opening of the first Telex/Gentex exchange in Johannesburg;

- 1962 Official opening of the first EMD (Nobelmetal Motor Selector) public telephone exchange at Bethlehem;
- 1967 Commissioning of the first national trunk dialling system on the completion of the automatic telephone exchange at Kimberley;
- 1967 Establishment of Port Elizabeth Branch;
- 1968 Signing of the second 10 year contract as supplier of telephone switching system, telex and power supply equipment to the South African Post Office;
- 1969 South Africa's telex network fully converted to automatic telex traffic;
- 1969 Completion of South Africa's international telephone exchange at Cape Town;
- 1972 Special telex network for the South African Railways and Harbours completed;
- 1974 Signing of contract for the extension of Mozambique's telex network;
- 1974 Telecommunications coaxial cable link for South African Railways and Harbours between Johannesburg and Cape Town inaugurated;
- 1974 New cable venture Siemens Cables (Pty) Limited formed;
- 1975 First ESK telex exchange officially opened in Durban following the decision by the SA Post Office to standardise on the telegraph cross-point exchange technique;
- 1976 Siemens builds a telecommunications factory at Waltloo, Pretoria;
- 1976 First orders from South African TV manufactures for locally-produced electronic components
- 1976 Official opening of the Rosslyn Factory of Siemens Cables (Pty) Ltd;
- 1976 Inauguration of the first CP24 electronic containerised public telephone exchange, installed at Constantia Park, Pretoria;
- 1977 Decision by South African Post Office to introduce Siemens fully electronic data switching system (EDS) from for international gateway telex exchange;
- 1978 Decision by SA Post Office to introduce the new Siemens electronic digital telephone switching system (EWSD) as one of the country's two future systems;
- 1979 Commissioning of EMD telephone exchange for the City of Cape Town in the new Civic Centre Building;
- 1979 Largest private telephone exchange type EMD in Southern Africa installed for Sasol in Secunda;
- 1979 South Africa's first electronic data switching exchange (EDS) commissioned in Braamfontein for the South African Post Office;
- 1979 Signing of the third agreement, this time for 15 years, for the supply of telecommunications equipment to the South African Post Office;
- 1979 Mozambique Postal Authorities standardise on Siemens type T1000 telex equipment;
- 1980 Delivery and start of installation for the first electronic/digital telephone exchange (EWSD) to SAPO (The first EWSD-D world-wide a Siemens product);
- 1981 South African Post Office approval of digital EMS-D 601 PABX;
- 1981 First order for an EMS-D 601 PABX received from the University of South Africa, Pretoria;
- 1981 Digital EWSD Public Exchange installed and commissioned in Sunninghill Park, Sandton;
- 1983 Orders for Teletex machines delivered to Department of Posts and Telecommunications - Teletex Service operation on a trial basis in Cape Town;
- 1983 South African Transport Services started field trials for Teletex;
- 1983 Installation of first EWSD - TK exchange for Department of Posts and Telecommunications commenced;
- 1983 First stage EWSD system approval completed by Department of Posts and Telecommunications;
- 1983 Successful commissioning of the first EMS 601 digital PABX system at the University of South Africa;
- 1983 South African Post Office approval received to market the Siemens EMS 91 digital PABX;
- 1983 First Digital PABX (EMS 601) supplied and installed in Natal for S.A. Breweries, Ltd., Prospecton, Durban;
- 1984 First three EMS 601 digital PABX's commissioned in Windhoek, Namibia;
- 1984 Namibian Department of Posts and Telecommunications order their first EWSD-DE 5 telephone exchange for Windhoek;
- 1985 Introduction of the world's most modern mobile telephone network (C network);
- 1989 Installation of a 1500 extension EMS 601 at Johannesburg Municipality and a 2000 extension EMS 601 at Edgars head office;
- 1990 Introduction of the Hicom 120 PABX system in Johannesburg;
- 1991 Installation of the largest network of Claire Telephone Management systems for Transnet in Natal;

- 1991 Installation of a Hicom 4100 Communications system for Transnet;
- 1991 Launch of the Siemens C30 Flexiphone (Mobile Telephone);
- 1991 Local manufacture of the Hicom 120 PABX system at Waltloo;
- 1992 Introduction of the Hicom 300 PABX system;
- 1992 Swaziland took the first step to join 56 other countries world-wide, in installing EWSD public switching technology;
- 1992 Installation of the first Hicom 300 Financial Trading System at Telkom Pretoria;
- 1993 Installation of a 3000 extension Hicom 300 PABX system at the ABSA head office Johannesburg;
- 1993 Formation of Siemens Telecommunications (Pty) Ltd;
- 1994 Siemens supplied the largest single Hicom 300 PABX in the country to Old Mutual Cape Town;
- 1994 Caltex becomes first user of Hicom 300 to provide all staff with digital telephone terminals;
- 1994 Installation of a 6000 extension Hicom 300 PABX for the Old Mutual Head Office in Cape Town;
- 1994 Three year supply agreement with Eskom for the supply of Hicom 300 PABX systems. This includes the supply of a 4000 extension system for their Megawatt Park Head Office;
- 1994 Supply and installation of the entire PABX network for IEC during the transitional election;
- 1996 Commissioning of the digitalisation in Saldanha, Soweto and Pretoria

Source: Siemens, 1997a

3.5.1.6 Sietel's activities since 1960

Sietel's activities in South Africa in the transmission and switching technology sector date back to the early sixties. Beginning in 1960, Sietel fulfilled a number of contracts for coaxial telecommunications cable, including the Pietersburg - Johannesburg - Cape Town route, and soon erected a cable plant in South Africa. The local subsidiary now independently constructs local and long-distance cable networks for the postal and railway service as well as private customers. In addition, the first EMD switching centre was installed in Bethlehem, in the Free State RSA, as early as 1962 (*Siemens, 1997c*).

In 1981, the first digital telex exchange was commissioned in Braamfontein, Johannesburg. In the same year, the first switching centre of the successful EWSD system was handed over to the South African telecommunications administration in Johannesburg.

Sietel also supplied to Vodacom the first cellular telephone network in South Africa in 1986. Another benchmark achievement was the introduction of the locally developed OFDC (Optic Fibre Distributed Concentrator) in 1993. The following year brought with it the introduction of South Africa's first digital GSM cellular radio-telephone network -

the D900 system, delivered to the company Vodacom which was one of the first licensed network operators.

South Africa is also a forerunner in the transmission technology sector. The latest project was put into operation in February of 1995 (*Siemens, 1996e*).

EWSD switching centers were installed to expand the national network in the period 1991 to 1996. South Africa became one of Sietel's most important customers world-wide: 241 switching centers with a capacity of 3.1 million ports are currently installed in the South Africa network (*Siemens, 1996e*).

Table 3.3 shows the first orders received for switching systems and Base Stations from Sub-Saharan Africa and their operators.

Table 3.3: Orders received for switching systems and Base Stations from Sub-Saharan Africa operators.

Country	Operator	1st Order	Switching Subsystem	Siemens Base Station
Cameroon	PTT	1990	*	
Ivory Coast	Comstar	1995	*	*
Ivory Coast	Loteny Telecom	1996	*	*
Kenya	KPTC	1995	*	
Lesotho	VCL	1996	*	*
Morocco	ONPT	1993	*	
Namibia	MTC	1995	*	*
Senegal	Sonatel	1996	*	*
RSA	Vodacom MTN	1993 1994	*	*
Tanzania	Tritel	1995	*	*
Uganda	Clovergem Celtel	1995	*	*
Zimbabwe	PTC	1997	*	*

Source: *Sietel, 1998*

3.5.1.7 Sietel's rank of products

Sietel is wholly responsible for the implementation of the fully electronic digital public switching system (EWSD) in South Africa and its neighbours and close to 3,5 million

ports are connected to 831 switching centres in both fixed and mobile networks (*Sietel, 1998*).

Small digital exchanges (SDE) were co-developed locally with sub-contractors to allow remote communities affordable access to telecommunications services. These exchanges can be cost effectively upgraded to large EWSD for new generation.

Another local development to enhance rural area access is the Optical Fibre Distributed Concentrator (OFDC), a product which will also be used on overseas networks.

The world's longest Synchronous Digital Hierarchy (SDH) fibre optic telecommunications link was opened in March 1995 between Cape Town and Johannesburg. The 1538 km long cable can carry up to 622/Mb/s and is the equivalent of 12 simultaneous high-quality standard television programs or 7560 telephone conversations at the same time (*Sietel, 1998*).

Increasing supply from the Sietel for sophisticated services are being met by upgrading networks to accommodate ISDN (Integrate Services Digital Network) capabilities. ISDN allows for the simultaneous transmission of voice, text, data and images through the public telephone-switching network to a particular junction, from where the dedicated service (voice, text, data or image) is accessed through a common infrastructure.

Sietel is the principal supplier of mobile cellular equipment (GSM) to Vodacom. Ordinary telephones are now connected to the GSM network using the locally developed digital telephone interface, enabling containerised community telephone services, to be rapidly deployed. Sietel's Radio technology is being used to extend telecommunications to more consumers.

Cellular networks design, supplied and installed by Sietel are currently in use in South Africa, Uganda Tanzania, Namibia, and Lesotho. In addition, the company has been contracted by Motorola to supply switches and services for a cellular network in the Ivory Coast. The majority of these projects were full turnkey contracts. The vast

distances in Sub-Saharan Africa countries, coupled with the primary costs of fixed line telecommunications infrastructure and the dearth of skilled, local engineering personnel, are realities, which have ensured that cellular networks are cost effective and reliable alternative solutions (*Sietel, 1998*).

Sietel has an additional competitive edge in that it can resort to a locally-based team of highly skilled and experienced engineers – rather than fly in high cost engineers from overseas – for both installation and post-commissioning maintenance. In addition the systems and products of Sietel supply are manufactured in Germany (*Sietel, 1998*).

Sietel offer full technical support free of charge for 12 months after the network has gone “live” with the option of further support thereafter at a pre-negotiated price (*Sietel, 1998*).

The Sietel turnkey projects offer comprises: cellular planning and network design; provision of complete cellular systems (including switching, base station, operating and maintenance systems) and value-added services, which include:

- Community cellular phone shops housed in containers;
- GSM pay telephones using cash or cards;
- Vehicle tracking systems;
- Provision of infrastructure (power, containers, masts, and air conditioning);
- Project management (a key component in the success of contracts on the African continent where problems arising from red tape are legendary);
- Installation;
- Database creation;
- Commissioning;
- Optimisation;
- Maintenance;
- Network management;
- Technical support;
- Securing loans; and
- Training of technical staff in South Africa and the country of origin (*Sietel, 1998*).

Sietel, which has been involved in mobile networks in South Africa since 1985 with the C450 system has so far provided 900 base station and eight switches for the ever-growing Vodacom cellular network, and currently employs more than 100 staff dedicated to public mobile networks. The team comprises 20 people in sales – which includes project management and order processing activities; 30 technical support engineers and technicians; and 50 technicians responsible for installation, commissioning and maintenance (*Sietel, 1998*).

A Tanzanian contract, secured by Sietel in 1995 against international competition, was a prime example of a full turnkey solution. The contract included a switch for 25 000 subscribers and nine base stations covering Dar-es-Salaam and Zanzibar, operations and maintenance equipment, a billing system, a voice mail system, and a customer care center. In addition, Sietel is responsible for all civil works, building masts, and the supply of standby diesel-driven generator sets with underground fuel tanks capable of running for about seven days (*Sietel, 1998*).

Despite hold-ups, the Dar-Es-Salaam area network was commissioned on schedule on 15 December 1995 with work having begun in October. The remainder of the base stations will be on the air by the end of May 1996, within the contract deadline. Phase two of the contract, was scheduled for completion in 1997 and has seen the network expanded into the major tourist areas of the country which includes the Serengeti, Kilimanjaro and Ngorongoro areas. Sietel set up the financing for the Tanzania network, which has a strong Asian company as a majority shareholder (*Sietel, 1998*).

The same problems with the dependability of the electrical power grid were experienced and overcome by Siemens in Uganda. The contract was not a full turnkey solution but was unique in that entire network's infrastructure was supplied as a containerised solution. This had the benefit of being a virtual "instant plug-in" solution, which was transported to Uganda in 16 containers in an Antonov 124, the largest aircraft in the world (*Sietel, 1998*). The switching centre and 14 base stations were built into containers at the Sietel's factory at Waltloo in Pretoria. The arrival of the equipment in a single load cut red tape, but led to transport problems when the heavy containerised

base stations had to be located at the top of steep hills accessible only by muddy, slippery roads. Transporting smaller and lighter loads appears to be a better option in the rainy season when roads become virtually impassable. Once on site, the network was commissioned by Sietel, the most complex task being connecting the GSM switching system centre to the existing fixed telephone system. The network covers the country's capital, Kampala, Entebbe and the industrial centre of Jinja and the corridor linking the centers (*Sietel, 1998*).

An integral part of the contract in Uganda, and that for Tanzania, was the provision of on-site maintenance for 12 months by technical personnel from South Africa.

Table 3.4, Table 3.5 and Table 3.6 shows the orders placed by Sietel customers for EWSD (switching system), Base Ports installed in 1994/95/96 and transmission equipment according to various systems in Sub-Saharan Africa countries, respectively.

Table 3.4: EWSD Sietel Customers

COUNTRY	CUSTOMER
Algeria	PTT
Cameroon	PTT
	<i>REGIFERCAM</i>
Cape Verde	Cabo Verde Telecom
Congo	ONPT
Djibouti	OPT
Egypt	ARENTO
Guinea	Sotelgu
Guinea-Bissau	Guinee Telecom
Kenya	KPTC
Lebanon	MPT
Libya	GPTC
Morocco	ONPT
Mozambique	Telecomunicacoes de Mocambique (TDM)
Namibia	Telecom Namibia
Nigeria	Nitel
Oman	GTO
Sao Tome and Principe	Companhia Sao Tomense de Telecomunicacoes (CST)
Saudi Arabia	Mo PTT
Senegal	SONATEL
Sierra Leone	SLNTEC
South Africa	TELKOM SA
Sudan	SUDATEL
Swaziland	SPTC
Syria	STE
Tunisia	PTT
UAE	ETISALAT

Source: Sietel, 1998

The ability to provide rapid and cost-effective technical support is a massive plus factor. Africa has a history of internationally financed with high technology equipment being

supplied and commissioned by overseas technical staffs who returns home shortly after commissioning procedures are completed. When the equipment breaks down, the country is unable to afford the high cost of flying-in overseas technical staff to make repairs. Nor do they have local expertise to rectify highly technical problems themselves.

More contracts from customers are in the offing, as benefits of the cellular solution available from South Africa become known across the continent. And the demand for value-added services is growing as the existing networks enter the mature phase. All new contracts depend on how effectively Sietel is able to offer low level prices a high level of quality and service.

Table 3.5: Sub-Saharan Africa: Base (Ports) installed

Country	Installed Base (Ports)		
	1996	1995	1994
Algeria	33 454	33 454	33 454
Cameroon	112 600	112 600	112 600
Cape Verde	11 734	10 214	9 114
Congo	3 207	3 207	0
Djibouti	860	720	0
Egypt	1 387 299	1 256 032	873 384
Guinea	3 605	3 605	3 605
Guinea-Bissau	5 198	5 198	5 198
Kenya	128 976	128 976	128 976
Lebanon	436 428	399 692	154 920
Libya	43 746	43 746	33 357
Morocco	307 974	201 000	49 076
Mozambique	18 486	18 486	18 486
Namibia	95 676	75 806	75 430
Nigeria	293 429	293 309	257 603
Oman	191 342	191 342	191 342
Sao Tome & Principe	2 354	2 354	2 354
Saudi Arabia	332 872	288 652	228 461
Senegal	5 092	5 092	0
Sierra Leone	22 392	22 392	22 392
South Africa	3 734 235	3 672 821	3 513 821
Sudan	138 670	122 064	0
Swaziland	5 518	5 518	5 518
Syria	1 493 394	1 293 512	927 369
Tunisia	176 774	156 104	102 602
UAE	0	0	0

Sources: Siemens, 1997i

Table 3.6: Sub-Saharan Africa: SDH Radios installed

	Synchronous Multiplexer			Synchronous Line System		Synchronous Crossconnect		Synchronous Radio	Management Network	
	SMA 1&4c Series 1&2	SMA 1&16c series 1&2	SMT 1D	SL 4	SL 16 Series 1&2	SXC 4/1 series 1&2	SXC 4/4 series 1&2	SRA/SRA L/SRT/ (PDH)- 5	EM-OS	SMN-OS
Algeria	14			22				5		
Cape Verde	5									
Eritrea	5							17	1	
Egypt	9	30	49	2					1	
Israel	22			32			13	391		
Ivory Coast								32		
Jordan	40	38			6	4		6	2	
Kuwait		7							1	
Lebanon	11	37						202	3	
Namibia								38		
Nigeria	38	24	6	38	18				5	
Oman				2				42		
Saudi Arabia	67			32				200	9	
RSA	1058	315				17		305	22	1
Sudan	32								2	
Swaziland								13		
Syria	7			19	2			46		
Tanzania								78		
Tunisia	14									
UAE						6				
Zimbabwe	4								1	

Source: Siemens, 1997g

3.5.1.8 Expected changes in market structure

"While on the one hand we develop new technological solutions, we also take part ownership in the development of community infrastructure, which allows residents use the services facilitated through technology. These may, amongst others, be in the area of electricity, transportation, telecommunications or health services".

Döring, 1998

Market share, needs to be expanded by synergies in all fields of operations. This can be achieved through, for example, microelectronics, in conjunction with software, producing an increasingly rapid succession of new generation products and becoming increasingly efficient in order to lower prices.

It is expected by international consultant (*Gemini, 1998*), that Sietel will begin to make fundamental changes to its operational structures, to accelerate operating procedures and to allow the company to reach its full creative potential, and so contribute to an even more successful future. A process of change will not happen overnight. New

concepts will have to be developed as well as a framework for the necessary changes. The basic principles needed to take Sietel to the top are:

- Customer satisfaction;
- Reasonable market related prices;
- The solutions must be even faster, and
- Services must be at the highest professional level (*Gemini, 1998*).

The objective of the company is to achieve 25 per cent of Sietel turnover from business in the Southern African Development Community (SADC) outside of South Africa by the year 2000. This goal represents a firm assurance to address Africa's needs from within Africa. Investment in capital, manpower and plant is being accelerated in order to accommodate the growing requirements of customers across the entire region.

Sietel's engineering group provides technical background from early 1980s and it now has a staff of 120 graduates and technicians qualified in the fields of Engineering or computer Science specialising in product development and technical sales. Research and development is focuses on three main areas:

- The adaptation of software and hardware products for South African and Sub-Saharan Africa customers;
- Contract development of software and hardware for products which are marketed by our parent company in the world market; and
- Local development of indigenous products which are aimed at the South African, Sub-Saharan Africa and world markets. This is done in collaboration with a number of South African countries, Universities and Technikons (*Siemens, 1997e*).

3.5.1.9 Research and Development

The frenetic pace of technological advancement world-wide demands sustained investment in research and development to maintain an edge in highly competitive markets.

Siemens utilises the services of 48 000 researchers world-wide, working to a budget of R 22,00 billion representing 9 per cent of global revenue. They develop and bring to the

market innovations, which will maintain the company's leadership in electrical and electronic markets (*Siemens, 1997d*).

International initiatives have resulted in host of fine achievements, amongst which are the development of fuzzy logic controls to optimise efficiency. In telecommunications a world record was set with the S4 Handy cellular telephone with up to fifty hours of operation and four hours of uninterrupted conversation, and S10 Handy cellular telephone with a colour monitor.

3.6 South African telecommunication competitors

Sietel has a number of local and international competitors. Brief descriptions of their profiles are given below:

3.6.1 Alcatel

Alcatel Altech Telecomms according to *Jančiga (1998)*, is a joint venture between local electronics giant Altech and Alcatel. Alcatel is one of the world's leading telecommunications equipment suppliers.

Alcatel Altech Telecoms has, during the past 70 years, supplied all of the transmission backbone infrastructure, most of the access network and a large portion of the digital switches in South Africa. The company has a history of innovation: beginning with the supply of the first single and three channel open wire systems linking Johannesburg with Durban and Cape Town in 1927 through the, installation of the first high frequency open wire carrier system, the first microwave radio system and the first submarine telephone cable system connecting South Africa to Europe.

Expertise gained in the adaptation of new technologies has resulted in the creation of a strong local systems engineering facility which has proved itself in the development of systems for voice and data transmission. An example of this is the 18 channel rural subscriber carrier system which successfully transported the Telkom rural network out of the automatic era, resulting in services to some 100 000 subscriber's in remote areas. The corporate data transmission arena also benefited from this commitment to local

objectives when Telkom SA Ltd. initiated the “Diginet” digital overlay network. The network-terminating unit has been completely redesigned and seventy five thousand of these units are now serving the data communications industry in South Africa.

Alcatel Altech Telecoms operates a local manufacturing plant for the Alcatel 1000-E10 digital exchange system and a software development centre, the output of which is primarily exported to Alcatel’s world market. The full range of Alcatel transmission and access equipment is supported from South Africa, serving the installed Alcatel base in more than 35 countries on the African continent.

Export features prominently in Alcatel Altech Telecoms plans, which has established Alcatel market leadership responsible for South Africa and surrounding countries supported by the recent conclusion of a local assembly and technical assistance agreement with the Zimbabwe Posts and Telecommunications Corporation (ZPTC). In Mozambique, Alcatel Altech Telecoms has installed multi-access rural subscriber radio systems and has trained Telecommunicadoes de Mozambique personnel to operate and maintain this equipment in the future.

Alcatel Altech Telecoms is a major player in the South African telecommunications industry offering:

- Turnkey contracting, including network design, system engineering, project management, implementation and after sales support across the complete system life cycle; and
- Universal access service solutions tailored to African conditions such as the locally developed Multipoint Digital Radio access system (MDPR) and the Phoneshop, a containerised telecommunications centre. In addition, partnerships are being sought to address the corporate sector with higher revenue-generating value-added services.

Alcatel Altech Telecoms is one of the strongest Sietel competitors. Alcatel manufacture is prioritised in switching equipment and access network system. With its local expertise, intimate knowledge of the network, strong commitment in terms of buildings plant plus people and its powerful international alliance. Alcatel Altech Telecoms is one

of the pillars of the telecommunications support structure in the South African and Sub-Saharan region (*Jančiga, 1998*).

The Multi Point Digital Radio (MPDR) systems was designed in South Africa by Alcatel Altech Telecoms specifically to address the capacity and cost restrictions associated with standard Point to Multi Point (PMP) systems when used to provide community services. Typical PMP radios presently in use offer a capacity of between 20 and 60 Erlang (the maximum call capacity of telephone line) per system. Because such PMP systems use slot sharing, this places a restriction on the number of high call rate subscribers requiring the service. If, for instance, the subscribers use a community telephone service as in the case of a Phone Shop, the initial capital and operating costs of a PMP system under these circumstances then becomes very expensive because only a relatively small number of high call rate subscribers can be connected at any one time.

In Southern Africa, this system is yet another way in which Alcatel Altech Telecoms is working to reduce costs of service provision to those areas which were previously considered uneconomical to access. Used in conjunctions with the A9910 Phone Shop, a containerised telecommunications centre, MPDR enables cost effective provision of telephone, fax and photocopying services to remote communities. In addition to providing business opportunities for both the manager and operator, the Phone Shop also provides the facilities required support the growth of other business within the community (*Sietel, 1998*).

3.6.2 Ericsson

Ericsson, an international telecommunications leader, operates in more than 100 countries. Ericsson offers the various choices that operators need to provide solutions. The company has a unique, combined expertise in switching, radio and networking, plus competence in software and microelectronics. With more than a 40 per cent share of the world market in cellular telephony, Ericsson is striving to repeat this performance in Southern Africa.

Since 1993, when cellular licence holder Mobile Telecommunications Network (MTN) awarded Ericsson SA the turnkey contract to supply a nation-wide Group System

Mobile (GSM), Ericsson SA has established itself as an integral part of the South African telecommunications industry (*Sietel, 1998*).

Ericsson is also one of the strongest Sietel competitors. Ericsson manufacturing is priorities in switching equipment and cellular network systems.

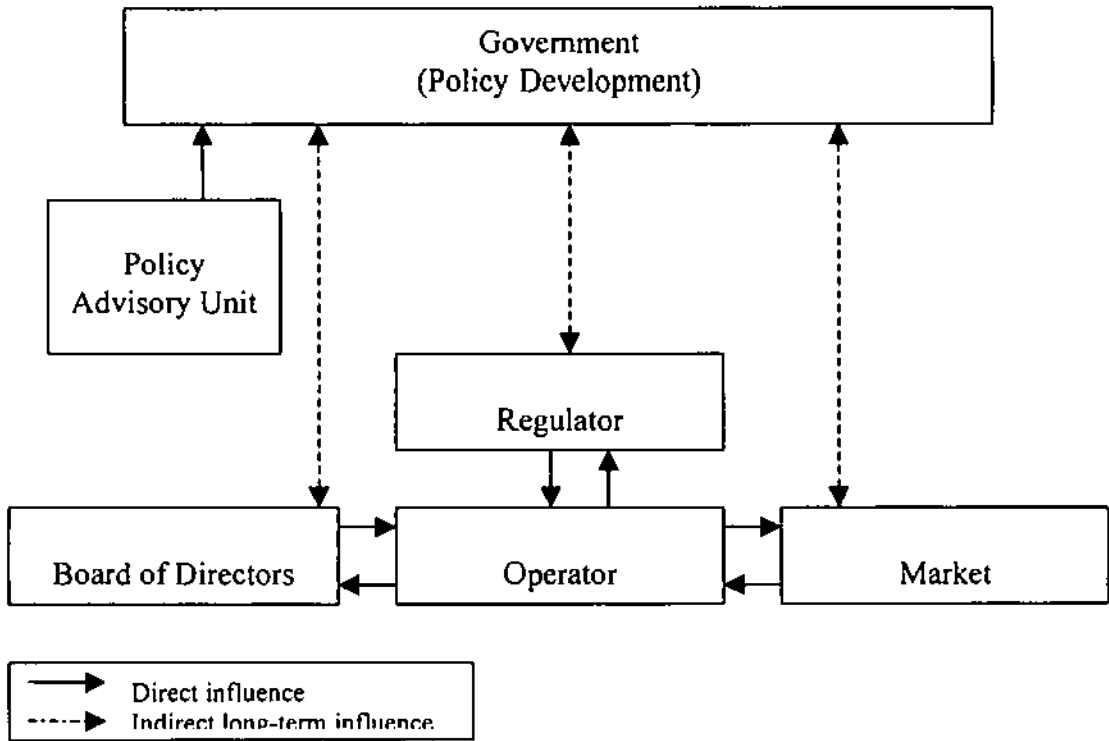
3.7 Designing an Optimal Institutional Structure

It is apparent there are three distinct, but related sets activities that are fundamental to telecom reform – policymaking, supplying services and regulation. The fundamental conditions required for the establishment of an institutional structure that clearly defines separate and distinct roles for policy making, regulation and operator management are the following:

- *Policy Development* - is directed to fundamental issues of long-term societal objectives and direction, rather than day-to-day implementation and problem solving. It ensures attention to long run implications of developments and issues arising from them. To ensure policymakers are informed and capable of addressing the need for policy change when it is required, it is important to establish a specialised professional policy analysis unit in the appropriate ministry. The policy unit is an independent, expert information and analysis group for government policymakers. It also reduces the need and dampens the incentive for policymakers to intervene in the detailed affairs of operators or the regulator except on matters of compelling policy significance (*Melody, 1997*).
- *Operations Management* – to separate operations management of the Public telecommunications operator (PTO) from the government so neither politicians nor government bureaucrats can interfere in day-to-day operational decisions. The management must be accountable to a Board that is insulated from day-to-day government interference. The Board may have political appointees, but for terms of significant duration and with mandates to act independently in achieving specified economic (e.g. efficiency) and social (e.g. universal service) objectives. Ways of achieving these objectives include corporatising or privatising the PTO and/or permitting diversified supply by allowing entry of additional players to create a more competitive market (*Melody, 1997*); and

- Regulation** – to establish a regulatory agency that is independent both from the PTO and from day-to day government influence. The regulator’s task is to implement government policy, ensure performance accountability by the PTO and other players to economic and social policy objectives, resolve disputes between competitors and between consumers and operators, monitor changing industry conditions, and advise government on developments bearing on policy. The regulatory agency acts as a buffer between telecom operators and government, helping to ensure the separation of functions. Whereas the PTO and other operators, once separated from direct government influence, may focus too narrowly on economic objectives, the regulatory agency can ensure recognition of social and other policy objectives as well. Although regulation has been used primarily with privately owned operators, it has been found increasingly beneficial with publicly owned operators as well in implementing the same policy objectives (*Melody, 1997*).

Figure 3.5 The decentralised structure of telecommunications reform



Source: Melody, 1997

Figure 3.5 illustrated the essential relations among policymaking, regulation and operations management. The PTO is separated from government by an independent board of directors, and an independent regulator. The PTO is accountable to its board of directors, and an independent regulator. The PTO is accountable to its board, the regulator and the marketplace to satisfy specified economic and social objectives.

The effectiveness by which this fundamental separation of basic functions is achieved will have a significant impact upon the growth of the sector. The more effective the separation, the better will be the climate to attract financing and undertake investment. If each function can be performed well, each will provide clarity and stability in an institutional framework conducive to rapid growth and effective achievement of economic and social objectives. This requires both that independence of the different activities be established and that it be understood by all the directly affected parties and the public.

3.8 Conclusion

The world's telecommunications network operators are scrambling to build the critical mass they will need to survive the convergence of technologies and markets. More than almost any industry, the telecommunications business has worked hard to create international standards. It offers a reasonably reliable and seamless conduit for information to all parts of the world. It is the advent of digital technology in switching, transmission and cellular technology. At the same time it has lowered the cost of providing a unit service, making it affordable to millions more people. It has also expanded the kinds of service, which can be delivered by the network. In the process it has created new demands from the customers. The shift to digital technology, still going on, has brought new competitors too. The telecommunications companies, TV companies, broadcasters and media companies controls the delivery systems of all types of information (sound, video, still image and text).

With the enactment of the 1996 Telecommunications Act (103), South Africa embarked on a new dispensation in its telecommunications sector. Organisations, industries, regulators, consumers and governments are being swamped by massive and ever-increasing future positive change.

CHAPTER 4

4. The performance of the telecommunications industry in South Africa

"The importance of trade in telecommunications is now widely recognised, not only for the income generated by sales of telecommunications equipment and services themselves, but as one of essential engines driving a nation's overall economic development."

Tarjanne, 1998

4.1. Introduction

The South African telecommunications equipment supply industry has the potential to make a substantial contribution to the SA economy. It has the capability and commitment and has aligned itself with the foremost global role players. In an industry where equipment prices are decreasing at approximately 15 per cent every year, the local supply industry has contributed meaningfully to the national economy through increased locally added value (*Deloitte & Touche, 1997*).

South Africa has the infrastructure, skills base and human capital to become a proud nation. However, an essential infrastructure requirement for economic and social advancement is the further development of the telecommunications industry. While this requires an investment in the future, it is an investment that can be leveraged to the advantage of all the people.

The South African telecommunications supply industry is the most advanced in Sub-Saharan Africa. It is both larger and more sophisticated than is generally realised, and it is already a significant exporter. Building on this solid foundation requires no more support from government than is given to the local industries of South Africa's main trading partners and those of other countries at a similar stage of development (*TMA, 1997*).

4.2 Objectives of the telecommunications industry in South Africa

A vibrant and competent local telecommunications industry will attract more investment, require more employment and generate greater economic activity, thereby creating the wealth that can guarantee a steadily rising standard of living for all Sub-Saharan people.

It is essential, therefore that South Africa grasp the opportunity inherent in building up the telecommunications network in its own under-developed areas to enhance its capability to be a player in one of our world's biggest and fastest growing industries. Properly implemented projects will create jobs and increase ongoing skill development, thereby boosting national competence.

The South African telecommunications supply differentiate between the telecommunications and industry is dedicated to ensuring the lowest cost of ownership to telecommunications operators and service suppliers based on world-wide evidence, that this aim has been achieved only where there is a strong local industry (*Sietel, 1998*). The ripple effect of a strong local telecommunications supply industry will benefit some of other industries. A major employer, the telecommunications industry could drive the empowerment of historically disadvantaged communities (*TMA, 1997*).

4.3 The future performance for the telecommunications industry in South Africa

Telecommunications multiplies economic activity and improves the quality of life at all levels. Indeed, it is an infrastructure prerequisite for social and economic upliftment.

South Africa is in a position to seize an opportunity such as is offered to few nations (Japan, Malaysia, Germany and UK) to use the economic and social imperatives and rapidly building up the telecommunications network in its own undeveloped areas, to become a world player in one of the world's biggest and fastest growing industries (*Sietel, 1998*).

In considering this opportunity, it must be realised that almost all of South Africa's industrialised trading partners in Africa have effectively harnessed local purchasing power in telecommunications and combined it with industrial policy (in all SADC countries). This has been done to develop a comprehensive ability in telecommunications from which indigenous industries have grown today to have large export capabilities. The local industrial capability needs to be nurtured to become the engine for the expansion of telecommunications both locally and beyond South Africa's borders. The industry needs to become internationally competitive; above all, local industry must not be destroyed by 'industrial colonisation' by large overseas suppliers and operators (*TMA, 1997*).

South Africa has many opportunities to implement GSM, switching, and transmission equipment projects. These projects will boost national competence and create ongoing skills development and major employment opportunities in the face of global competition. Such projects also allow the problems associated with the maldistribution of resources to be addressed on a massive scale. All branches of industry will be strengthened, placing South Africa in a strong competitive position, which will enable it to contribute to the economic development of the entire Sub-Saharan region (*TMA, 1997*).

Several considerations according to *TMA, (1997)* must be taken into account to project the future of the South Africa telecommunications industry. These include:

- **Cost** – no country can afford to pay a high premium for telecommunications systems and services. If all, or a very large proportion, of project inputs were to be imported, there would be an immense drain on foreign reserves;
- **Security** – the performance and security of South Africa's telecommunications infrastructure can be assured only by a local skills base, which requires a structure to facilitate its development and maintenance. A local industry is the only framework, which can develop and maintain the broad spectrum of skills required. Academic and research institutions have an important role to play (i.e. consultants), but do not permit the exercise of all institutions in a practical environment;
- **Jobs** – the projects will create jobs in network construction, network operations, maintenance and manufacturing. In addition, further jobs in the economy will result

from the availability of good quality telecommunications. To ensure ongoing job creation and availability, it is important that these jobs be created within existing industries;

- **Training** – South African industry focuses on training for long-term operations which are geared to the overall development and upliftment of the work force, as opposed to the all-too-common practice of training only for the immediate need and where the contractor cannot sustain the level of activity after project completion;
- **Labour relations** – labour, justifiably, wants to see progress and development in South Africa. They look to establish organisations for long term plans for job security, training and improvements to conditions of employment. By integrating the people development needs of such projects into already established programmes. The Sub-Saharan telecommunications industry will be able to satisfy many labour demands while at the same time improving productivity. The economy of the South Africa should take the lead in this development; and
- **Leadership** – Projects will allow the South African telecommunications industry to further develop its ability to address African conditions. This is a major competitive advantage and could lead to South Africa playing an even stronger leadership role in the development of Africa.

In the short period during which the local telecommunications industry has been able to compete in Africa, especially Sub-Saharan Africa, it has won the lion's share of the business against competitors from the USA, Japan, Sweden and France. It has done this without the financial support of aid funding and exports credit institutions based in the home country. African customers have been impressed by the improved support available from South African suppliers. The involvement of foreign companies and competition are welcomed and necessary to improve the performance of local industry.

4.4 The contribution of the telecommunications sector to the South Africa economy

Additional benefits include savings of foreign exchange reserves and the direct employment and development of thousands of South Africans. Furthermore according to *TMA, (1997)* it contributes significantly to the economy:

- As a tax-payer;
- By improved domestic saving performance;
- By export-orientated trade;
- By research and development; and
- Job creation (*TMA, 1997*).

4.4.1 Regional development

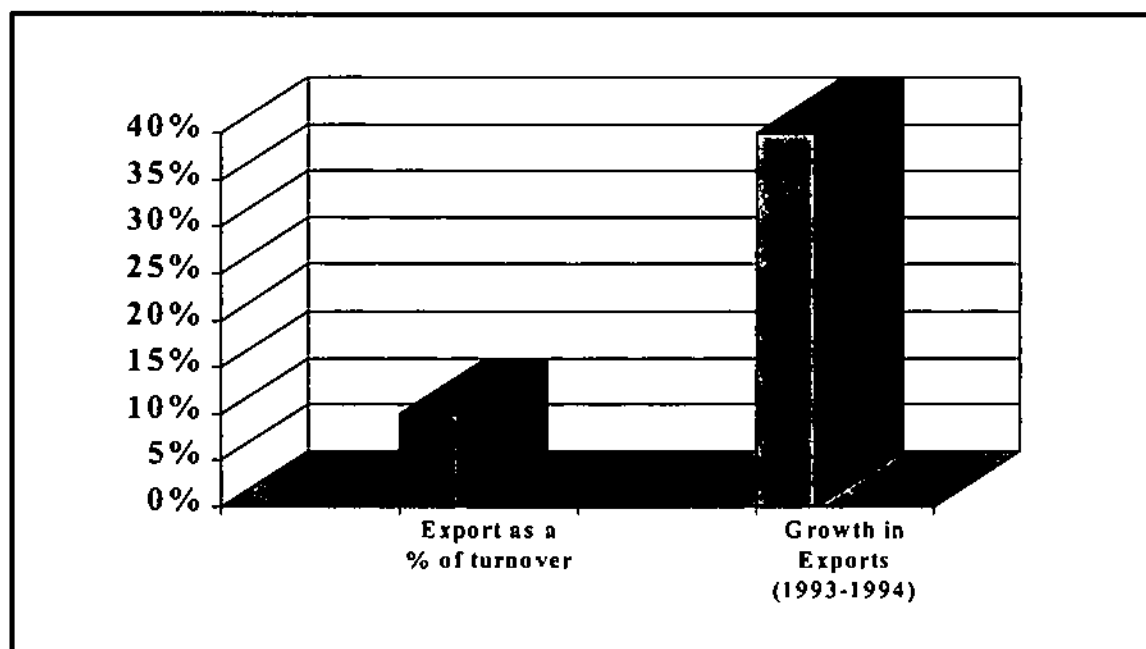
The South African telecommunications equipment supply industry is bigger, more sophisticated and more successful than is commonly realised. These developments and others, such as wireless local loop, digital switching systems and mobile cellular services were introduced during this decade and became an overnight success. Internet, VSAT services and Direct-to-Home broadcasting, all point towards the convergence of technologies, services and applications into a global universal network (*BMI-T, 1997a*).

4.4.2 Earner of foreign exchange

As a significant stakeholder in the national economy, the local industry has, during the past three years, transformed itself into a set of globally-aligned, export-led companies with many distinctive success stories in key niche markets (*refer to Chapter 2*). The local industry offers the region a substantial, existing, modern technological capacity fully capable of providing sophisticated African solutions to African telecommunications problems. Most of the major local telecommunications manufacturing companies are internationalised (Sietel, Ericsson and Alcatel). Not only do they represent leading global telecommunications-manufacturers but they have also demonstrated their capability by securing significant export business in the face of fierce international competition. Exports to key European, American, Sub-Saharan African and Asian markets, as well as other states, are growing by the day.

Figure 4.1 shows the export growth by TMA from 1993 to 1994 (*TMA, 1997*).

Figure 4.1: The export growth in South Africa from 1993 to 1994



Source: TMA, 1997

4.4.3 Local Telecommunications Supply Sector Turnover

The local telecommunications supply sector, in addition to being truly an African resource in nature, has full access to the finest global telecommunications research and development (R&D), technologies and product development resources in the world long thus ensuring a non-marginalised and technologically advanced local capability (*TMA, 1997*).

Table 4.1 summarises Sietel's export operations and performance in Sub-Saharan Africa.

Table 4.1: Sietel export ⁽¹⁾ per countries, (in million US\$; ZAR) in 1995 - 1998

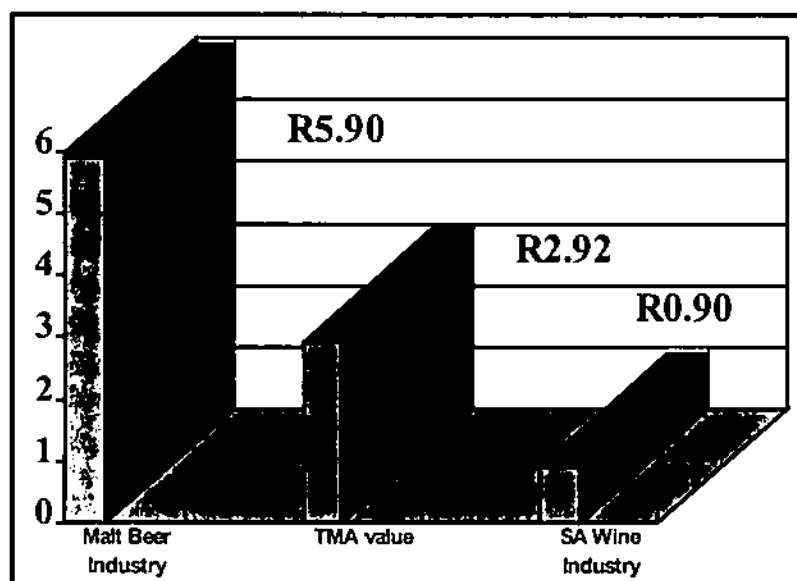
	Per cent share 1995	Per cent share 1996	Per cent share 1997	Per cent share 1998
Namibia	66.73	60.76	37.85	29.56
Mozambique	0.02	0.98	-	-
Swaziland	0.06	2.15	2.74	1.8
Botswana	-	-	-	2.91
Germany	1.49	-	1.11	0.76
Lesotho	-	0.001	-	3.89
Zimbabwe	-	0.08	44.88	29.52
Brazil	0.05	3.03	1.55	-
Mauritius	-	-	1.14	1.35
Tanzania	-	-	-	22.48
Belgium	0.7	0.44	2.06	1.31
South Africa	4.68	25.52	7.79	6.43
Bophuthatswana	26.2	6.33	-	-
England	0.01	-	-	-
Ciskei	0.06	0.7	0	-
Malawi	0.01	-	0.45	-
Italy	-	-	0.42	-
Total	100.00	100.00	100	100.00

Source: Siemens, 1998a,b,c

(1) Hypothetical data were used to maintain confidentiality

Figure 4.2 depicts the relative position of the telecommunications sector turnover to that of the malt and wine industry.

Figure 4.2 Local Telecommunications Supply Sector Turnover in perspective (in billions Rand)



Source: TMA, 1997

4.4.4 Contribution towards the GDP

By the second half of 1995, the economic surge which started in 1993 seemed to have lost much of its vigour. Business cycle indicators of the South Africa economy suggested that economy was slowing. GDP growth slowed to 3,2 per cent in the third quarter of 1996, down from 3,7 per cent in the second. This had reached a non-sustainable pace by mid-1995. Growth in fixed investment has also been slowing, while consumer credit growth topped out earlier in 1996, owing to the tight financial situation of private households and their heavy indebtedness, some 56 per cent of household assets, and high interest rates which cost some 12 per cent of income to service.

GDP growth during 1996 showed sharp increases in agricultural production followed favourable weather conditions in summer of 1995/96, resulting in an increase of almost 55 per cent in agricultural output in second quarter. Secondly the depreciation in the value of the Rand (some 30 per cent in 1996) allowed somewhat higher export volumes,

and especially made itself felt through the increase in overall GDP growth that slowed only marginally from 3,3 per cent in 1995 to 3,0 per cent in 1996, but following the increase in the bank rate in November 1996, a 2 per cent growth in 1997 was realised (*Meyer, 1998a*).

Slowing demand, high interest costs, and becoming part of the global economy have hurt company earnings. Growth in industrial and financial earnings, usually a fairly good indicator of the business cycle trend, is dropping. The SA Chamber of Business (SACOB) business confidence index declined in 1996 as business adjusted to a more realistic assessment of the economy (*Meyer, 1998a*).

Table 4.2 shows the historical growth of South Africa economy, represented by GDP at factor cost from 1991 to 1998.

Indications are that the economy will bottom out in the course of 1997-1998. A new period of growth, fuelled by restocking inventories, better export prospects, higher import substitution and increased infrastructure expenditure in support of development initiatives.

The state has made progress in reducing the unacceptably high fiscal deficit, from 9 per cent in 1993 to 5,5 per cent in 1996. The Budget was for 5,1 per cent in 1997. Inflation has remained well below 10 per cent since 1993, after two decades of high inflation. Real interest rates are high by international standards, but are likely to remain so because of the large imbalance between government spending and income, the high growth rate in the money supply and decline in net reserves (*CSS, 1997*).

The communications sectors contribution to GDP in South Africa (at current factor cost) increased from R 3 996 million in 1988 to R 7 833 million 1997 (*see Table 4.3*). The economy had growth at an average annual growth rate of 1,1 per cent between 1998 and 1997. The value added by the telecommunications sector had growth by 7,8 per cent during this period.

Table 4.2: Total GDP at factor cost, 1946 - 1997 (R' million)

Year	Agriculture, forestry & fishing	Mining & quarrying	Manufacturing	Electricity, gas & water	Construction	Wholesale & retail trade, catering & accommodation	Transport, storage & communication	Finance, insurance, real estate & services	Community, social and personal services	Less imputed financial charges	General government	Other producers	Total GDP
1946	3 558	9 948	6 383	613	1 377	5 460	2 968	6 410	3 045	770	8 157	0	47 150
1947	4 096	9 638	6 998	648	1 801	6 218	3 071	6 631	3 173	847	6 640	0	48 067
1948	4 439	10 023	7 697	726	2 315	6 787	3 267	7 032	3 298	936	6 702	0	51 352
1949	3 938	10 566	8 290	805	2 396	7 126	3 448	7 032	3 417	902	6 954	0	53 072
1950	4 539	11 025	9 021	898	2 489	7 166	3 494	7 255	3 541	888	7 381	0	55 921
1951	4 584	11 262	9 820	968	2 589	7 263	3 744	7 582	3 643	1 060	7 620	0	58 315
1952	4 839	11 777	10 436	1 045	2 923	7 357	3 975	7 669	3 741	1 060	7 850	0	60 551
1953	5 278	11 918	11 106	1 119	2 782	7 883	4 125	8 029	3 862	1 074	8 140	0	63 169
1954	5 557	13 025	12 100	1 231	2 737	8 332	4 231	8 579	3 992	1 205	8 469	0	67 047
1955	5 664	14 169	12 938	1 357	2 782	8 495	4 421	8 941	4 160	1 361	8 987	0	70 553
1956	6 107	15 475	13 624	1 435	2 761	8 850	4 605	9 190	4 324	1 472	9 513	0	74 411
1957	5 841	16 390	14 346	1 524	2 955	9 140	4 798	9 600	4 424	1 588	10 228	0	77 659
1958	5 449	17 088	14 863	1 601	3 069	9 634	4 848	9 905	4 577	1 719	10 599	0	79 914
1959	5 947	18 840	15 370	1 717	3 011	9 924	4 892	10 212	4 735	1 719	10 748	0	83 675
1960	6 166	19 390	16 169	1 821	2 876	10 467	5 118	10 943	4 668	1 971	10 947	2 632	86 025
1961	6 395	20 411	16 896	1 915	2 842	10 658	5 186	11 340	4 504	2 050	11 564	2 682	89 343
1962	6 757	22 017	18 060	2 023	2 902	11 326	5 477	11 806	4 577	2 193	12 341	2 679	94 772
1963	6 976	23 118	20 613	2 157	3 272	12 650	5 830	12 477	4 619	2 358	12 479	2 714	101 548
1964	6 177	24 768	23 869	2 316	4 118	13 711	6 300	13 358	4 704	2 603	12 939	2 733	109 392
1965	6 246	25 580	25 867	2 484	4 887	14 909	6 716	14 042	4 726	2 827	13 749	2 773	116 152
1966	6 737	26 470	27 760	2 564	4 838	15 320	6 975	14 524	4 800	2 838	14 405	2 812	121 367
1967	8 422	26 201	29 872	2 753	5 273	16 725	7 307	15 387	4 911	3 051	15 334	2 849	128 981
1968	7 414	27 174	31 487	2 978	5 630	18 482	7 741	16 801	2 028	3 346	16 359	2 909	135 656
1969	7 767	27 652	34 638	3 157	6 433	19 529	8 322	18 461	2 026	3 738	16 554	2 924	143 726
1970	7 250	28 360	36 936	3 488	7 380	21 108	9 207	19 299	2 105	3 964	17 218	3 027	151 614
1971	8 611	27 505	39 284	3 713	8 374	22 510	9 723	19 863	2 224	4 132	18 058	3 158	158 891
1972	8 536	26 157	40 776	4 065	9 110	23 297	10 108	20 677	2 258	4 225	18 648	3 279	162 705
1973	7 473	25 937	44 558	4 439	9 128	25 325	10 885	22 005	2 307	4 653	19 166	3 383	169 953
1974	9 742	23 876	47 449	4 794	10 121	27 495	12 225	22 967	2 436	4 963	20 078	3 592	179 813
1975	8 907	22 677	49 274	5 078	10 368	29 921	12 611	23 483	2 509	5 104	21 236	3 710	184 670
1976	8 691	24 360	50 510	5 276	9 967	29 958	12 927	24 072	2 609	5 149	22 520	3 811	189 553
1977	9 712	24 857	48 818	5 556	9 430	28 108	13 182	24 126	2 702	5 013	23 165	3 824	188 467
1978	10 102	25 053	52 360	5 872	8 654	27 887	13 759	24 702	2 805	5 119	23 880	3 898	193 853
1979	9 883	25 679	56 683	6 280	8 770	26 886	14 974	25 965	2 934	5 260	24 527	3 960	201 281
1980	10 869	25 107	62 083	6 825	9 511	30 004	16 028	27 565	3 041	5 715	25 356	4 056	214 729
1981	11 497	24 965	66 284	7 606	10 038	32 830	17 044	29 006	3 273	6 461	25 961	4 157	226 199
1982	10 526	24 997	64 274	8 054	9 642	32 878	16 515	29 721	3 475	6 615	26 988	4 281	224 736
1983	8 136	25 069	60 003	8 042	9 119	34 033	15 547	30 707	3 717	6 755	28 345	4 435	220 399
1984	9 064	26 041	62 396	8 560	9 344	37 183	16 768	31 930	3 966	7 238	29 446	4 606	232 069
1985	10 907	26 130	58 872	9 143	8 875	35 599	16 977	32 441	4 037	7 249	29 491	4 712	229 935
1986	11 626	25 238	58 777	9 390	8 157	34 301	16 686	33 176	4 118	7 043	30 522	4 841	229 791
1987	11 922	24 069	60 060	9 714	7 618	35 295	16 801	34 399	4 243	7 009	31 882	5 010	234 003
1988	12 256	24 489	63 929	10 240	7 864	36 767	17 604	35 081	4 358	7 421	32 860	5 198	243 225
1989	14 058	24 232	64 813	10 619	8 527	36 917	18 371	35 740	4 444	7 577	33 664	5 384	249 192
1990	13 055	24 040	63 064	10 804	8 606	37 204	18 377	35 823	4 507	7 770	34 207	5 398	247 315
1991	13 638	23 511	60 183	11 015	8 203	36 547	17 975	36 377	4 571	7 883	34 982	5 430	244 549
1992	9 921	23 909	58 209	11 074	7 693	35 689	18 316	36 532	4 639	8 101	35 373	5 457	238 711
1993	12 302	24 458	58 316	11 512	7 168	35 880	18 748	36 714	4 698	8 255	35 464	5 480	242 485
1994	13 779	23 844	59 791	11 939	7 251	37 281	19 444	37 758	4 760	8 534	35 748	5 534	248 575
1995	11 726	23 094	64 351	12 332	7 376	39 687	20 459	39 100	4 853	8 840	35 991	5 641	255 770
1996	15 133	22 773	64 581	12 942	7 506	41 167	21 109	40 406	4 948	9 189	36 551	5 767	263 694
1997	14 975	23 049	66 685	13 498	7 609	41 371	21 637	41 404	5 044	9 539	36 528	5 881	268 142

Source: CSS, 1998

The sector's contribution to the total economy increased from 7,2 per cent to 8,1 per cent over the corresponding period.

Table 4.3: Telecommunications: GDP at forecast, 1988 to 1997 (R/million)

Year	Transport Storage & Communi- cation	Communi- cation	Communi- cation Per cent of sector	Total	Sector as per cent of Total
1988	17 604	3 996	22.7	243 225	7.2
1989	18 371	4 464	24.3	249 192	7.4
1990	18 377	4 888	26.6	247 315	7.4
1991	17 975	5 195	28.9	244 549	7.4
1992	18 316	5 330	29.1	238 711	7.7
1993	18 748	5 962	31.8	242 485	7.7
1994	19 444	6 319	32.5	248 575	7.8
1995	20 459	7 181	35.1	255 770	8.0
1996	21 109	7 557	35.8	263 694	8.0
1997	21 637	7 833	36.2	268 142	8.1
Growth Rate					
1988-97	2.3	7.8		1.1	
1990-95	2.2	8.0		0.7	
1995-97	2.8	4.4		2.4	

Source: CSS, 1997

Growth in South Africa will depend largely on capital inflows from abroad to boost limited domestic savings and investment, and on direct foreign participation to alleviate the local skills shortage. The government's macroeconomic plan clearly recognises that it is imperative to convince global markets of its *bona fides*. The Small Business Sector (SBS) is expected to play a major role in creating new jobs. Private sector initiatives are being added to the traditional government and donor aid development funding. Manufacturing, which contributes 24 per cent of GDP, is the largest employer in the country (CSS, 1997).

Despite average selling prices declining by an average 15 per cent per annum the local telecom supply industry has:

- An annual turnover growth of 20 per cent per annum; and
- Restricted import growth to 14 per cent (TMA, 1997).

4.5 Developing people

The local telecommunications supply industry is a significant employer and investor in human resource development. The local telecommunications industry has a sound record in work force training and development. The encouragement of the local telecommunications supply industry will boost national competence and will, furthermore, secure employment opportunities in the face of new overseas-based competition. Currently TMA employs a combined staff of 7 236 (*TMA, 1997*).

Fear of job losses was prevalent in the large organisations with parastatal roots. The national importance of job creation, and the union's concerns with job security, have thrust this issue into the forefront of the debate.

Table 4.4: Jobs shed by Telecommunications Operators from 1992 to 1996

South Africa Telkom	
1 000	jobs in 1995
10 000	jobs in the period from 1992 to 1996
AT&T	
40 000	announced intention to shed, 70% to be done in 1996
British Telecom	
100 000	jobs shed from the original 240 000 strong work force (1992-1996)

Source: TMA, 1997

As per *Table 4.4*, recent local and international trends among large telecommunications operators undergoing restructuring show that thousands of jobs are being lost in the process.

British Telecom revealed that it had shed 100 000 jobs from the original 240 000 strong work force (in March, 1996). Earlier AT&T announced its intention to shed 40 000 jobs, and that 70 per cent of this process was completed in 1996 (*AT&T, 1997*).

Telkom SA Ltd. cut 10 000 jobs between 1992 and 1996. The entire Eskom group, including its telephony sector, shed 26 000 jobs in the last decade (*TMA, 1997*).

Both the job creations in the cellular networks and the reduction of jobs at Telkom SA Ltd. and Eskom can be ascribed to striving towards competitiveness. However, it has been argued that restructuring and increasing the levels of competition in the industry will, in the long term, create far more jobs than will be lost. Furthermore, this restructuring and increased competition is believed to be the only way that the demands of the Reconstruction and Development Programme (RDP) demand can be met (*RDP, 1996*).

Competition in the local cellular telephony industry has created an estimated 7 000 direct and indirect new jobs, although it must be noted that this development arose from the introduction of a whole new communications technology industry and did not merely result from an existing organisation becoming more competitive. The job in the cellular industry is shown in *Table 4.5*.

4.6 Investing in local Research and Development (R&D)

The local telecommunications supply industry spends more on R&D than is generally recognised. Key research projects as per *Deloitte & Touche (1997)*, focused on developing African solutions for African telecommunications problems, are in place in most of the key players in the local industry.

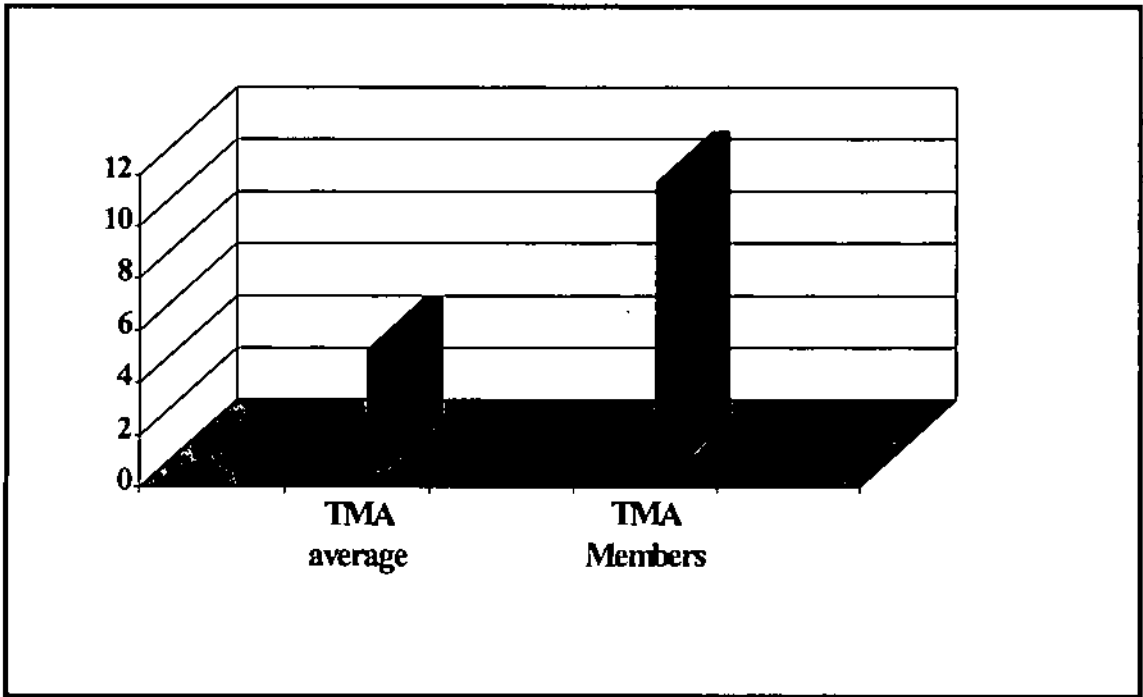
Table 4.5: Job creation in the cellular industry

• Direct employment	
Networks, operators and service providers,	2 300
Dealers, agents, suppliers;	2 200
Installers community phone operators	500
• Indirect employment	
Advertising, banking, computer systems support, printing, property rentals, etc.	2 000
TOTAL	7 000

Source: TMA, 1997

In addition, quality R&D is being undertaken, often in collaboration with the most sophisticated global R&D facilities, to identify and exploit important technologies in key niche global markets (TMA, 1997).

Figure 4.3: Investment in R&D in South Africa telecommunications industry (percentage turnover)



Source: TMA, 1997

4.7 Conclusion

The South Africa telecommunications industry will have to undergo fundamental changes in order to meet the dynamic challenges of the 21st century and beyond. Central to the subject is the impact of the information society and the associated sector. In addition the emergence of multimedia services, the rapid development of mobile communication, advent of intelligent network and other dynamic and energetic sectors. Global challenges require a concerted response. Global environmental protection requires global co-operation and monitoring telecommunications performance. In developing of the South Africa telecommunications performance and strategy, it is important that there will be established guidelines for telecommunications regulation. The establishment of a dedicated Africa Telecommunications Foundations to support public and private infrastructure investment programmes, needs to be considered.

CHAPTER 5

5. Human resources in the South Africa telecommunications industry

"None of the intentions to deliver basic needs in South Africa is capable of attainment without skilled human resources. None of our objectives to ensure economic growth, international competitiveness and equality will be realised if we do not develop the requisite skills. It is for this reason that human resource development forms a central part of RDP implementation."

Mandela, 1995

5.1 Introduction

Telecommunications technology has a vital role to play in South Africa's process of change. Accelerating changes in global telecommunications technology and in international relations have had a tremendous impact on the communication industry and the people involved in it. South Africa's process of change has, *inter alia*, catapulted its telecommunications industry into global competition. This in turn has raised the profile of human resource issues within the telecommunications industry.

The impact of telecommunications technology on human resources issues far exceeds the boundaries of the industry itself, extending into the core of the country's socio-economic development.

Telecommunications technology has played an important role in the changing times in South Africa. In the eighties, the leaders of the South Africa Union and ANC members secretly communicated with leaders outside of the country (via coded pager messages only). Negotiation and organisation by cell telephones and faxes facilitated the miracle of the first democratic national and local elections in 1994. In this new era, the telecommunications industry has a major part to play in improving the day-to-day lives of South Africa's people.

5.2 New communications technology

Strategies and practices in the local telecommunications business have had to change rapidly to meet local and international challenges. The concerns and needs of customers, employees and shareholders, as well as expectations of Reconstruction and Development Programme (RDP) delivery, have created an environment for the industry where organisational capabilities have been stretched (*RDP, 1994*).

The extension of telecommunications technologies has been shown to have a positive effect on the country's development (*Barnett, 1996*). The rollout of telecommunications services to an increasing number of the population will have a major impact on South African society, more specifically the increased potential for human resource development using the new technology.

In the past, technology was less sophisticated and the South Africa government controlled monopolies saw little reason to invest in substantial human resource development programmes (*Barnett, 1996*). The previous political dispensation prioritised communications services and development for the then centres of social power (*Barnett, 1996*). The peripheral communities, although numerically greater, were severely neglected (*Barnett, 1996*). These communities have been disadvantaged and lack the appropriate technological resources which could begin to redress inequities (*Barnett, 1996*).

Rapidly changing telecommunications technology now demands thorough training and re-training for the effective growth of the industry. The industry's growth will, in turn, facilitate the development of business, health and education sectors as the country strives towards significant socio-economic growth and RDP delivery. The successful growth of the telecommunications industry requires substantial training and development, while the industry is itself a catalyst and a facilitator of human resource development in the country (*Barnett, 1996*).

5.3 Challenges facing human resource development

Leaders of organisations in the telecommunications industry must take their organisations into a dynamically competitive market. Simultaneously, they must take the lead in the costly commitment of resources and time to human resource development and realistic affirmative action. Some of these main human resources related issues are depicted in *Table 5.1*.

Table 5.1: Human resource-related issues

• Rapid roll-out of services to disadvantaged communities	Global competitiveness
• Allocation of more resources for education, training and development	Competition around product, service and quality issues
• Job creation	Restructuring and downsizing
• Development of affirmative action candidate	Recruitment and retention of skilled personnel

Source: BMI-T, 1996

The demand for a rapid roll-out of affordable services to disadvantaged communities is perceived to contradict the need to be profitable and competitive in a global market. Recruitment and retention of skilled personnel is sometimes considered to conflict with a commitment to deliberately select affirmative action candidates and their development. Organisational restructuring accompanied by downsizing seems to appear to fly in the face of the need to increase employment in the country (*ITU, 1996*).

The interviews indicated that a positive accommodation of seemingly opposing issues was underway. All players agreed that comparatively great strides had been made, nevertheless much remains to be done. Relevant structures and forums have been established where issues are aired openly and some common ground agreed (*Barnett, 1996*). In 1996, saw representatives of polarised forces move from a totally confrontational stance to the accommodation of wider interests and the willingness to work within the dynamic realities and interests of the country.

The fact that the pertinent issues of the telecommunications industry are very much in the public eye at present encourages responsible interactions between the various interest groups. It is felt that the continued commitment of all telecommunications involved parties to honest attempts to address the issues of the day are beginning to bear fruit. The telecommunications industry is seeing the beginning of a framework, albeit still fragile, that could grow to be robust enough to contain and foster the inter-relationship of forces with very different focuses and priorities, flourishing within these opposing fields of force, rather than one force insisting on ascendancy over. Those players who succeed to interact on human resources issues will be identified by the degree of successful interaction (*Sietel, 1998*).

5.4 Recruitment and retention

For the telecommunications sectors in South Africa which are experiencing growth, such as the VANS and cellular operators, the recruitment of skilled personnel has been an important feature of their human resources activities during the past two years (*ITU, 1996*). While there is steady growth in the VANS, some do not see large numbers of jobs being created in the telecommunications sector. Nevertheless there are companies, which reported hiring at a rate of 20 people per month in 1995, with very few exits years (*ITU, 1996*). Recruitment in this sector has been via networks of informal communication, recruitment agencies, and some headhunting. Applications from overseas candidates have abounded. Technical skill shortages are still being experienced in the VANS. This is fairly common challenge facing at a time of increasing growth and potentially increased competition. There is a marked trend for skilled people to move out of the larger organisations, such as the banking networks, and then to sell their skills back to their original and other employers or clients as consultants. One VAN was proud to report that its best technically skilled person was now in a consulting relationship with them and did work for numerous other companies (*Barnett, 1996*).

The most sought after people have a mix of skills combined with practical business experience. Affirmative action employees with business or technical experience are most exposed to poaching, and one interviewee reported receiving offers on a fortnightly basis. There is a widely held view that people are loyal to the VAN industry,

rather than a specific company. One VAN company reported that most of its skill losses were not to other companies in the industry. Most losses resulted from their people becoming contractors or leaving the country (*Sietel, 1998*).

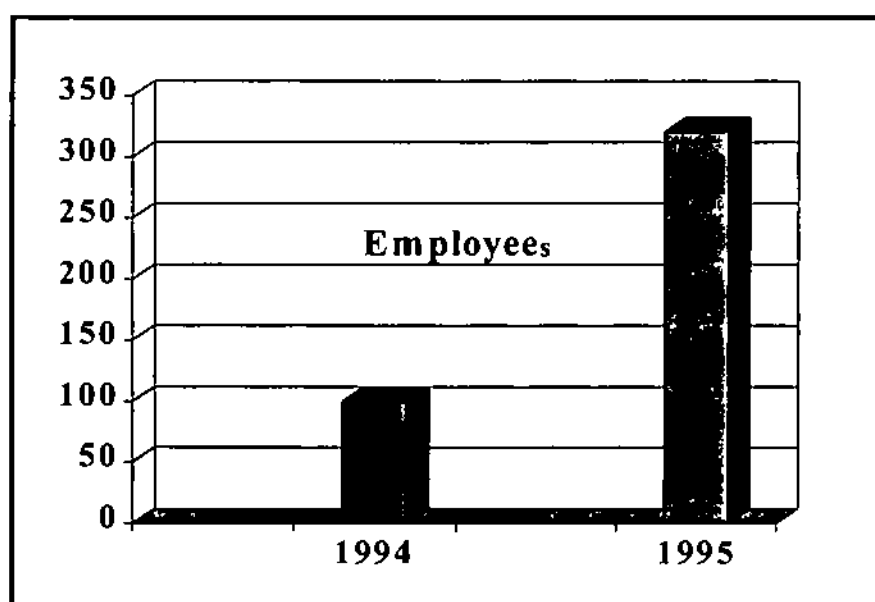
Skills-losses still occur among experienced and highly qualified whites. Although new skills are entering the country more readily now, the perception in the VANS is that there is still a notable "brain drain" out of the country. Departing employees in their exit interviews cite criminal violence, feared lowering of standards in education, and a perceived "glass ceiling" for career development (*BMI-T, 1996*). Contrary to a view that a "glass ceiling" and affirmative action priorities are limiting the options for some, there was a strongly held view that the value of the skilled individual in the VANS was expected to rise with future developments in this sector. This would serve to enhance the individual's marketability, the demand for their skills, and their bargaining power when it comes to negotiating packages. Under these circumstances, any significant growth of unionisation in this sector should be minimal (*ITU, 1996*).

Moves, and expected moves, into Sub-Saharan Africa have led to the VAN and cellular sectors undertaking recruitment in other African countries. There are instances where senior appointments have already been made from these countries, and where the appointees are now working in South Africa to prepare for the expectation thrust into Africa (*Barnett, 1996*).

5.5 The cellular sector

Growth has been in the cellular industry and this has focused attention on the recruiting issue. During 1994/95 have been employed approximately twenty people each month. In terms of recruiting, word of mouth advertising is encouraged by any telecommunications company. One company pays incentives to existing employees who successfully introduce people to the company where needs exist. Another company has moved from giving 80 per cent of its recruiting work to agencies, to handling most of the recruiting itself. A deliberate decision has been taken to add value to the recruiting process internally (*ITU, 1995*).

Figure 5.1: Employment growth in cellular network organisation



Source: ITU, 1996

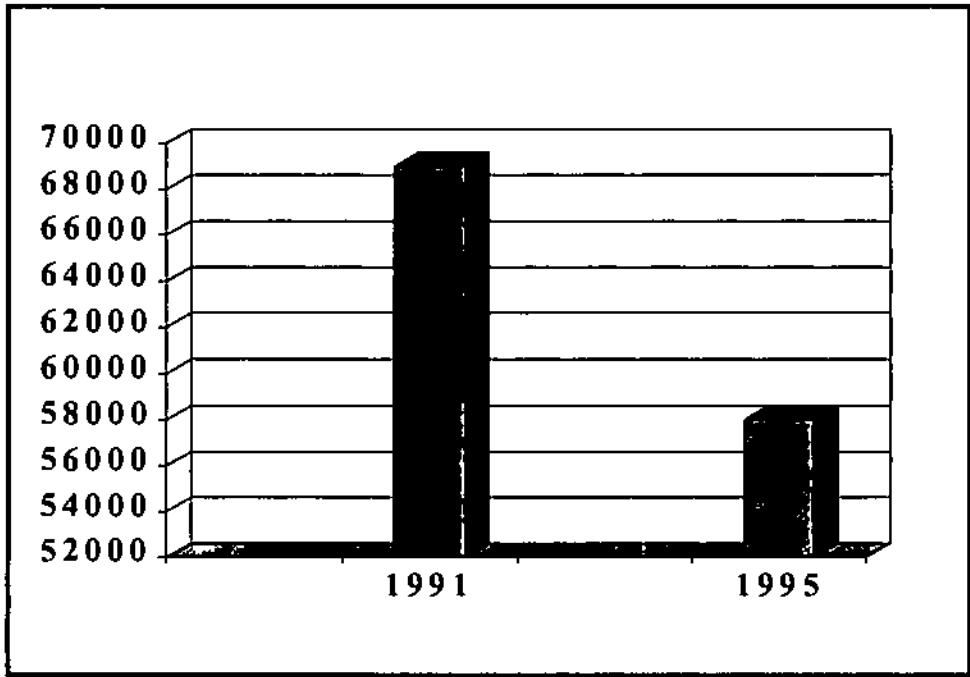
The one VANS company has a profile for the typical employee who would best fit the organisation. They believe that this profile is known and understood by all line managers, who have the final say in the hiring process. Their agencies too have been made to recognise this profile.

At present, the low turnover in this sector has risen very slightly to between 7 and 9 per cent. In some cases, those exiting the cellular sector companies have a six-month restraint of trade placed on them. There appears to have been little movement of staff between the two existing network companies. The prospect of a third licensee coming into the market would bring some interesting dynamics into play (*ITU, 1996*).

The growth phase of the cellular sector in the telecommunications industry has been characterised by the rapid development and deployment of people. Seven year plans were brought forward by up to six years as demand and competition grew, with serious implications for recruiting. Throughout this growth phase, these companies have remained relatively flat structures. Very few employees are below the grade, and less

than 10 per cent of employees are in the top three levels of the organisation (*Barnett, 1996*).

Figure 5.2: Reduction of jobs at a large operation in the telecommunications industry from 1991 to 1995.



Source: ITU, 1996

Within the cellular networks staff have been willing to put in tremendous effort for few extra rewards, motivated, it is reported, by a sense of belonging to a major pioneering project. It is a common view amongst senior human resources management that this phase has now passed, and that this particular kind of pioneering challenge, in the cellular sector, is coming to an end (*ITU, 1996*).

There is consensus that a new phase has begun which, although it retains some aspects of ongoing development, now focuses on consolidation and on customer service. Staff numbers are not expected to grow rapidly. Retention of staff, and creativity around compensation and incentive issues, will be crucial in the years ahead (*ITU, 1996*).

Table 5.2: Employment in the telecommunications industry in South Africa

Design & Development	No.	Multiplier
Hardware	450	N/A
Software	250	N/A
Total D&D	700	1
Assembly, manufacture and sale	6 500	9,3
Operation, installation and maintenance	75 000	11,5
Total	82 200	N/A

Source: ITU, 1995

Top management has been central in the preceding phase, and is retaining a hands-on involvement with people and customers. During the past four months May-August 1996 a number of important structural changes and senior appointments were made (*Barnett, 1996*).

In the set-up phase, both cellular network companies made substantial use of skills seconded from their overseas associates. The move into Africa will be carried out in similar fashion with South African skills being seconded to other countries where local understudies will be recruited. In a few cases nationals from those countries have already been recruited and are undergoing training in the South African company (*Sietel, 1998*).

Increased demand for skilled and experienced human resources will arise from the new technology in the telecommunications sector, from competitors arriving on the world and local markets, and from other value-added service companies. Over the past three years the biggest telecommunications companies have lost or transferred skills to other sectors. The massive restructuring still underway has seen thousand of jobs shed in these organisations. Recruiting has nevertheless been necessary to fill skilled positions and to meet the challenges of changing technology, changing markets and the demands for affirmative action. The retention of experienced, skilled personnel has clearly been a problem (*Barnett, 1996*).

Recruiting procedures in the telecommunications sector, generally, follow set guidelines and procedures unlike the cellular sectors where line managers are often encouraged to place their own adverts or use agencies of their choice. Internal advertising is important in all the organisations interviewed. Internal advancement has been a contentious issue due to the changed basis for advancement. The focus is now on advancing potential in line with the new visions of the organisations (*Barnett, 1996*).

Many managers warned against referring only, that even largely, to test results when making decisions on candidates. Interviews were the most frequently used evaluation, although these were not always structured. Confidence in line management's ability to handle job interviews effectively and make recruiting decision was some times questioned, but there was unanimity that line should have the final say. Despite this, only 40 per cent of those interviewed said there was effective training of line managers in these skills (*Sietel, 1998*).

5.6 Affirmative Action (AA)

5.6.1 Introduction - Definition

"An employer is not prevented from adopting or implementing employment policies and practises that are designed to achieve the equal protection and advancement of persons or groups or categories of persons disadvantaged by unfair discrimination, in order to enable their full and equal enjoyment of all rights and freedoms" (Sietel, 1998).

Efforts are being made by companies in the telecommunications industry to implement this view of affirmative action. However, in general progress has been slow. While there is a strong understanding that things have to be different, and all organisations interviewed had a policy of sorts, there is a perception that some form of legislation is inevitable (*Sietel, 1998*).

AA is a sub-set of a broader process of change, and cannot be equated with equal opportunity, although it can lead to a situation where equal opportunity can apply. Neither is it a permanent way of doing things, and is not about creating diversity. It is

about actions to bring the existing diversity into all strata of an organisation, and must proceed from a sound base of education, training and development (*ITU, 1996*).

It has been necessary to embark on programmes of organisational change, which include this specific and urgent intervention plan known as "Affirmative Action". AA is a vital subset of a wider process of change, but it is not the entire process. It remains a priority, in that other transformations cannot progress fully without it. One of the superficial, but visible results, is to bring about changes in the demographics at all levels in the organisation through the deliberate recruitment and advancement of people who have hitherto been hindered from competing fairly for such positions. This includes the enabling of the candidates to perform competently. AA will be a permanent feature of the communication industry, and once it achieves its goals the focus of action will shift to general human resource development (*ITU, 1996*).

In the telecommunications industry, the confusion of AA with "Equal Opportunity" persists. An equal opportunity approach does not acknowledge the profound impact that the previous social system had on South Africa's people. Such an approach can therefore do little to change the *status quo* in terms of management demographics within the industry, empowerment, and organisational transformation.

AA is a deliberate and necessary phase of a larger process of change. The end result of this process should be a situation where equal opportunity principles could then apply in the telecommunications industry. The telecommunications industry in South Africa has always been multi-cultural (*Sietel, 1998*). The need for AA intervention and change is evidenced by the fact that this diversity has remained stratified, trapped in specific job levels or job types related to race (*BMI-T, 1996*).

Telecommunications Manufacturers Association (TMA) members recognised that some form of legislation of AA would be implemented even though it was questioned. Some felt that certain sectors of the industry would still be able to motivate reasons for non-compliance with legislation, while others stated that they would be prepared to pay fines for lack of compliance (*BMI-T, 1996*).

AA poaching and job-hopping remains an issue in this time of scarce skilled resources. Certain senior people interviewed were receiving offers fortnightly from competitors in the telecommunications industry. All respondents and interviewees rejected tokenism, although no specific questions were asked about this. There was agreement between unions and employers that Affirmative Action should be based on education, training and development. This would produce changed demographics in the workplace and maintain the integrity of the business (*Sietel, 1998*).

Public sector corporations and industry associations Sietel take between 55-68 per cent of recruits from the black population who also account for up to 45 per cent of all promotions (*Sietel, 1998*). The VANS have approximately 25 per cent of employees from previously disadvantaged groups on their payroll with as many as 41 per cent of their employees being women (*BMI-T, 1996*).

The importance of AA targets varies from company to company. The cellular sector is working toward 50-55 per cent other than white employees within the next 48 months. This sector has the advantage of having born and staffed in this new era, and was able to attend to AA considerations from the start of the industry.

Table 5.3 summarises the total of Sietel salaried blacks and whites female staff split according to Job Grades in 1997. (Structure of managerial and salaried staff - affirmative action candidates).

All those interviewed by human resources have guidelines regarding recruitment that encourage appointments to add to the diversity to the company. These include the deliberate choice of certain media and agencies for recruiting, careful wording of advertising to encourage AA applicants, and insistence that between half and three-quarters of the short list is made up of candidates other than white males (*Barnett, 1996*).

Table 5.3: Sietel salaried blacks and whites female staff split

	Peromnes Grades	Total Salary Staff	Total	Black Males	Female Whites	Female Blacks
Executive	1	1	0	0	0	0
Management	2	3	1	1	0	0
Senior	3	7	1	1	0	0
Management	4	33	0	0	0	0
Middle	5	101	6	4	2	0
Management	6	238	28	17	11	0
Total 1-6		383	36	23	13	0
Percentage			9.4			
First	7	350	59	27	32	0
Line	8	347	72	53	18	1
Management/	9	337	109	47	58	4
Specialists	10	329	163	72	76	15
Total 7-10		1363	403	199	184	20
Percentage			29.6			
Total 1-10		1746	439	222	197	20
Percentage			(25.1%)	(12.7%)	(11.3%)	(1.14%)
Total SAL		2356	929	425	393	111
Percentage			39.4%	18.0%	16.7%	4.7%

Source: Sietel, 1998

5.7 Siemens – Human Resources

Table 5.4 depicts total the Sietel Employees split according to colour in 1995, 1996 and 1997.

5.7.1 Sietel efforts on education, training and development

A concern expressed by Sietel numerous human resources practitioners that the measurement of training must move away from a purely "days per employee per year" measurement. Quality of training needs to be monitored more closely and measures of success need to be quantified (*Siemens, 1996b*).

Sietel has programmes to promote self-study have increased since 1992. Training is providing in a modern in-house Training Centre in Silverton. With high technology telecommunications, it is not surprising to find substantial outsourcing of the technical training to local and overseas training facilitators (*Siemens, 1996c*).

Table 5.4: Sietel Employees split according to colour in 1995, 1996 and 1997

Population	Sex	Employees		
1995		Salary	Wage	Total
White	Male	298	123	421
	Female	71	4	75
	Total	369	127	496
Asian	Male	24	76	100
	Female	10	125	135
	Total	34	201	235
Black	Male	60	353	413
	Female	3	24	27
	Total	63	377	440
1996				
White	Male	336	109	445
	Female	76	1	77
	Total	412	110	522
Asian	Male	19	15	34
	Female	0	0	0
	Total	19	15	34
Coloured	Male	6	35	41
	Female	12	93	105
	Total	18	128	146
Black	Male	66	261	327
	Female	6	17	23
	Total	72	278	350
1997				
White	Male	426	48	474
	Female	85	1	86
	Total	511	49	560
Asian	Male	25	13	38
	Female	0	0	0
	Total	25	13	38
Coloured	Male	19	19	38
	Female	16	84	100
	Total	35	103	138
Black	Male	84	217	301
	Female	6	18	24
	Total	90	235	325

Source: Sietel, 1998

Deliberate efforts are underway to use affirmative action considerations in selecting trainees for local and overseas training (*Siemens, 1997k*).

Sietel has established links with UNISA, Wits, University of Pretoria, VISTA University, African Development Bank, SACOB, SABS, and other institutions to present various courses, viz., (business management, accountancy, administration etc.) to contribute to the growth of the telecommunications industry (*Sietel, 1998*).

5.7.2 Human resource development and RDP in Sietel

Sietel group needs to demonstrate that its RDP activities meet the RDP programme criteria in terms of aims, targets, time-scales, evaluation strategies and costing. The education, training and development of human resources will have most profound impact on the people of Sietel (*da Silva, 1998*).

5.7.3 Black economic empowerment

In line with the government programme of Reconstruction and Development, Sietel has established its own Economic Empowerment initiative. Economic Empowerment is an economical reality needed for the growth and the distribution of wealth and skills in the country. Sietel is engaged in a quest for technical partners. The Sietel commitment to economic empowerment is in the support of RDP, particularly in providing telecommunication through modern technology at competitive and yet affordable cost; as well as to providing capacity building and creating jobs through community participation (*Siemens, 1997b*).

Some of the objectives in the pursuance of economic empowerment are:

- To ascertain that a substantial technology transfer takes place to the communities;
- To assist in providing relevant training to communities;
- To increase Black procurement in a manner that advances the Sietel policy and company image;
- To help create and promote technical partners within the franchising scheme;
- To make sure that Sietel is located in the transformation process; and
- To ensure continuity of telecommunications standards and sustainability of the industry through growth (*Sietel, 1998*).

The priorities have been spelt out by the government as to how to empower the disadvantaged communities. Sietel have had to deal with a lack of business and technical skills in these communities. To accelerate the entry into these communities would require the partnering of existing business with new business created within the

disadvantaged communities. Sietel see a success in this programme that ensures that the transfer of skills is taking place (*Siemens, 1996a*).

The zeal for implementation of Black Economic Empowerment in Sietel is manifested in the shareholding where the Industrial Development Corporation (a parastatal) holds 36 per cent of Sietel shareholding. Furthermore this percentage is intended for the empowerment of the previously disadvantaged in South Africa (*Siemens, 1997k*).

As telecommunications is one of the stimulants of economic growth, it is imperative that Sietel involves black business as sub-contractors. Sietel have involved and trained black sub-contractors in numerous projects i.e. street lighting projects and PABX maintenance. Special efforts are made to empower and develop blacks owned business, sub-contractors, community projects, regional and national site initiatives in line with the RDP. To facilitate these initiatives, an economic empowerment committee has been established comprising of representatives from executive management Human Resource, Strategic Purchasing, Trade Unions and a full time Economic Empowerment Manager (*Siemens, 1997l*).

Sietel affirmative action policy, which is part of the company philosophy, seeks to address equal opportunity and development of all employees. It is a long-term goal to achieve social equality, which from its adoption on 30 May 1996 has yielded significant results (*Siemens, 1997j*).

Sietel's commitment to social responsibility is reflected within the company and in the community. Within the social responsibility programme, there is the social fund policy through which low-cost financing for housing and education opportunities is made via grants for all employees who are classified as socially disadvantaged (*Siemens, 1997e*).

5.7.4 Shareholding of Siemens Ltd.'s Group

The current shareholding in Sietel is 64 per cent Sietel AG and 36 per cent Industrial Development Corporation (IDC) a parastatal body. The agreement provides, *inter alia*,

for onward sale by the IDC, of any part of its shareholding in Sietel Limited, to groups constituted for the purposes of economic empowerment of the previously disadvantaged in South Africa (*Siemens, 1997j*).

In a trial project in Mpumalanga recently twenty people from the community were engaged and trained in the installation of the access system of the DECT-link, which is a 100 per cent local investment. Upon completion of the project, eleven of the empowerment candidates were taken for specialised training on DECT installation. Further technical and business training is being conducted to assist them to be Sietel sub-contractors. Four trainees are with Sietel being trained on various installation processes. In other projects (e.g. Soweto street lighting project), Sietel has successfully trained and involved sub-contractors from the previously disadvantaged groups in its contracts (*Sietel, 1998*).

Sietel is pushing the process of outsourcing of work to Black business in line with and beyond the economy of scale in the country. A model for the future of Sietel's manufacturing is represented in a diagram defining the outsourcing of non-core business units. Recently a high technology surface treatment plant with a replacement value of R7 million has been outsourced to an at least 60 per cent majority Black shareholding company called "NEWCO". This shareholding also includes the staff at the surface treatment plant. Additional areas are being identified for outsourcing: at the moment a tool room and a plastics molding plant which are also high technology with equipment to the value of R6 million are on the list (*Sietel, 1998*).

The involvement of Black businesses in projects forms part of Sietel corporate position on economic empowerment. For other installation projects, it is planned that current sub-contractors increase their Black shareholding up to 50 per cent to be able to get business. A special business system to assist in franchising initiatives has been subcontracted to Motswedi Information Systems for development. This system is intended for use in Mpumalanga with the Machadodorp candidates involved in it. The selected 20 representatives from Mpumalanga who were utilised in the installation of the pilot project and who were given specialised training will be involved in Sietel

future general and special projects. Additional training is provided to develop them into subcontractors (*Sietel, 1998*).

The Sietel affirmative procurement policy targets to achieve 10 per cent procurement from Black businesses. The Economic Empowerment committee representatives of employees and management meet on a monthly basis to consider progress in this regard. Agreement has been reached that Sietel will increase procurement by 10 per cent annually for the next three years. In addition, Sietel are presently compiling information on suppliers who have recently attained black shareholding. Sietel are also encouraging suppliers to work on their companies with regards to Black shareholding. The pre-condition of the Sietel policy on SMME's is that they should be capable of meeting the required quality and standards. Sietel involvement in the Corporate Small, Micro and Medium Enterprise Development Forum (CSDF) and other empowerment forums is primarily to achieve this objective (*Sietel, 1998*).

In recognition of the special circumstances in South Africa, the Sietel has broken with their international policy and has established an affirmative action policy which aims at accelerating the progress of disadvantaged groups (gender and race). Board appointments reflecting this have already been made (*Sietel, 1998*).

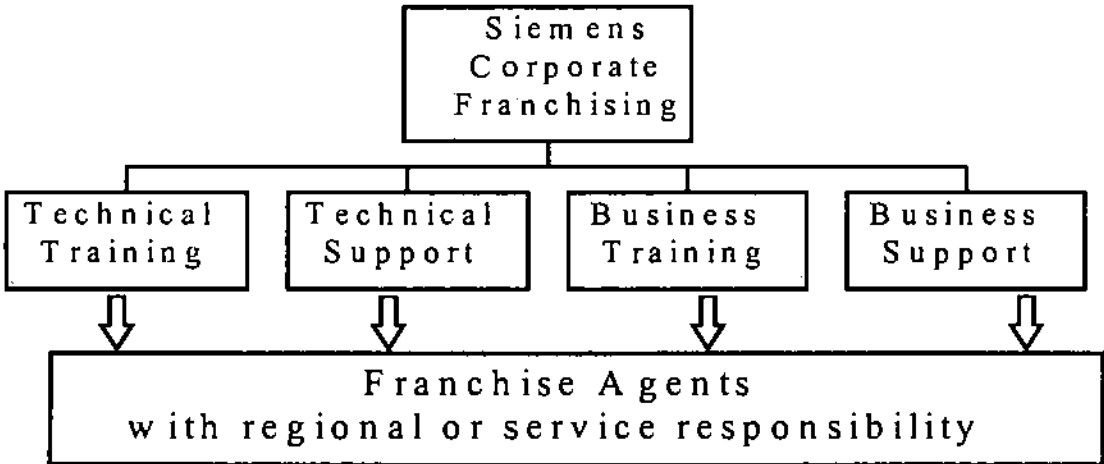
5.7.5 Sub-contracting

The following Black sub-contractors are currently being utilised by Sietel:

1. Goal Electrical (Soweto) with approximately 90 employees;
2. R.M. Electrical (Soweto) with 50 employees;
3. Hash Electrical (Soweto) with 30 employees;
4. Mayekiso Electrical (East Rand) with 8 employees;
5. Isaac Electrical with 4 employees;
6. Mandla Associates (Eastern Cape) with 10 employees;
7. Metrame Cleaning Services (Isando) with 14 employees;
8. Nkosi's Transport and Distribution Service (Pretoria) with 13 employees; and
9. Peter & Aron C.C. - Cable Rigging with 6 employees (*Sietel, 1998*).

Sietel will expand its activities into the emerging markets within Southern Africa by means of a network of owner-operator businesses. This will be achieved by a scheme similar to franchising whereby owner-operator businesses will be trained and supported by an organisations such as in the following diagram:

Figure 5.3: Sietel Corporate Franchising



Source: Sietel, 1998

These businesses will act as the primary local sub-contractors for Sietel in the following activities:

- Network building and equipment installation;
- Network and equipment maintenance;
- Marketing and supply of terminal equipment;
- Marketing and supply of services on the part of the network operator where permissible; and
- Business activity facilitation through the provision of shared services such as communication and bureau services.

5.7.6 Black companies utilised for procurement

A following Black companies have a joint venture with Sietel:

1. Gold Circle Metals - copper brass and non-ferrous metals;
2. Select Fasteners C.C. - screws, nuts and bolts;

3. D.I.D. Supplies C.C. - drawing material;
4. H M Bolts C.C. – bolts; and
5. Joe Motete Studios C.C. – photography (*Sietel, 1998*).

Alliances involved in the Sietel Projects:

- South National African Civic Organisation (SANCO); and
- Motswedi Technology Group

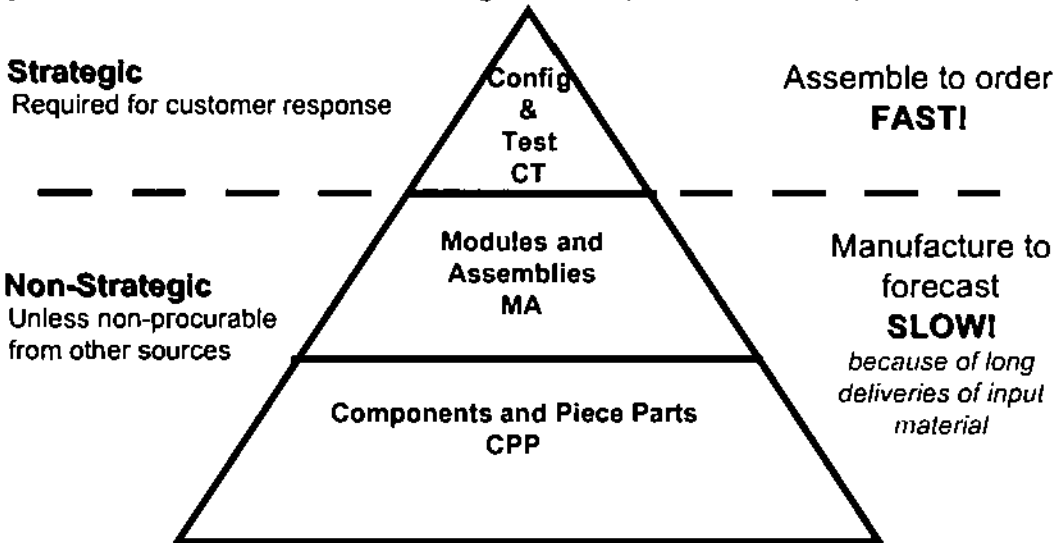
5.7.7 Outsourcing

Figure 5.4 represents Sietel’s manufacturing model for the future. The lower levels will be outsourcing. In some cases the outsource supplier will be one of the existing Sietel manufacturing units e.g.

Surface treatment;
 Small mechanical parts;
 Metalwork; and
 Precision plastic parts.

These units have been sold to the operating staff and suitable external partners on a LBO scheme. Sietel staff and Black-owned investment companies will enjoy priority (*Sietel, 1998*).

Figure 5.4: Model for manufacturing in future (Millennium 2000)



Source: *Sietel, 1998*.

5.7.8 Support of Black Sub-Contractors and Local Industry

Apart from the sub-contractors and suppliers listed in tender documents, Sietel is actively engaged in creating Black majority-owned companies with whom it will work on a sustainable basis especially for third cellular network which should receive licence from SATRA South Africa as from 1999 (*Sietel, 1998*).

The general process to establish implementation for above-mentioned project is as follows:

1. A market study is conducted to establish the economics of the unit;
2. The operation is separated from the Sietel factory and located in new premises. For instance, the process of relocating the tool room as mentioned earlier in the Sietel marketing strategy for South Africa has been completed;
3. The unit management is encouraged to find external work; and
4. When it is clear that the new business can fulfil its below mentioned promises, buyers are sought who meet the following criteria:
 - i. They must agree to employ the staff on equal or better terms than at Sietel;
 - ii. They must offer the staff equity participation;
 - iii. They must have adequate managerial capability to run the business competently;
 - iv. They must sign a supply agreement with Sietel;
 - v. They must agree to make their results available to the Digital Telephone Interface (DTI); and
 - vi. They must have a sound-financing plan (*Sietel, 1998*).
5. Sietel management vets the applicants and submits those who qualify to the workforce (operators and management) for acceptability; and
6. The new owners are assisted and supported for a mutually agreed period.

In exchange Sietel offers them the business on very good terms and a supply contract.

The following operations which are in different stages of this process at the present:

Surface Treatment	5
Sheet Metal Plant	2

Small precision parts	1
Tool shop	2
Precision plastics	1
Wire wound parts	1

A special Sietel business system adapted to the needs of these franchised businesses has been contracted to Motswedi Information Systems for development. All the candidates obtained their initiation in the Machadadorp project.

The businesses will be supported throughout by Sietel and will create a business portfolio from the following:

- Installation and commissioning for Telkom SA Ltd. and Eskom projects;
- First level maintenance of Telkom SA Ltd. and Eskom equipment (when enabled by customer);
- Sale and support of terminal equipment;
- Operation of telecommunications and secretarial bureau; and
- Sale and support of PABX and related equipment (*Sietel, 1998*).

The operating area of each franchisee will be adapted to the volume of business required to achieve sustainability (*Sietel, 1998*).

5.7.9 Manufacturing Strategy

Telecommunications manufacturing in South Africa was initiated by the South Africa Post Office for self-sufficiency reasons and resulted in a vertical-manufacturing model within all contracted supplier companies. Suppliers were encouraged to manufacture as much as possible locally. Self-sufficiency was the driver, not competitiveness and thus uneconomic (*Sietel, 1998*).

After the termination of the Supply Agreements (Agreement between buyer and seller about supply, delivery, installation, testing and commissioning) in 1994, Sietel reviewed its manufacturing strategy and benchmarked it against the global industry. Several international trends were clearly discernible:

- Logistics rather than process technology was the new driver;
- System suppliers were outsourcing feeder processes to an increasing degree; and
- World class manufacturing performance required stable demand (*Sietel, 1998*).

The following *Figure 5.5* depict the local manufacturing of Sietel from 1995 to 1996. Order received summarised all official orders received from Telkom. Turnover just copied orders received according contract condition demand (*Sietel, 1998*).

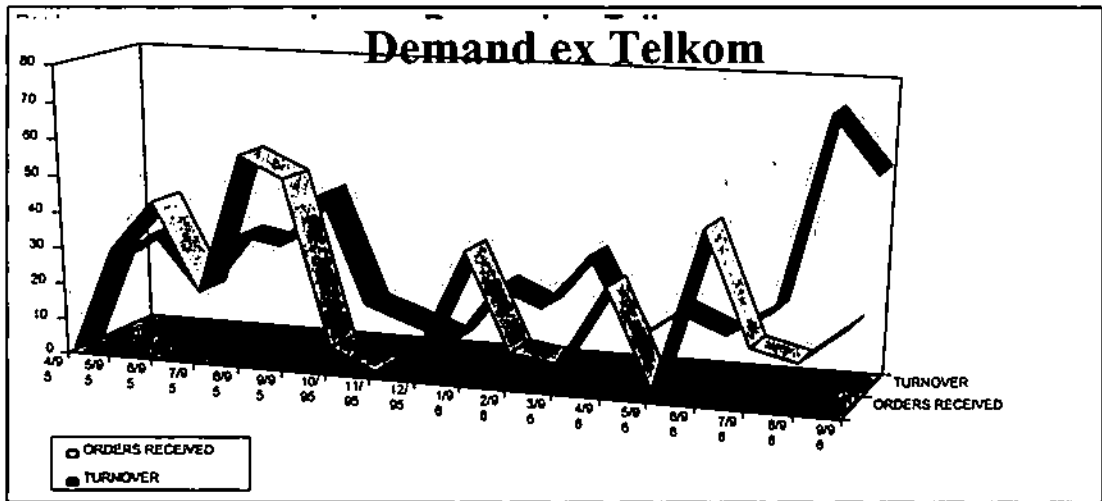
Local manufacture would be directed primarily toward locally designed products for the world market and secondly toward products with a stable demand. The result was that Sietel would increase the product range, which it would configure and then test and outsource the second and third levels to competent, preferably local suppliers.

5.8 Sietel further performance

Sietel will evaluate its RDP involvement in terms of the following criteria:

- Promote active and democratic involvement by all holders in the development and implementation of programmes;
- Overcome disadvantage through the demonstrated provision of access, equity and redress;
- Contribute to lifelong learning;
- Develop the capacity for critical and creative thinking;
- Contribute to the long term availability of resources and infrastructure needed for future;
- Be sustainable;
- Provide the basis for ongoing implementation and further development in RDP;
- Indicate how delivery outcomes can be measured; and
- Priority and target marginalised elements in the telecommunications communities, workers, women, the disabled and the youth (*Sietel, 1998*).

Figure 5.5: Local manufacturing of Sietel in 1997 ex Telkom, [R/million].



Source: Siemens, 1996d

5.9 Conclusion

An enduring feature for telecommunications industry sector is learning to operate and thrive in climate of change, competition and delivery demands for development. The complexity of this task requires extraordinary leadership, and committed teamwork.

The demand placed upon the telecommunications companies in the industry do not originate from South Africa context alone. They are the basic requirements for entry into the global market.

Human resource issues are amongst the telecommunications industry's most critical issues, and they will continue to be a determining factor of success.

Whether one measures that success in term of penetrating ever increasing levels of disadvantaged communities with telecommunications technology, in terms of successful global competitiveness, or in terms of job creation and transformation in society, it is the human resource issues which are critical (Siemens, 1996f).

CHAPTER 6

6. Sub-Saharan African Telecommunications Country Perspectives

"At the eve of 21st century, we must commit ourselves to spreading the benefits of telecommunications to every corner of the globe, linking all the world's people and giving them the equal opportunity to take part in the dawning age of information. That aim can be achieved through co-ordinated international co-operation."

Utsumi, 1998

6.1 Introduction

The Sub-Saharan Africa countries are situated very strategically for the South African economy from an export perspective. Apart from being better endued with natural resources Sub-Saharan Africa countries such as South Africa, Namibia, Zimbabwe, and Botswana account for the greater part of the Gross National Product (GNP) of the entire continent.

In the telecommunications industry the Eastern section of the Sub-Saharan Africa was developed mostly by telecommunications companies from West European countries such as Siemens Aktiengesellschaft (AG) in Germany, Siemens in Portugal, Siemens in Spain and Siemens in Greece. Siemens have established own representatives (as a people, agents,) in the countries such as Nigeria, Sudan, Guinea, Angola and a number of other Sub-Saharan Africa countries. The new territorial opportunities to secure more business opportunities in all African countries for Sietel especially in cellular network and switching equipment. An expansion of the telecommunications industry (especially cellular networks) is expected in countries as Mauritius, Tanzania, Uganda, Malawi, Congo, Nigeria, and Swaziland (*Sietel, 1998*).

6.2 Economic performance and population

Table 6.1 and *Table 6.2* depict the Gross National Product (GNP) and Gross National Product (GNP) per head and annual growth rate per Sub-Saharan African country and the population respectively. Telephone traffic is growing faster in all countries which are in internationally strategic positions and in those countries where the GNP is growing fast and permanently from year to year. It can be seen from tables that a few Sub-Saharan Africa (SSA) countries were already economically improved and they try to be stabilised in the 1980s.

South African-based private telecommunications companies such as Siemens, Alcatel and Ericsson, which manufacture and sell telecommunications equipment compete with each other and foreign firms in distributing their products and services in Sub-Saharan countries. The market demand for telecommunications products and services is growing rapidly in South Africa and Sub-Saharan African countries, while the technology of the electronic systems, modules and equipment are developing rapidly and they are coupled with a new strategy.

6.3 Country profile of the Sub-Saharan Africa countries

These countries selected for this exposition were those important from a country Sietel and South African telecommunications import and export perspective. These countries *inter allia* include Angola, Botswana, Lesotho, Mozambique, Namibia, Mauritius, Zimbabwe, Malawi, Tanzania, Zambia, Ghana, Nigeria and Uganda.

The democratisation of South Africa has paved the way for the closer integration of the constituent economies of the region. The formalisation of integration requires strong regional institutions that can build on existing institutional infrastructure in the region. This chapter will focus on the political and economic situation the communications infrastructure (including institutions) and the market structures and some of the problems experienced in these countries.

Table 6.1: The Sub-Saharan Africa countries: Gross National Product, (1997).

Countries	GNP (US\$ mil)	GNP per Head (US\$)	Annual growth rate %
R.S.A.	130,9	3 160	1,7
Nigeria	28,4	260	1,6
Sudan	10,3	360	4,6
Cote d'Ivoire	8,7	610	0,7
Cameroon	8,4	630	-3,8
Kenya	7,0	260	1,4
Ghana	6,7	390	4,3
Zimbabwe	5,9	540	3,7
Ethiopia	5,7	100	2,3
DR of Congo	5,3	122	N/A
Senegal	4,8	570	1,9
Uganda	4,5	240	6,6
Angola	4,4	410	0,5
Gabon	4,2	3 800	-2,5
Botswana	4,0	2 800	3,1
Tanzania	3,8	130	3,2
Mauritius	3,8	3 502	4,9
Guinea	3,6	540	4,0
Zambia	3,5	370	-0,2
Namibia	3,2	2 035	3,8
Madagascar	3,2	240	0,1
Burkina Faso	2,4	230	2,6
Mali	2,4	250	2,7
Benin	2,0	370	4,1
Niger	2,0	220	0,5
Congo	1,7	650	0,6
Malawi	1,6	160	0,7
Lesotho	1,5	770	7,5
Mozambique	1,4	80	7,1
Togo	1,2	310	-0,2
C.A.R.	1,1	330	1,0
Chad	1,1	180	1,9
Liberia	1,1	471	N/A
Swaziland	1,0	1 160	2,3
Burundi	1,0	150	-2,3
Mauritania	1,0	460	4,0
Rwanda	0,9	110	-12,8
Somalia	0,9	120	N/A
Sierra Leone	0,8	170	-4,2
Djibouti	0,5	971	-0,9
Eritrea	0,5	136	2,1
Cape Verde	0,4	970	3,0
Gambia	0,4	360	-0,2
Guinea-Bissau	0,3	270	2,8
Equatorial Guinea	0,2	380	1,2

Source: Standard Chartered, 1998

Table 6.2: The Sub-Saharan Africa's population (million), 1998.

Countries	Population (million)	Annual Population growth rate (%)
Nigeria	111.0	2.8
Ethiopia	57.0	3.4
DR of Congo	43.5	3.2
R.S.A.	38.0	2.3
Kenya	29.0	3.3
Sudan	29.0	2.7
Tanzania	29.0	3.1
Uganda	19.0	3.2
Mozambique	18.0	3.1
Ghana	17.3	2.9
Cote d'Ivoire	14.5	3.3
Cameroon	13.5	2.9
Angola	11.5	3.1
Zimbabwe	11.2	2.1
Burkina Faso	10.4	2.9
Malawi	10.0	3.3
Mali	10.0	3.1
Zambia	9.5	2.9
Somalia	9.0	3.1
Nigeria	9.0	3.3
Senegal	8.6	3.1
Rwanda	6.5	7.0
Chad	6.5	2.8
Guinea	6.5	2.9
Burundi	6.3	3.0
Benin	5.5	2.7
Sierra Leone	4.7	2.6
Togo	4.3	3.1
Eritrea	3.5	3.4
Madagascar	3.5	2.7
C.A.R.	3.4	2.4
Liberia	3.0	2.8
Congo	2.7	3.2
Mauritania	2.3	2.9
Lesotho	2.0	2.5
Namibia	1.6	2.8
Botswana	1.5	3.1
Gabon	1.1	2.8
Guinea-Bissau	1.1	2.0
Mauritius	1.1	0.9
Swaziland	1.0	2.3
Gambia	1.0	2.8
Equatorial Guinea	0.9	2.3
Djibouti	0.5	3.2
Cape Verde	0.4	2.8

Source: Standard Chartered, 1998

6.4 Angola



Political situation of Angola

Angola has not had peace for a long time. First there was the war of independence from Portugal from the middle 1960s until November 1975 when the Portuguese left (*Bhagavan, 1986*). Then followed a civil war that left half a million people dead and 3,5m people displaced. On November 20, 1994, a comprehensive peace agreement, the Lusaka Protocol, was signed by the government and its former opponents, the National Union for the Total Independence of Angola (Unita). Recently however, the civil war again flared up and the possibility of peace still seems remote (*Webster's, 1997*).



The economic situation of Angola

Subsistence agriculture is the main livelihood for 80 to 90 per cent of the population, but accounts for less than 15 per cent of GNP. Oil production contributes about 60 per cent to GNP. Angola has rich natural resources - notably gold, diamonds, and arable land, in addition to large oil deposits - but will need peace to achieve its full potential. Angola's long-term economic potential is promising (*Bhagavan, 1986*).



Communications infrastructure of Angola

Direccao Nacional de Correios e Telecomunicacoes (DNCT). The telecommunications regulatory authority is reports to the Ministry of Transport and Communication and operates with a colonial Portuguese body of law. The regulatory authority is formally separate entities. Under market pressure, particularly demand for new services,

deregulation is being studied. The new government has made liberalisation commonly accepted philosophy, especially for value-added services. The network is in very poor shape and is generally unreliable. The international donor community are very supportive; for instance at a donor conference in Brussels in September 1995 (*WTD, 1997*).



Market structure of Angola

Angola Telecom, a state-owned company incorporated in 1992, is at present the only operator of telecommunications in Angola. Along with the economic reforms taking place in the country, the liberalisation of the telecommunications services will start at the end of this year. This will allow other companies to come into the market in order to improve the quality and the spread of basic telecommunications services.

Telecommunications development was deeply affected due to the war in the country. National traffic was reduced by 40 per cent when the second major telecommunications centre in the city of Huambo was destroyed. These losses were slightly reduced by the increase of international traffic.

Despite the civil war, the following projects were commissioned in 1993-1994:

Extension of telephone and telex services to seven provincial capitals, which are connected to Luanda by Very Small Aperture Terminals (V-SAT) stations:

- Digitalisation of telex exchanges with a capacity of 1400 subscribers;
- A new digital international and national transit exchange using the system 12 technology with Automatic Number Identification (ANI); and
- A cellular telephony service was introduced in 1994 using Analysis, Management, System (AMS) technology with the capacity of 1500 subscribers that can be extended to 7000.

Table 6.3 shows the historical network growth leading telecommunications indicators in Angola from 1994 to 1996.

Table 6.3: Historical network growth leading telecommunications indicators in Angola from 1994 to 1996.

	1994	1995	1996
LINE BREAKDOWN			
Teledensity (DELs/100 people)	0.78	0.78	0.84
Call completion % (int.)	55	60	65
DELs	53 300	55 000	60 000
Teledensity	0.52	N/A	N/A
International outgoing traffic (m minutes)	14.35	17.79	N/A
International incoming traffic (m minutes)	N/A	25.58	N/A
Capacity	N/A	N/A	865000
Telecom staff per 1000 lines	39.59	40.25	37.45
Cellular users	1100	1500	1994
Main Lines	48 900	53 300	58 660
Teledensity	0.49	0.52	N/A

Source: BMI-T, 1997a

6.5 Botswana



Political situation of Botswana

Botswana has been a stable multiparty democracy since independence on 30 September 1966. The government is chosen in a "first past the post" election whereby the party winning the majority of votes becomes the ruling party and its leader becomes president. The Botswana Democratic Party (BDP) has won every election fought so far. However, recently the Botswana National Front has been gaining ground, as voters appear to be polarising into urban and rural constituencies. The next election, scheduled for 1999, should confirm the shift, but the BDP is expected to retain its leadership (*AI, 1992a*).



The economic situation of Botswana

The Botswana government's policy has always been to spend less than what it earns. With careful budgeting and wise spending, it has managed to achieve this. However, in recent years, the government has been inclined to flirt with deficit spending to ease a 20 per cent unemployment rate. Still, the economy is expected to grow at a rate of 6 per cent per annum, driven mainly by mineral production and exports such as motor vehicles and meat. Mining, especially diamond mining, is still the biggest contributor to the economy, but the government is trying to diversify into other sectors to lessen its dependence on non-renewable resources (*BTC, 1998*).



Communications infrastructure of Botswana

The year 1997/98 was an eventful year for the Botswana telecommunications industry. The changes associated with the liberalisation of the industry aim to achieve universal service, private sector participation in the development of the industry, and advancement of consumer interests (*Ditapho, 1998*).

Sietel customer in Botswana is Botswana Telecommunications Corporation's (BTC). BTC has removed its monopoly over network operations and removed its regulatory functions. A new regulatory body (Board of directors) was set up at the end of 1996 in consultation with Swedtel (Swedish consultant company for telecommunications) and the ISO Swedish Management group. The new regulatory body (Board of directors) will issue licenses, set tariffs, ensure fair competition and manage the radio spectrum. It is likely that the government will contract BTC to maintain, upgrade and expand the existing network infrastructure. Competitors will then be required to share BTC's network and provide interconnect facilities (*Ditapho, 1998*).

BTC's network is one of the Africa's most advanced. It has a digital microwave backbone ring supplemented by high capacity optical fibre links. All the major switches are digital with the exception of a few small exchanges in remote areas. Botswana is

linked to its neighbours via digital microwave, and an optical fibre link is being built to South Africa. BTC is providing local service providers with Internet connectivity via Global One's international network (*Siemens, 1996c*).



Market structure of Botswana

Botswana's new policy for telecommunications reflects its main economic goals. These are universal and efficient services and regional balance. To achieve them, the government has decided to liberalise the industry and introduce competition for BTC, which formerly was a monopoly carrier. The new regulatory authority (Board of directors), independent of BTC, will conduct licensing, price and tariff control, approve the type of terminal equipment and research. It will also monitor compliance with licence conditions and regulate performance.

Except for national and international services, the government's long term intention is to permit the market to regulate itself. However, long distance communications are seen as a national interest, and therefore deserving of continued monitoring. In terms of pricing in the short term, the regulator (Botswana government) is expected to monitor charges with the aim of reducing cross-subsidies, which are now built into BTC's price list (*Ditapho, 1998*).

The Botswana government is regulator of the following prevailing issues:

- Universal service;
- Separation of services;
- Terminal equipment;
- Store and forward facsimile service;
- Public telephones;
- Packet switched data services;
- E-mail services;
- Cellular telephony;
- Local access network services;
- Paging services;

- National telecommunications services; and
- International network services.

Sietel is at present providing installation, supply, commissioning of optical fibre cables from the west to the east of the country. A paging system was installed to service the towns of Gaborone, Maun, Mahalapye and Francistown. BTC is at present one of few customers of Sietel in the telecommunications industry (*Sietel, 1998*).

Table 6.4 shows the historical network growth leading telecommunications indicators in Botswana from 1993 to 1996.

Table 6.4: Historical network growth leading telecommunications indicators in Botswana from 1993 to 1996.

	1993	1994	1995	1996
NETWORK				
Capacity (lines)	52 458	58 924	65 512	71 596
Exchanges	41	47	50	52
Microwaves (km)	2 245	2 245	4 031	4 295
Optical fibre (km)	25	219	299	339
CUSTOMERS				
DELS	36 477	43 487	50 447	59 673
Telephone stations	66 095	76 069	86 401	98 546
Payphones	413	528	457	528
Telex subscribers	419	383	344	402
Packet switching	18	18	61	140
Subscribers	N/A	N/A	N/A	N/A
Private circuits	520	473	499	754
Paging subscribers	124	130	123	176
TRAFFIC				
National calls (000 units)	326 259	341 224	460 461	484 186
International (000 mins)	27 793	29 890	28 402	29 583
PERFORMANCE				
Teledensity	2.9	3.4	3.8	4.0
Revenue/lines (US\$)	1 744	1 472	1 357	1 109
DELS/employee	23	27	31	37
Revenue/employee (US\$)	40 288	39 949	41 624	40 772
Exchange rate P:US\$	0.43	0.39	0.37	0.33

Source: *BMI-T, 1997a*

BTC has achieved big increases in the rate of service, with installations having risen 23 per cent since 1994 to almost 60 000 (*BTC, 1998*).

During the 1995/9 financial year, BTC spent US\$20,9 million on transmission and telephone equipment, some 68 per cent of the capital spending for the year. In the 1996/97 financial year, BTC invested capital in introducing a toll-free service as well as public video-conferencing between Gaborone and Francistown.

6.6 Lesotho



Political situation of Lesotho

On independence the British Protectorate of Basotholand became the Independent Kingdom of Lesotho in 1966. Following a military coup in 1986, Lesotho went through a period of political uncertainty. King Moshoeshoe was exiled in 1990, and his son, King Letsie III, crowned in his place. Despite an election in 1993, the government could not maintain order, and a national forum, comprising various opposing parties, took control in 1995 (*Webster's, 1997*).

A new constitution was adopted in 1993, based on the original 1986 constitution. It provides for a constitutional monarchy, a bicameral legislature with an elected Lower House and an upper house. A new election was scheduled for March 1998. The Lesotho Congress for Democracy achieved a clean sweep in the elections, which were eventually held in April 1998 (*BMI-T, 1997a*).



The economic situation of Lesotho

Lesotho is one of the world's least developed countries. The main sources of national income are remittances by migrant workers on South African mines, the sale of water to South Africa from the Lesotho Highlands Water Project, and the construction and services sectors.

Although only 13 per cent of the land is arable, most local jobs are directly or indirectly dependent on agriculture which is mainly subsistence level farming and herding. Downstream jobs include leather making, textile weaving, pottery and food processing. Diamonds are one of the few natural mineral resources.

Lesotho is economically dependent on South Africa. The loti (Lesotho currency) is on par with the South African Rand, which is accepted as legal tender in Lesotho. Payments to migrant workers on South Africa mines account for approximately 40 per cent of GNP (*Sietel, 1998*).

Increased foreign aid in recent years has also encouraged growth, particularly in the construction and services sectors. Since 1988, the IMF, in agreement with the government, has supported a series of economic and financial programmes. The Structural Adjustment Facilities (SAF) were aimed at increasing the efficiency of the public sector. The structural adjustment programme has included privatisation and improving incentives for the private sector through tax reforms and streamlined investment incentives, among other measures (*BMI-T, 1997a*).



Communication infrastructure of Lesotho

The state-owned Lesotho Telecommunications Corporation (LTC) is the statutory authority which it regulates the communications sector on behalf of the Ministry of Transport and Communications. The LTC is the operational arm of the Lesotho government in the telecommunications sector on behalf of the Ministry of Transport and Communications.

The Telecommunications Act of 1979 established the LTC, giving it exclusive stewardship over telecommunications development in Lesotho. The Act empowers the LTC to undertake joint ventures with other organisations. New regulations to permit competition are expected, but have not been promulgated yet. Selling LTC has been discussed by the Privatisation Unit in the Department of Finance, but not implemented. The LTC may not legally use cross-subsidises for its services (*BMI-T, 1997a*).

A liberalisation programme was planned for 1996/7 to cover the installation and maintenance of PABXs, block wiring, phone shops, and other customer premises equipment. Companies in these fields were expected to be licensed by the LTC. The telephone system has been extensively modernised and expanded in recent years. Connection increased by an average of 13 per cent a year between 1988 and 1991. In 1991 there were 13 406 telephones in use, giving Lesotho a teledensity of 0,7. By 1995 this had improved to 0,9 and the waiting list had dropped from 8 000 to less than 5 500 subscribers (*ADB, 1998*).



Market structure of Lesotho

The LTC is expected to operate on sound business principles as a tax-paying corporate body, while also fulfilling the government's socio-political objectives with telecommunications. Sietel is presently involved in installing a Group System Mobile (GSM) network, which is operated by Vodacom SA. Lesotho's GSM cellular network is a joint venture between Vodacom of South Africa and the Lesotho Telecommunications Corporation. The partnership operates as VCL Communications. The VCL project, which is worth R5 million, is only first phase in the expansion of the cellular network. In order to provide service quicker and cheaply to rural dwellers, LTC is turning to digital multiple access radio systems. It commissioned its first two lines, totalling 395 lines, in 1995/6 in the Katse and Butha-Buthe areas, and will probably order more. LTC is also experimenting with modifying Philips Sopho PABXs as rural switches, relying on the direct in-dialling feature.

LTC uses differential pricing for residential and business lines. Those connected to digital exchanges can take advantage of features such as automatic alarm calls,

electronic clock, call transfer, call transfer on no answer, call waiting, three-way conference calling, malicious call tracing, and call barring, for small incremental fees (BMI-T 1997a).

Table 6.5 shows the historical network growth leading telecommunications indicators in Lesotho from 1993 to 1996.

Table 6.5: Historical network growth leading telecommunications indicators in Lesotho from 1993 to 1996.

	1993	1994	1995	1996
NETWORK				
Capacity (lines)	22 100	24 950	21 335	21 350
Exchanges	38	38	43	44
Cellular phone subscribers	N/A	N/A	N/A	1 262
Residential connections	7 300	8 300	8 500	8 600
Business connections	4 000	4 400	5 000	5 400
Government connections	N/A	N/A	N/A	7 300
Public phones	210	250	250	280
Telex subscribers	220	200	180	N/A
International circuits	N/A	N/A	850	N/A
Leased circuit subscribers	65	70	90	92
ISDN subscribers	N/A	N/A	N/A	N/A
Paging subscribers	N/A	N/A	N/A	200
Total DELs	N/A	N/A	N/A	21 300

Source: BMI-T, 1997a

6.7 Mozambique



Political situation of Mozambique

Mozambique is coming to be regarded as a post-conflict reconstruction and reconciliation success story as per United Nations (Survey, 1998). Peace, political

stability and economic growth have all been reached in varying degrees over the last few years. The National Assembly and other institutions of Mozambique's new democracy are moving forward with the task of restructuring the government infrastructure. Decentralisation and improvements to state administration are high on the agenda for reform (*Webster's, 1997*).



The economic situation of Mozambique

Mozambique has experienced a number of passive economic developments such as telecommunications and constructions industry over the past few years, prompting the World Bank to describe Mozambique's economy as "extremely successful". Certainly, the government is to be commended for pressing ahead with many economic initiatives and keeping the communications channels open for greater dialogue with the private sector. The government reiterated its support for private sector development at the second annual Private Sector Development and Investors conference held in Maputo in June 1996. Positive economic trends include the privatisation of a large number of state-owned companies, including customs management. Preliminary research shows that state enterprises which have been privatised are showing encouraging signs. These include overall improvements in efficiency and performance based on increased sales, production levels and number of employees. Moreover, the state is benefiting from increased revenue (*BMI-T, 1997a*).



Communications infrastructure of Mozambique

The local authority responsible for providing telecommunications is Telecommunicagues de Mozambique (TDM). TDM was formed in 1981 when the Posts and telecommunications authority was split into two separate entities. Mozambique's re-orientation towards a free market economy in the last few years has had a major impact on parastatals such as TDM.

The telecommunications sector as a whole, including TDM, is undergoing a continual structural adjustment, and a number of changes have been implemented as the sector has

reformed. The changes have been accomplished with the support of experts from Swedtel and other consultants.

The National Assembly has recognised the pivotal role the telecommunications sector plays in the development of society and the economy, and several laws and decrees have been promulgated to make this sector more effective. Other laws make the national operator responsible for its own activities, and allow greater autonomy. Its makes TDM more responsive to the demands of the users, less dependent on government, and able to set up more appropriate management structures.

This has resulted in a telecommunications operator, who has made major efforts in improving the communications structure, aiming to satisfy the telecommunications requirements of any new business investment in the country while expanding basic services in rural areas.

In particular, TDM has adopted a two-tier operating policy where business users and those paying in hard currency receive priority service. The telecommunications network structure established for public telecommunications services, which is managed and operated by TDM, is owned by the state.

Ownership of infrastructure for complementary or value-added services is open to both the public and private sectors. Participation in joint ventures in the telecommunications industry, which will bring in foreign capital, is allowed up to a limit of 50 per cent of the share capital. Government may adjust this ratio as it sees fit on an *ad hoc* basis. TDM is free to participate in joint ventures with partners with foreign capital. It has already done so in several areas such as data communications, paging, construction of local networks, telephone directory publication, electronic alarm and security services, and telecommunications consultancy services (ADB, 1998).



Market structure of Mozambique

The main operator is TDM, which is the public telecommunications operator. TDM has exclusive rights to plan, install and operate the national and international telecommunications public telephone and telex services in Mozambique. Any service

provider duly authorised by the government can undertake complementary services, which use telecommunications infrastructure, such as paging. The same applies to value-added services. These can be provided by any duly licensed individual or collective body.

The public telecommunications operator, TDM, is obliged by law to keep the public telecommunications network open to all users. It must allow all telecommunications service providers onto its network on an equal and non-discriminatory basis in regard to access, service quality and pricing. TDM can also provide complementary or value-added services, but by law may not take unfair advantage of its position as a public operator. The supply, sale, installation and maintenance of terminal equipment, including connection to the network, is open to free competition, but dependent on meeting the relevant technical standards or type approval requirements of the INCM.

The most pressing need in Mozambique is to provide a minimum basic service to areas outside the main centres, i.e. where communications infrastructure was neglected during two decades of war. The government has made this a priority and has implemented an institutional infrastructure to provide rapid development of communications on both a social and commercial basis. This stems from the promulgation of a specific telecommunications law by the Mozambican parliament, which defines both policy and strategy for the sector. A consultative body, the Higher Telecommunications Council, whose members are appointed by the government, was set up to co-ordinate all service and infrastructure development.

Responsibility for planing, administration, implementation and financing of the communications sector rests with the Telecommunicagoes de Mozambique (TDM). In 1994, the government created a new regulatory body, the Instituto Nacional das Comunicagoes de Mozambique (INCM), as an autonomous institution with regulatory responsibility for supervising. Co-ordinating and planning the development of the public communications sector, and managing the radio frequency spectrum. The INCM reports to the ministry of transport and communications. The jurisdiction of the INCM covers:

- Defining communications policy measures;
- Advising government in the exercise of its supervisory functions;

- Assessing international treaties, conventions and agreements;
- Defining standards and approving materials and equipment;
- Managing radio frequency spectrum;
- Licensing operators, and
- Co-ordinating civil, security and defence telecommunications for public use and broadcasting (*BMI-T, 1997a*).

The goal of this sector and the government is to provide, within the limits of economic sensibilities, basic and affordable telecommunications services to all citizens (*BMI-T, 1997a*).

All Sietel projects in Mozambique have been financed by international institutions like the European Union (EU), African Development Bank, Kuwait Fund, BADEA, The World Bank, CFD France, NORAD (Norway), and Danida (Denmark) (*Sietel, 1998*). TDM has already made major improvements to the infrastructure and quality of service. In the last five years, about 20 000 lines have been installed and 74 towns and larger villages now have access to the telecommunications network. The total automatic exchange capacity of the network has increased by 84 per cent since digitalisation began in 1989. The local cable network has been completely rehabilitated. There has been a steady 3 per cent growth in direct exchange lines (DELs) per 100 inhabitants over the last five years. This has brought teledensity (DELs per 100 inhabitants) to above 0.36. The short-term teledensity goal is one. There has been a marked improvement in the fault rate per telephone and in the quality of the lines in the towns due to the rehabilitation of the local network. (*BMI-T, 1997a*).

Mozambique is linked to Swaziland and South Africa via a 960-channel analogue microwave link terminating in Maputo, and to Zimbabwe by a 120-channel UHF link. This latter is being upgraded to a high capacity digital microwave system terminating in Beira. A microwave link connecting Mozambique to Zimbabwe and Malawi passes through the provincial capital of Tete in north-western Mozambique. International traffic is handled by a Boane standard an earth station near Maputo. There are connections to Angola, Portugal, Italy, UK, Malawi, France, USA, Spain, Sweden, Tanzania, Germany and Brazil and some E-mail links have been established.

By providing communications cable, Sietel has made considerable contributions to the construction of subscriber networks in Quelimane and Beira. Three EDXS switching centers also provide substantial support for telex traffic. 2000 ports were integrated in the joint venture between Mozambique and Swaziland (*Siemens, 1997c*).

Table 6.6 shows the historical network growth leading telecommunications indicators in Mozambique from 1993 to 1996.

Table 6.6: Historical network growth leading telecommunications indicators in Mozambique from 1993 to 1996.

	1993	1994	1995	1996
LINE BREAKDOWN				
DELS in capital	N/A	N/A	37 399	38 545
Residential connections	37 200	33 828	35 533	36 927
Business connections	24 800	23 662	24 286	24 620
Government connections	N/A	N/A	N/A	N/A
Urban connections	N/A	N/A	N/A	N/A
Rural connections	N/A	N/A	N/A	N/A
Public phones	10	N/A	150	181
Public call offices	N/A	N/A	N/A	N/A
International circuits	N/A	N/A	N/A	N/A
Leased circuit subscribers	100	N/A	200	N/A
ISDN subscribers	N/A	N/A	N/A	N/A
Party lines	N/A	N/A	N/A	N/A
Manual exchange capacity	4 033	N/A	2 980	N/A
Automatic exchanges	39	N/A	43	N/A
Digital exchanges	N/A	N/A	N/A	N/A
Total exchange capacity	92 507	97 347	97 347	N/A
CUSTOMER PREMISES				
EQUIPMENT				
Cellular phone subscribes	N/A	N/A	N/A	N/A
Telex users	1 201	1 226	1 177	1 140
Two-way radio sets	5 347	N/A	5750	N/A
Answering machines	N/A	N/A	N/A	N/A
Fax machines	700	N/A	1 100	N/A
Modems	450	N/A	700	N/A
Radio pager subscribers	100	N/A	1 000	N/A

Source: BMI-T, 1997a

6.8 Namibia



Political situation of Namibia

The South West Africa Peoples Organisation (SWAPO), headed by Sam Nujoma, was supported by 73 per cent of the population in the 1994 general election. Opposition parties are weak and no big political changes are expected in the next election in 1999. However, there is a call for more grassroots involvement in planning and policy making, as well as a need to improve communication between central government and the populace, most of whom live in the north of the country (*Webster's, 1997*).



The Economic situation of Namibia

Exports and imports together represent 90 per cent of Namibia's gross domestic product. For the past 30 to 40 years, the economy has depended on two sectors, agriculture and mining. The other main sources of GNP are fishing and fish processing, and tourism. The agricultural sector remains an integral part of the Namibian economy, but it is subject to regular droughts. Mining is and will continue to be a major contributor to the economy despite low prices for minerals recently. The main pillars of the mining industry are diamonds, uranium, copper, lead, zinc, gold and silver (*ADB, 1998*).



Communications infrastructure of Namibia

There are two independent operators in the Namibian telecommunications sector, Telecom Namibia (which is the biggest customer for Sietel) and cellular operator Mobile Telecommunications (MTC) Limited. Even though MTC's shareholders include Telecom's Namibia holding company, Namibia Post & Telecommunications Holdings,

Telecom Namibia is not directly involved with MTC. Telecom Namibia was established as a public corporation in August 1992 from the original Department of Posts and Communications. It reports to the Minister of Works, Transport and Communications. The National Communications Commission (NCC) was established in 1992 as the regulatory body for the telecommunications services, such as call-back systems, but they are not likely to have a significant impact, as Telecom Namibia will lower its international tariffs by 30 per cent once its digital network has been fully implemented (*Siemens, 1998*).



Market structure of Namibia

With Telecom Namibia's 99 per cent penetration of the fixed line market (1 per cent is held by call-back services) and only one cellular operator, the telecommunications market is stable and very predictable. Telecom Namibia's marketing has been restructured along regional lines, with four autonomous business units responsible for the central, northern, southern and Windhoek regions. The fixed network is moving fast to replace an analogue with a digital system by the end of 1998. Suppliers of equipment include Alcatel, NEC, Sietel and Plessey.

The only cellular network, Mobile Telecommunications (MTC), was launched on 28 April 1995. Namibia Post & Telecommunications Holdings holds a 51 per cent stake. The other partners are Swedish - Swedfund International has a 23 per cent stake and Swedish operator Telia International 26 per cent. There are no plans for a second operator, even though MTC is looking for an international partner to help it provide more advanced value-added services, including data and fax facilities. The radio-paging operator, Radiopage, operates in Windhoek, Swakopmund and Oshakati. It has a paging base of around 1500 clients. Radiopage sources its equipment from Electrocom, which uses Motorola equipment (*Siemens, 1997c*).

The sector has undergone significant restructuring in the last few years. NCC was established in 1992 to regulate telecommunications and broadcasting. Its main function is to implement government policy in these sectors, to ensure that the necessary legal and regulatory framework is in place and to enforce such legislation. Besides

administrative tasks, other responsibilities include frequency spectrum management, setting telecommunications and broadcasting standards as well as tariffs, equipment type approval and international liaison (*BMI-T, 1998*).

The provision of rural communications is likely to attract most attention for the next few years. The allocation of frequencies is guided by the ITU's international standards and regulations. Namibia is part of the ITU Region 1. The NCC also considers applications for microwave broadcasting bands, cable networks or satellite transmissions. Foreign broadcasts are being received via satellite on C band and Ku band (*BMI-T, 1998*).

Sietel is extending and modernising of telecommunications network to comply with Telecom Namibia specifications. A master plan prepared by Telecom Namibia, aims that by the year 2000, Namibia will have a fully automatic network that meets international standards. The goal is to have 150 000 customers by 2000 that is, a penetration of nine phones per 100 inhabitants. At present, Sietel has a few contracts for switching, optical cables, transmission, GSM and access networks. New Ultraphone 110 equipment has been installed in Windhoek and two Digital Enhanced Cordless Telephony (DECT) link systems was ordered by Telecom Namibia in 1998 (*Sietel, 1998*). The Namibia first EWSD system was installed in Windhoek in 1986. In 1993, four SDE switching centres with a capacity of 2000 ports for rural and suburban areas were added. A year later, the newly developed OFDC (Optic Fibre Distributed Concentrator) with a capacity for 500 subscribers was introduced. The current network includes a total of eight EWSD switching centres with more than 50,000 ports, providing this young nation with a high-performance telecommunications backbone (*Siemens, 1997c*).

Telecom Namibia has set itself the goal of being consumer driven while at the same time improving the quality of its products and services. To achieve this it has embarked on a countrywide customer satisfaction feedback survey conducted by an independent research organisation on a quarterly basis. Results after two years show measurable improvements in customer satisfaction level (*Siemens, 1997c*).

The survey measured:

- Delivery of new products and services;

- Processing of faults and complaints;
- Public phones;
- General information numbers;
- Performance of manual exchanges;
- Tele-shops countrywide;
- Performance of international exchange, and
- Telecom directory (*Sietel, 1998*).

Namibia has a near First World telecommunications infrastructure in most parts of the country. The network consists of 60 automatic service nodes and 29 manual nodes and an extensive multiparty line infrastructure for basic telephone services. Digital telecommunications were installed in 1985 in Namibia and are still far from complete, but the process has speeded up considerably over the past three years. Since Telecom Namibia's commercialisation in 1992, a substantial share of earnings from telecommunications has been reinvested in the sector. In 1993, the investment in network capital projects was a mere N\$26m. This rose to N\$ 98m in 1994, N\$158m in 1995 and N\$172m in 1996 and N\$264m in 1997 was spent on modernising the network (*BMI-T, 1998*).

An Intelsat Standard A was commissioned in Windhoek in 1995 to provide international links. A further two international EWSD gateway exchanges supplied by Sietel were commissioned in Windhoek. Traffic to South Africa and SADC countries uses an analogue microwave link via Upington. Telecom Namibia is looking at the viability of using optical fibres linked to the SAT-2 (Phase 2) cable through RSA as well the link with AT&T's proposed Africa One cable. Satellite services like Iridium, ICO and GlobalStar are also a possibility.

All digital EWSD technology used in the switching network has been installed by Sietel. All new transmission equipment uses SDH and PDH technology. The dominant technology for transmission links throughout the country was based on analogue microwave channels from the north, west and south of the country with copper open wire carrier routes to other centres. Optical fibre links exist between Windhoek – Swakopmund - Walvis Bay - Henties Bay - Oshakati - Grootfontein and Rundu. Digital

microwave links exist from Tsumeb to Grootfontein, Windhoek to Okahandja and Windhoek to Rehoboth. The rest of the transmission network is analogue microwave. Sietel has installed all the equipment supplied to the above-mentioned sites. Urban connections are mainly by means of copper cable, though wireless local loop technology is being investigated. Public phones are largely card coin operated (*Siemens, 1997c*).

Table 6.7 shows the historical network growth leading telecommunications indicators in Namibia from 1994 to 1997.

Table 6.7: Historical network growth leading telecommunications indicators in Namibia from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
DELS	69 765	73 038	99 265	117 000
Business connections	25 782	27 298	29 230	31 820
Autolines	62 816	69 334	77 598	85 550
Analogue	9 162	4 430	N/A	N/A
Digital	53 654	64 904	77 598	85 550
Manual Lines	6 949	3 704	1 402	450
Party lines users	6 421	6 397	6 000	4 500
Customer base	76 186	79 435	85 000	90 500
Port capacity	87 627	110328	120 700	142 000

Source: BMT-T, 1997a

6.9 Mauritius



Political situation of Mauritius

Mauritius became independent from Britain in 1968 in a relatively peaceful separation. There are various political parties in Mauritius, with a few large ones. Six are

represented in the National Assembly, but the two major parties, Labour and the Mauritius Militant Movement (MMM), hold almost all the seats (*Webster's, 1997*).

The economic situation of Mauritius

The Mauritius economy is mainly based on sugar, the export processing zone and tourism. The major benefits of the economic performance can be illustrated by the substantial change in the level of GDP over years.

Communications infrastructure of Mauritius

Mauritius has a well-developed telecommunications system comparable to all advanced countries. The recent developments in the field of cellular telephony have strong expansion possibilities. Mauritius has a telephone density of 17 per cent based entirely on a digital system. Further development is expected in this sector during the coming decade, with the increased utilisation of the latest technologies (*Wan, 1998*). The whole telecommunications sector is likely to benefit from growth through increased liberalisation. The major player in telecommunications is Mauritius Telecom. All exchanges are completely digital exchanges and use lines of 64kbps to 128kbps. Mauritius Telecom has an exchange capacity of 200 000 lines, of which 160 000 lines have already been connected. Mauritius Telecom is moreover looking forward to increasing the number of subscribers, and providing appropriate infrastructure and modern capacity to keep pace with the economic development (*CSO, 1997*).

Areas within the telecommunications sector which are more likely to experience future growth are TV and radio transmission and programming, home satellite TV equipment, cellular phones and paging services. There is ongoing discussion in the TV and radio-broadcasting field with private companies that have expressed their intention of setting up private TV and radio channels. All telecommunications equipment is subject to a uniform customs duty of 15 per cent. However, sales tax has increased from 6 per cent to 8 per cent following 1996-97 financial budget. Mauritius Telecom has recently started to promote GSM cellular phones, but demand for fixed phones is still increasing.

New private users still have to wait an average of 20 months to get a line. The latest development in Mauritius in the field of telecommunications has been the introduction of Internet services (*CSO, 1997*).



Market structure of Mauritius

In 1988, the two telecommunications operators, Mauritius Telecommunications Services and Overseas Telecommunications Services, were merged into a new entity established in terms of private company law. There are four major operators in the telecommunications market, two in the public sector, two in the private sector. Mauritius Telecom (MT) is responsible for both internal and external communications for Mauritius. Mauritius Broadcasting Corporation is not the sole national TV and radio station operator (MBC, Canal Plus and Sky News). The two largest private sector companies are Emtel Ltd for cellular phones, and Paging Services Ltd. for pagers. Mauritius has a fast growing network of information technology suppliers which seems capable of meeting demand for IT equipment (*Wan, 1998*).

The objectives of Mauritius Telecom, currently the parastatal monopoly, are to be the leader in the telecommunications sector and to provide the country with enough modern telecommunications systems and infrastructures. Its ambition is also to cater for the market of surrounding countries, specifically in Africa and the surrounding countries, given the current small size of the Mauritius market.

Mauritius Telecom has put much effort into setting up 16 customer service centres throughout the island to decentralise its sales activities. It has also delegated network responsibilities to regional managers. It is carrying out development of the network, through its own construction unit without the help of external contractors. Mauritius Telecom also has a connection unit:

- To install new telephone lines with the help of external contractors;
- Technology strategy unit to keep up with latest innovations;
- Buildings unit to do wiring of buildings;
- Planning; and

- Project implementation unit to plan and implement the network, including switching, transmission and power (*Sietel, 1998*).

Table 6.8 shows the historical network growth leading telecommunications indicators in Mauritius from 1994 to 1997.

Table 6.8: Historical network growth leading telecommunications indicators in Mauritius from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
Teledensity (DELS/100 people)	12	13	17	21
Annual revenue per DEL (US\$)	677	658	658	650
Annual revenue per employee (US\$)	60 732	66 786	64 548	79 026
Net income /DEL (US\$)	N/A	139	134	130
DELS/employee	89	101	98	121
Line availability (% uptime)	99	99.0	99.2	99.5
Known requests for main line	N/A	40K	38K	30K
Average waiting period (days)	730	690	580	360
Estimated hidden demand	35 000	30 000	20 000	20 000

Source: *BMI-T, 1997a*

6.10 Zimbabwe



☐ Political situation of Zimbabwe

Zimbabwe is a *de jure* multiparty democracy with a 250-seat House of Assembly. Constitutionally, Zimbabwe is already a multi-party democracy. However, there is no immediate prospect of a serious political challenge to the ruling Zanu-PF party which has been in power since 1980 (*Amin, 1991*). In the April 1995 general election, Zanu-PF lost only three seats. One went to an independent candidate and two to the long-standing opposition, Zanu-Ndonga. The president, Robert Mugabe, was re-elected in March 1996.



The economic situation of Zimbabwe

Zimbabwe's large and diversified industrial base distinguishes it from all of the other countries of Sub-Saharan Africa, with the exception of South Africa. The share of manufacturing in GNP is comparable with that of many industrial countries. Unlike much of Sub-Saharan Africa, Zimbabwe has a comparatively highly diversified economy, a well-developed business sector, a sophisticated financial system, skilled human resources and generally sound infrastructure (*AID, 1985*).

Zimbabwe's external competitiveness has improved in recent years. In mid-1991, the authorities depreciated the currency 38 per cent against the US\$ dollar (*AI, 1992c*). They followed this in 1993 with a 15 per cent drop and another in January of 1994 of 17 per cent. This wiped out the gap between the official and the market-determined rates, which fell from 22 per cent to zero during the first half of 1994. The convergence of the two-tier exchange rates led to the abolition, on 30 June 1994, of the official exchange rate.

Zimbabwe now operates a unified, free-floating exchange rate, which is determined by the demand and supply of foreign exchange in the inter-bank market. This measure, together with the removal of all exchange control restrictions on commercial and current account transactions, amounts to a major liberalisation of the trade while certain dividend remittances remain subject to approval by the monetary authorities. The exchange rate has continued to float down, but without the sharp depreciations of previous years. It is currently about Z\$ 10,3 to US\$ 1,00. During this period, Zimbabwe has built up significant foreign reserves. Import cover rose from 1,5 months in 1990 to 6,9 in 1995 (*ADB, 1998*).



Communications infrastructure of Zimbabwe

By African standards, Zimbabwe has a relatively well developed telecommunications infrastructure. There are two international gateway exchanges. They use SPC digital exchanges connected via digital microwave links to the Mazowe satellite earth station, 40km north of Harare, which is equipped with Time division multiple access (TDMA) and International digital route (IDR) carriers, one facing the Atlantic Ocean and the

other the Indian Ocean geo-stationary satellites owned by Intelsat. The installation of telecommunications infrastructure and provision of telecommunications services has been the domain of the state-owned Post Telecommunications Corporation (PTC) for nearly three decades. Consequently, infrastructure equipment belongs to the PTC.



Market structure of Zimbabwe

Users of telecommunications services in Zimbabwe encompass private individuals, businesses, government and other institutions. These broad categories can be subdivided into large corporate and small corporate users, urban residential, rural commercial and rural community users. Generally, the distribution between business subscribers and residential is 37 per cent and 63 per cent respectively, while that between rural and urban is 9 per cent and 91 per cent respectively. Growth of this market has been limited by the PTC's inability to provide adequate telephone lines and to maintain the existing network. The failure to expand has largely been due to the obsolete network and its severely limited expansion capacity. Although a digitalisation programme was initiated to address this problem, the bulk of the PTC's investment in the last few years has been, of necessity, to replace obsolete equipment rather than to expand the network. The network is now about 30 per cent digital, but is expected to be fully digital by 2001 by Zimbabwe Post and Telecommunication Corporation (ZPTC) (*ADB, 1998*).

The telephone density rose from 1.2 main lines per 100 population to about 1.5 main lines per 100 population between June 1994 and June 1996. However, the waiting list for telephone lines remains high at 100 000. The PTC, in its current five-year Public Sector Investment Program, expects to spend US\$1,02bn up to the financial year 2000/2001 in order to wipe out the growing waiting list. Additional 230 000 new telephone connections are planned for installation by the year 2001, to bring the total to 401 100 connected lines. This will provide spare capacity of 60 000 lines in the fixed network. The PTC predicts about 60 000 cellular phone customers by the year 2001.

The PTC plans to phase out open wire carrier systems by 1997 and 1998 and to replace analogue frequency division multiplex links with digital transmission systems by the year 2000. It is considering technologies such as multi-access radio systems, wireless local loop and digital European cordless telecommunications (DECTlink). It also plans

to install optical fibre systems to create major long distance high capacity networks by 2005. In switching, SPC digital systems are planned to provide 96 per cent of the capacity by 2000. The existing microwave transmission is 60 per cent analogue.

The PTC plans to provide digital microwave links on the primary trunk routes between Gweru and Beitbridge; Harare and Masvingo; Mashonaland North, Mutare and Chiredzi. It is also proposed to expand the PTC's cellular mobile telephone network, Net-One, to a capacity of 40 000 by the end of 1997. PTC hopes to digitise its network completely by 2001.

The current telecommunications network includes facilities for the following services:

- Basic telephony;
- Telex facilities;
- Fax services;
- Modem and data line services;
- Radio communication;
- Packet switching facilities;
- Data services; and
- Paging services (*Sietel, 1998*).

Table 6.9 shows the historical network growth leading telecommunications indicators in Zimbabwe from 1994 to 1997.

Table 6.9: Historical network growth leading telecommunications indicators in Zimbabwe from 1994 to 1997

	1994	1995	1996	1997
LINE BREAKDOWN				
Teledensity (DELs/100 people)	1.30	1.50	1.50	1.75
Annual revenue per DEL (US\$)	862	923	935	858
Annual revenue per employee (US\$)	23 950	27 609	26 771	26 695
Operating cash flow/DEL (US\$)	273	280	271	270
Net income/DEL (US\$m)	27	30	31	33
No DELs/employee (US\$)	27	30	31	33
Call completion (%)	35	35	40	50
Waiting list for main lines	110 000	130 000	140 000	150 000

Source: BMI-T, 1997a

6.11 Malawi



Political situation of Malawi

Malawi has a predominantly agriculture-based economy and one of the most densely populated countries on the African continent (*AI, 1992b*). The new government was installed in 1994 and has put poverty alleviation at heart of its development agenda. The government has committed itself to a major structural adjustment program with the IMF and World Bank to re-establish private sector and donor confidence (*Webster's, 1997*).



The economic situation of Malawi

Financial markets are shallow. The newly established Malawi Stock Exchange operates through Stockbrokers Limited based in the capital, Lilongwe. The government's privatisation campaign is the main factor in stimulating the stock exchange and thus a local investor's market. However, because of the small local capital market, the government is keen to stimulate participation by:

- Developing measures to attract foreign investment, and
- Developing schemes to enable a larger cross-section of the population to participate through loan schemes (*Sietel, 1998*).



Communications infrastructure of Malawi

The Malawi Post and Telecommunication (MPTC) was incorporated on 1 April 1995. MPTC is the main provider of telecommunications services and is a 100 per cent government-owned corporate body. MPTC was incorporated on 1 April 1995 from its previous status of a government department. The only other provider of

telecommunications services is Telecom Network Malawi (TNM). This firm provides mobile cellular radiotelephony in the four cities of Blantyre, Lilongwe, Mzuzu and Zomba. TNM is a joint venture company between MPTC (40 per cent) and Telecom Malaysia (60 per cent). The companies, which have supplied TNM with equipment, are Ericsson, Alcatel, Siemens, Oki and Plessey (*Sietel, 1998*).

The provision of the telecommunications infrastructure has been the monopoly of the MPTC from its government department. Liberalisation now applies to PABXs, telephone handsets, fax machines, data modems, answering machines and mobile radios as well as private point to point radio systems. Intending suppliers of equipment must submit it to MPTC for type approval. The list of type approved equipment is updated regularly (*BMI-T, 1997a*).



Market structure of Malawi

The penetration and quality of telecommunications services in Malawi remains poor. There were less than 40 000 connected DELs and a switching capacity of around 65 000 subscribers at the end of 1996. MPTC has taken full responsibility for attracting investment programme to the country. However, due to scarcity of cheap financial investment resources, the MPTC has sometimes had to resort to short term high premium sources. There are no firm plans to privatise MPTC even though this might attract capital for network expansion. Pressure from various sectors is mounting to do something about the poor state of development of telecommunications (*BMI-T, 1998*).

The government decided that the organisation would be geared to fulfil its mission as an autonomous parastatal entity. The incorporation removed the constraints imposed on it as a government department. MPTC is 100 per cent owned by government, but the change to parastatal has opened up the possibility that shares may be sold to private investors sometime in the future. The existing network consists of manual and automatic analogue and digital exchanges. These exchanges are interconnected by a variety of transmission media including:

- Metallic copper cables;

- Analogue radio systems;
- Digital microwave radio systems;
- Fibre-optic cable; and
- PCM (30 CH) on cable (*Sietel, 1998*).

The main transmission backbone is a 140 mbit/s digital microwave radio system connecting Blantyre, Zomba, Lilongwe and Mzuzu. The distribution network to customer's premises is by metallic cable but a wireless local loop network is under construction in Blantyre and will provide 5 000 lines. This project valued at US\$7m has been funded by the PTA Bank and guaranteed by the EXIM Bank of the USA (*AI, 1992b*).

Table 6.10 shows the historical network growth leading telecommunications indicators in Malawi from 1994 to 1997.

Table 6.10: Historical network growth leading telecommunications indicators in Malawi from 1994 to 1997

	1994	1995	1996	1997
LINE BREAKDOWN				
Teledensity (DELS/100 people)	0.33	0.34	0.40	0.50
Annual revenue per DEL (US\$)	339	304	826	980
Annual revenue per employee (US\$)	N/A	N/A	12 033	14 579
DELS/employee	N/A	N/A	15	15
Line availability (% uptime)	70%	70%	70%	75%
Call completion (%)	33%	33%	33%	35%
Known requests for main lines	27 467	24 286	26 000	26 500
Average waiting period (days)	90	90	90	90
Estimated hidden demand	3 466	5 901	6 000	6 500

Source: BMI-T, 1997a

6.12 Tanzania





Political situation of Tanzania

Tanzania is in the early stages of a transition toward a multi-party democracy and liberalised economy. From independence in 1961 until the early 1980s, the country had a one-party, authoritarian regime committed to a socialist model for economic development. The election in 1995 was won by the ruling party's candidate, Benjamin Mkapa, who was sworn in as the new president. (*Webster's, 1997*).

Tanzania is one of Africa's largest countries. It has a rapidly growing population of 28 million people. Tanzania is one of the most debt-burdened countries in the world. At the end of November 1996, Tanzania had an external debt of US\$ 7 859m. This was almost twice Tanzania's gross domestic product. The cost of servicing the debt, at US\$26,2m a month, accounts for 40 per cent of monthly collections (*Webster's, 1997*).



The economic situation of Tanzania

Tanzania began a major economic reform programme in 1986 which freed prices, interest rates and the exchange rate, and eliminated the monopoly positions of state owned enterprises in manufacturing trade and marketing. In 1991, private banking was allowed, and currently there are 10 private banks, eight of which are foreign. Since the economic reform programme began, economic growth has averaged 4 per cent a year, much better than the previous 20 years,



Communications infrastructure of Tanzania

Tanzania pioneered one of the first independent telecommunications regulatory authorities on the continent. The Tanzania Communications Commission (TCC) was established at the same time as the Tanzania Telecommunications Company Ltd. (TTCL) in 1994. TCC is the regulatory body empowered to license and oversee the operations of all forms of communications services in the country. Radio frequency management and allocation are, by law, the preserve of the TCC. Operators apply for

radio frequencies from TCC and are obliged to pay for a license to operate radio equipment.

Liberalisation and deregulation have already been implemented to a much higher degree than in most African countries. TCC has invited would-be operators with at least 35 per cent local participation, through joint ventures, to apply to provide and operate rural basic telecommunications networks. TTCL will, for the time being, continue to be the only national basic telecommunications operator and to provide interconnection to rural operators.

Since 1990, the government has allowed private sector participation in the economy. The major challenges to the telecommunications are:

- Narrow the supply/demand gap;
- Improve the quality of telecommunications services; and
- Increase investment in telecommunications with private sources of financing (*Sietel, 1998*).

To do this, the government formulated its policy in 1993 and enacted the following laws:

- Tanzania Communications Act, 1993;
- Tanzania Telecommunications Incorporation Act, 1993; and
- Tanzania Posts Incorporation Act, 1993.

The Tanzania Communications Commission (TCC), which was established by the Tanzania Communications Act of 1993, deals with all conventional telecommunications services. TCC is not independent from the minister responsible for the sector since the latter is empowered by the relevant act to give general directions to TCC.



Market structure of Tanzania

With liberalisation, many private companies have been licensed to offer customer premises equipment and telecommunications services such as bloc wiring, sales and

maintenance of telecommunications terminal equipment such as switchboards, telephone sets, fax machines, modems. Dominant brands of PABX in the country are Panasonic and Sietel. As the sole operator of international services, TTCL was hurt by the emergence of the call-back services.

There have been several evaluations of the sector in Tanzania. They were sponsored by international agencies. They revealed the weaknesses in the sector, which are now being rectified by the enactment of the three acts as is above mentioned.

The Tanzania Telecommunications Company Limited (TTCL) was established in January 1994 after the government split the Tanzania Posts and Telecommunications Corporation (TPTC) into a postal corporation and a telecommunications company. TTCL is 100 per cent government-owned, but it is expected that shares will soon be sold to private individuals. TTCL currently holds 25 per cent of the only cellular mobile operator, MIC Limited. It also has a joint venture with Nexus of France called Tanzania Data Communications Ltd. as a consultancy company. TTCL is also looking for an external joint venture partnership in several other operations, especially in cellular radio and card phones (*BMI-T, 1998*).

The existing network consists of manual, analogue and digital automatic exchanges. These exchanges are interconnected using analogue and digital transmission links, optical fibre cables and microwave radio. Copper cables provide access to subscribers. Many networks in the region, the analogue backbone transmission network was installed in the early-1970s and mid-1980s. Manufacturers have stopped producing spare parts for some of the analogue equipment. This makes it hard to maintain the existing (*BMI-T, 1998*).

The international telephone service is provided by TTCL through its Mwenge earth satellite station. The station uses various technologies: time division multiplexing (TDMA), frequency division multiplexing (FDM) and IDR using C-band. Regional connectivity to neighbouring Kenya and Uganda is through analogue links. There are 44 and 177 channels linking Tanzania to Uganda and Kenya respectively. In addition, Tanzania users the Panaftel network for international traffic to Malawi, Zambia and

Zimbabwe to the south, Burundi and Rwanda to the west and finally Ethiopia through Kenya.

Alcatel supports Tanzania's existing switching equipment. As a result of the liberalisation by the government in 1993, there are now two cellular mobile operators in Dar-es-Salaam: MIC (Tanzania) Ltd. and Tritel. Tritel company has connected 5000 subscribers and equipment is supplied by Sietel (*BMI-T, 1997a*).

Sietel completed the construction of a telecommunications cable line along the rail route between Tabara and Kigoma in 1995. The company is also closely involved in the installation of telecommunications networks in Dar-Es-Salaam and Zanzibar region (*Sietel, 1998*).

Table 6.11 shows the historical network growth leading telecommunications indicators in Tanzania from 1994 to 1997.

Table 6.11: Historical network growth leading telecommunications indicators in Tanzania from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
Residential telephone rental	3.3	3.3	4.3	5.5
Business telephone rental	3.3	3.3	4.3	5.5
Telex line	22.04	2.04	30.5	40.5
International outgoing traffic (minutes)	4 844 829	5 457 372	6 003 002	N/A
Total DELs	88 315	88 546	87 042	N/A
Auto exchange capacity	76 917	130 000	142 916	N/A
Manual exchange capacity	N/A	N/A	N/A	17 312
Auto exchanges	58	N/A	N/A	62
Digital exchanges	31	N/A	N/A	41
Total exchange capacity	129 998	N/A	N/A	160 228

Source: BMI-T, 1997a

6.13 Zambia





Political situation in Zambia

Zambia introduced multiparty politics in November 1991. The first general and presidential elections under the multiparty system were preceded by political squabbles, which led to a boycott of the elections by the former president, Kenneth Kaunda (*Webster's, 1997*).



The economic situation in Zambia

Zambia still depends mainly on earnings from copper and other mining activities. The diversification into other sectors such as agriculture, tourism and semi-precious stone mining has not yet earned the foreign exchange Zambia needs. It is worth noting that horticultural exports have shown a 190 per cent growth from US\$20m in 1991 to US\$48m in 1994 (*Time, 1998*).



Communications infrastructure of Zambia

Very little change has occurred in the telecommunications sector since 1995. To date, Zambia Telecommunications Limited (Zamtel) has not been privatised, although the government has decided to sell part of its shares in the firm (*Sietel, 1988*).



Market structure of Zambia

The following companies viz. Philips, Afritel and Horizon are the main telephone operators. The main telephone operators are also contractors who undertake rehabilitation, installation and other major works to the telephone infrastructure.

Zambia is a member of the International Telecommunications Union (ITU) and the Commonwealth Telecommunications Union (CTU), which govern and regulate air frequencies, the use of satellite and the Internet.

Although Zamtel is the monopoly operator, the others listed are included because of their intimate involvement in infrastructure development and maintenance. Zamtel is the operator with an average turnover of US\$ 90m a year. It enjoys about 30 per cent market share. The company is a dealer in Ericsson communications equipment. It has been operating in Zambia for over 12 years. Its estimated market share is about 14 per cent with an annual turnover of US\$ 1.65m. Zamtel has a market share of 68 per cent with estimated turnover of US\$ 5m in cellular operations only. Bad debts amounting to US\$9m, inherited by Zamtel from PTC, are causing profitability problems for the operator. Debts are being recovered through court actions (*BMI-T, 1997a*).

The present telecommunications network is concentrated along the Lusaka-Copperbelt railway line. Most expansions and new development projects as well as rehabilitation works are funded by the donor community working through the government. Donors are increasingly showing preference for private operators. Consequently, Zamtel, is becoming less significant in the liberalised economy, although Zamtel still has an historical monopoly over the fixed wire network. The monopoly that this organisation used to enjoy as a parastatal no longer applies because the license conditions have been changed by the Zambian Communications Authority. Consumers are now able to sue Zamtel, even for wrong billing or poor services (*BMI-T, 1997a*).

The sector needs funding to not only finance new infrastructure but also to rehabilitate the network countrywide. Zamtel has an operator's license for public switched telecommunications and for cellular and satellite transmissions. The objectives of the company are to provide a service to the people and to develop Zambia. There are no conditions, which modify the operation's profit-maximisation. Zamtel issues an annual report, which is tabled in Parliament. The cables and switches, including the new system, there is still more to be done, in particular in the Copperbelt Province and the rural network (*BMI-T, 1997a*).

Table 6.12 shows the historical network growth leading telecommunications indicators in Zambia from 1994 to 1997.

Table 6.12: Historical network growth leading telecommunications indicators in Zambia from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
Teledensity (DELs/100 people)	0.88	0.89	0.95	1.00
Annual revenue per DEL (US\$)	N/A	N/A	200	300
Operating cash flow/DEL	43	52	67	68
Net income/DEL (US\$000)	48	57	52	78
DELs/employee	4.0	4.0	3.6	3.2
Line availability (% uptime)	N/A	N/A	N/A	N/A
Call completion (%)	36.4	36.4	34.4	34.4

Source: BMI-T, 1997a

6.14 Ghana



Political situation of Ghana

Ghana is a medium-sized West African country with a population of 17,5 million people. It was among the first countries in Sub-Saharan Africa to become independent (1957). Ghana is politically stable (*Webster's, 1997*).

Ghana is commonly seen as a role model for IMF/World Bank-inspired economic policy. By 1996, that policy was showing positive results in poverty alleviation, employment and overall modernisation of the country (*Webster's, 1997*).



The economic situation of Ghana

The government attaches primary importance to the private sector. The government has announced its intention to seek foreign private participation in the telecommunications

and in the power generating business. Ghana most important trading partners are UK, USA, Germany, Japan and South Africa (*Time, 1998*).

Communications infrastructure of Ghana

The exemplary manner in which Ghana has adopted the World Bank reform recipe is reflected in telecommunications sector policy. The government approaches it from the perspective of under-development, as opposed to those governments in the region which approach policy from the perspective of a vested interest in parastatal organisations (*Time, 1998*).

On 13 December 1993, the telecommunications division of the former P&T Corporation was set up as a telecommunications entity under the Companies Code by Act 461 of Parliament. It was registered as Ghana Telecommunications Company Limited (GTCL), and subsequently branded as Ghana Telecom (GT). Ghana Telecom was still fully owned by government at the end of 1996. The GT board of directors includes the Minister for Transport and Communications. The existing public telecommunications network is characterised by a big diversity of equipment, partly outmoded or in need of rehabilitation and upgrading. Much innovation and expansion has already been implemented in the switching network. Important investment has been made in cellular sector, which is a very competitive market segment with three operating companies, none of them with commercial ownership ties to Ghana Telecom (*Sietel, 1998*).

The Ghana Telecom network has been characterised by rapid modernisation from 1994. But with many segments comprising aged equipment, there are lapses in performance. In addition, the network is made up of no less than eight different switching platforms. This is a problem for maintenance and technical staffing. The latest switching platform to be introduced has been supplied by Alcatel. Manual switches will be phased out quickly (*Sietel, 1998*).



Market structure of Ghana

Accelerated network growth during 1994 and 1995 resulting from Second Telecommunications Project saw the number of connected DELs increase from 50 000 to 68 500, which is a growth of 37 per cent. Ghana Telecom as a private sector operator has adopted a dynamic marketing strategy leading to an increase of nearly 30 per cent in connected telephone lines, resulting in an equivalent rise in the teledensity from 0,4 in 1996 to 0,56 currently.

Additionally, the business plan for Ghana Telecom for the next five years will entail capital expenditure likely to be in the region of \$3-400 million. The service targets for the period include additional connected telephone line capacity in excess of 225 000 as well as provision of extensive digital telecom infrastructure.

Table 6.13 shows the historical network growth leading telecommunications indicators in Ghana from 1994 to 1997.

Table 6.13: Historical network growth leading telecommunications indicators in Ghana from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
International outgoing (min)	8.98	11.50	N/A	N/A
Cellular phone subscribers	3 336	6 200	7 500	N/A
Telex users	983	1 175	1 021	N/A
DELs in capital (switch cap.)	N/A	N/A	N/A	61 000
Residential connections	N/A	N/A	N/A	42%
Business connections	N/A	N/A	N/A	58%
Urban connections	N/A	N/A	N/A	95 450
Rural connections	N/A	N/A	N/A	6 564
Public phones	N/A	N/A	N/A	90
Annual growth in DELs	N/A	N/A	23%	24%
Total DELs	44 640	54 984	68 472	N/A
Total exchange capacity	N/A	87 513	122 423	N/A

Source: BMI-T, 1997a

6.15 Kenya



Political situation of Kenya

For nearly 10 years, Kenya had a *de jure* one party political system since its independence from Britain in 1982. Kenya's constitution was repealed in 1991 to allow political pluralism (*Webster's, 1997*).



The economic situation of Kenya

Kenya's economy has shown some signs of recovery from the recession at the beginning of this decade. The average growth of the GNP at constant prices in the year 1995 was 4,9 per cent from 0,2 per cent in 1993. All economic tools have been attributed to macroeconomics reforms, which the government has been implementing since the early 1990s (*BMI-T, 1998*).



Communications infrastructure of Kenya

Since its inception in 1977 the Kenya Posts & Telecommunications Corporation (KPTC) policy has always been to expand, modernise and diversify postal and telecommunications services, improve quality of service and exploit opportunities provided by new and appropriate technologies (*BMI-T, 1997a*).

KPTC, acting on behalf of the government, is also the regulator of postal and telecommunications issues. It is charged with allocating frequencies for radio telecommunications and for licensing companies wishing to compete in liberalised areas such as the sale of customer premises equipment and block wiring. Furthermore, KPTC

must type approve any equipment bought for telecommunications to ensure that it is compatible with KPTC's network (*BMI-T, 1997a*).



Market structure of Kenya

The KPTC is the only provider of postal and telecommunications services; telephone, telex and telegraph as per the Act of 1977 which was promulgated after the collapse of East African Posts and Telecommunications Union (EAPTU). With the liberalisation and commercialisation of state corporations, the statutory monopoly is gradually being broken. In 1991, non-strategic areas like block wiring, selling and maintenance of telecommunications terminal equipment: switchboards, telephone sets and fax machines was liberalised. There are now more than 200 companies which offer these services in Kenya, KPTC included. The corporation is also the sole provider of new services and is also the sole assembler of telephone sets, switchboards, cables and telephone poles. Kenya's telecommunications infrastructure is more developed and spread out than some other networks in the region. This has made Kenya a suitable communications centre in Eastern Africa.

KPTC has the monopoly on the telecommunications services in Kenya. Some multinational companies and local banks have recently set-up their local area networks and wide area networks using leased lines from KPTC and through the Kenpac switch for packet switched data services. None of these has established its own telecommunications network infrastructure (*Sietel, 1998*).

The corporation was established by an Act of Parliament and is wholly owned by the government. Within the government, the Minister of Finance is responsible for the corporation in so far as government investments are concerned, but professional management of the sector falls under the line ministry, the Ministry of Transport and Communication. The latter appoints a Board of Directors to manage the corporation. Based on the Act, the Minister of Finance and Transport and Communication sit on the Board. Other Board members are chosen by the Communications Minister for a three-year term, which can be renewed at the discretion of the Minister. The managing director of KPTC is also a member of the Board (*BMI-T, 1997a*).

KPTC's strategy is to extend the services as widely as possible in order to benefit from the current demand. It wants to use the latest cost-effective technologies that are quick to deploy. As the current sole provider of telecommunications, it has the discretion to offer any type of service. Since KPTC is the sole telecommunications service provider, there are no special conditions put in place except that the government requires service be provided throughout the country. Provision of services in rural areas reduces profitability. In addition postal services have perpetually made losses which have been made good by the telecommunications services. The corporation is considering a joint venture in value-added services in order to accelerate the provision of these needed services. KPTC has an interest in the Kenya College of Communications Technology (KCCT) (BMI-T, 1998).

Table 6.14 shows the historical network growth leading telecommunications indicators in Kenya from 1994 to 1997.

Table 6.14: Historical network growth leading telecommunications indicators in Kenya from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
Teledensity DELs/100 people	0.85	0.91	0.94	0.98
Annual revenue per DEL US\$	1 101	1 053	1 140	1 129
Annual revenue per employee	12 403	14 130	16 517	20 313
Operating cash flow/DEL (US\$m)	542.6	630.0	615.9	554.3
Net income/DEL (US\$)	778.0	147.2	394.9	410.8
DELs/employee	10.8	12.9	14.2	15.6
Call completion %	60.0	61.0	65.0	65.0
Known requests for main lines	70 095	67 479	65 730	61 129
Public phones	6 068	6 605	6 155	6 255
Annual growth in DELs (%)	N/A	9.2	6.0	7.6
Total DELs	228 552	249 604	265 041	285 184
Digital exchanges	125	155	160	164
Residential connections	53 459	55 669	61 236	67 359
Business connections	70 494	74 402	84 262	90 361
Urban connections	86 260	100 742	105 991	117 438
Rural connections	12 242	12 792	13 552	14 258

Source: BMI-T, 1997a

6.16 Nigeria



☐ Political situation of Nigeria

Nigeria is a federation of states ruled by a military government. The legal system is based on English common law, tribal law, and Islamic law. The executive branch is vested in the chief of state and head of government. Since November 1993 this has been the chairman of the Provisional Ruling Council and Commander-in-Chief of the armed forces and Minister of Defence. The federal government has embarked upon Vision 2010, a national planning exercise affecting all sectors of society and economy. Economic reform measures proposed by the International Monetary Fund were abandoned by the government. The state now looks to the advice of experts on topics such as telecommunications and broadcasting (*Webster's, 1997*).

☐ The economic situation of Nigeria

The economy has been in a chronic state of depression since the early 1990s. Investment activity is mainly limited to oil exploration and production which is the mainstay of the Nigerian economy. The transport, media and telecommunications sector are all depressed, notably in civil aviation, with sluggish growth in the other two cases. The Nigerian currency Naira has been stable against the US dollar since the fourth quarter of 1995. The mean exchange rate was N80 to the dollar. The Naira is traded through weekly auctions of US dollars organised by the Central Bank of Nigeria at its autonomous foreign exchange market (*FMI, 1998*).

A second key sector is the financial sector, which had 106 private banks at the end of 1996. The services sector in general is the only one showing strong growth, averaging over 5 per cent a year over the past five years. Union Bank PLC is the largest bank with

assets of almost N 10bn in 1995. First Bank of Nigeria PLC is the second largest with assets of N 9bn, in 1995. Of the 100 largest companies in Nigeria, 41 are banks and insurance firms, according to the Nigerian Stock Exchange. Not all banks do well, and the Central Bank of Nigeria forced the sell-off of five banks early in 1996 (*ADB, 1998*).



Communications infrastructure of Nigeria

The insecurity of tenure of key players in the communications industry has had a major impact on the development of the sector. In the last three years, five ministers have been appointed to the ministry responsible for telecommunications and three managing directors of the national telecommunications operating company, Nitel Plc, have also been moved.

Three cellular radio operators have been licensed provisionally and regional cellular licenses are being prepared for tender. NCC has reported that the analogue ETACS cellular service offered by Nitel is susceptible to fraud. The joint venture company between Nitel (45 per cent) and Digital Communications Limited of Atlanta, USA, (55 per cent), was named Mobile Telecommunications Services (MTS) it started up in 1992, but went out of business in mid-1996 as a result of a showdown with Nitel in December 1995 over alleged non-payment of interconnection fees. The NCC had been unable to retrieve the situation, despite its consistent efforts. A new state owned company, Mobile Telecommunications Limited (M-Tel), was formed in June 1996 to replaced the old joint venture. The idea is to privatise M-Tel. Nitel is a 100 per cent government - owned limited company. Loans to Nitel are to be provided by the Nigerian federal government. A World Bank loan to Nitel was frozen early in 1995 and no fresh loans have been forthcoming since. Independent cellular communications, community telephony and value-added network services companies have been licensed but most are delaying making their services operational. This is sometimes caused by difficulties in obtaining international financing, which in turn is a result of the extent of Nigeria's international isolation (*BMI-T, 1997a*).



Market structure of Nigeria

Nigeria has deregulated both the telecommunications and broadcasting sector, resulting in a business landscape with many private players. The market structure reflects the most important public and private operators.

Emerging markets in Nigeria are:

- Wireless local loop;
- Cellular radio; and
- Private networks including VSAT (*Sietel, 1998*).

The public switched telecommunications service provider Nitel Plc does not enjoy a favourable reputation among the population at large. Both business and consumer communities have a welcoming attitude towards new private service providers. In April 1996, around 30 000-telephone lines in Lagos business districts were disabled as a result of an accident in a major switching centre (*Sietel, 1998*).

Among the top 10 users of telecommunications services in Nigeria are: Texaco, Shell Petroleum Development Company; Chevron; NNPC; Central Bank of Nigeria; First Bank of Nigeria Plc; Union Bank of Nigeria Plc; Mobil Oil Nigeria; Elf Petroleum; and Nigeria Bottling Company (*BMI-T, 1998*).

The public telecommunications service in Nigeria is characterised by high demands, which has not been met, and low quality of service due to under-investment. There are no policies in place yet to address these challenges in a positive manner.

The agencies regulating the communication industry in Nigeria are:

- Nigerian Communications Commission for telecommunications; and
- Nigerian Broadcasting Commission for broadcasting and radio/frequency allocation.

Whereas liberalisation of the broadcasting and telecommunications sectors are continuing, this will only result in very limited influx of (international) investment capital into the business. This state of affairs is expected to continue as long as Nigeria

makes no progress with the democratisation of its political institutions and processes as demanded by key donor agencies such as the International Monetary Fund and the United Nations. The digitalisation of the Nitel public network is progressing. The network is a multi-vendor environment with equipment sourced from mostly large international suppliers.

Three Intelsat earth stations and one coaxial submarine cable carry international traffic. There are three international gateway systems: in Lagos, Kaduna and Enugu.

Table 6.15 shows the historical network growth leading telecommunications indicators in Nigeria from 1994 to 1997.

Table 6.15: Historical network growth leading telecommunications indicators in Nigeria from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
Teledensity	0.34	0.34	0.33	0.37
DELs in Lagos	161	198	N/A	N/A
Business connections	153	194	N/A	N/A
Public call offices	N/A	N/A	238	5
No of international circuits	21	21	21	25
Annual growth in DELs in %	14	27	N/A	N/A
Total DELs	593	751	N/A	N/A
Total exchange capacity	593	751	N/A	N/A

Source: BMI-T, 1997a

6.17 Uganda



Political situation of Uganda

Uganda is situated in the Great African Rift Valley, bordering Kenya to the east, Sudan to the north, Zaire and Rwanda to the west and Tanzania to the south. Uganda has been

in the forefront of political rehabilitation after a new constitution was promulgated in 1994. In the short term, Uganda should enjoy continued stability and economic growth at home (*Webster's, 1997*).



The economic situation of Uganda

Although economic growth has increased, with real per capita income rising 20 per cent since 1986 to US\$180 in 1994, this is still 23 per cent below the level of 25 years ago. This puts Uganda among the poorest countries in the world (*BMI-T, 1998*).



Communications infrastructure of Uganda

At the moment, the government of Uganda is intent on the complete restructuring of the communications sector. On its completion, the sector may be the only one in Africa without direct government involvement, even as a minor shareholder. Licenses for the public switched telephone service operators will be negotiated competitively with the government taking into account the commitment and the ability of the prospective operator to fulfil the government's stated objectives (*Sietel, 1998*).



Market structure of Uganda

The Ugandan telecommunications market is very open. This exclusion will disappear with the licensing of the second national operator in 1997. The pre-qualification of the second national PSTN license was considered during the first months of 1997. With only 42 000 telephone lines to serve a population of 18 million, telecommunications services are extremely inadequate. Approximately 72 per cent of the telephones are in greater Kampala, with the rest unevenly spread in the urban centres. In the last 10 years, the economy has registered steady growth, up to 10 per cent in 1994/95 (*ADB, 1998*).

Uganda has a well-developed market for computer-mediated communications services. The country has access to full Internet provided via very small aperture satellite terminals (VSAT) by two companies, Starcom and Informal. Makerere University

Mukla is now providing full Internet via free capacity provided by Starcom. Mukla however may not provide the service to non-academic users without arrangement with Starcom (*BMI-T, 1997a*).

UPTC is a wholly owned national parastatal created to take over the functions of the Uganda portion of postal and telecommunications operations after the collapse of the East African Posts and Telecommunications Union in 1977. UPTC has been stopped from further capital investment until after liberalisation. In the meantime, the corporation is the dominant provider of communications services and enjoys a monopoly on all wire-line telephony. WordTel, a telecommunications development agency sponsored by the International Telecommunications Union, has agreed to finance the construction of 100000 lines in the country as part of a one million line telecommunications project (*Sietel, 1998*).

Table 6.16 shows the historical network growth leading telecommunications indicators in Uganda from 1994 to 1997.

Table 6.16: Historical network growth leading telecommunications indicators in Uganda from 1994 to 1997.

	1994	1995	1996	1997
LINE BREAKDOWN				
Teledensity DELs/100 people	0.18	0.22	0.23	0.25
Annual revenue per DEL US\$	816	828	1 065	1 060
Annual revenue per employee	28 125	30 625	33 125	35 625
Operating cash flow/DEL (US\$m)	N/A	N/A	N/A	N/A
DELs/employee	35	26	29	32
Call completion %	40	60	80	80
Known requests for main lines	3 115	N/A	N/A	N/A
Public phones	251	579	N/A	N/A
Annual growth in DELs (%)	11%	N/A	N/A	N/A
Total DELs	35.3	41.6	46.5	50.2
Digital exchanges	10	10	N/A	N/A
International circuits	119	292	309	330

Source: *BMI-T, 1997a*.

Parts of the existing network were constructed in the early 1970s and consequently are now way beyond their designed life span. Maintaining such parts of the network is a serious problem due to lack of spares. UPTC has emphasised rehabilitating and upgrading the networks in major towns. Presently the network is highly congested and therefore offers a poor level of service. In early 1996, the average national exchange capacity usage was 71 per cent, but usage on almost all exchanges in Kampala was upward of 90 per cent.

6.18 Conclusion

As can be seen from this research most of the economies of the Sub-Saharan Africa countries have basically been in a chronic state of depression since the early 1980-90s. Investment activity is mainly limited to mineral production, which is the mainstay of the Sub-Saharan Africa countries' economies. The telecommunications sectors of most of the Sub-Saharan Africa countries can be considered to be functioning to satisfactorily.

One of the key factors in developing the communications industry in Sub-Saharan countries is the financial sector, especially international, state and private banks. The services sector as banking, which they are financing the telecommunications projects are generally the one that has shown growth over the past five years.

The uncertain tenure of key players in the Sub-Saharan communications industry has a major impact on the development of the sector. In the last few years, many ministers responsible for telecommunications have been appointed to their positions for reasons other than insight into the telecommunications industry in some Sub-Saharan Africa countries.

The future in the telecommunications industry in Sub-Saharan African countries lies in the development of the cellular network system. Independent cellular communications, community telephony and value-added network services companies must be licensed and there must be no delay in making their services operational. These delays can, in part, be attributed to the difficulties experienced in obtaining international finance, which in turn is a result of a degree of international isolation of some countries of Sub-

Saharan Africa countries. The reason for the international isolation were mentioned in this Chapter.

While liberalisation of the broadcasting and telecommunications sectors continues, there will be an influx of international investment capital into the economies of Sub-Saharan Africa countries to develop their telecommunications industries. This state of affairs is expected to continue as long as Sub-Saharan Africa countries continue to progress towards democratisation as demanded by key donor agencies such as the International Monetary Fund and the United Nations.

Africa is one of the world's largest potential markets for improved telecommunications. The development of Africa's communications infrastructure is, in turn, enhancing the opportunities for profitable and productive investment in the continent. Better telecommunications will lead to improved quality of life and the delivery of electronic health and learning services to previously disadvantaged areas of the continent. That opens up great opportunities to train and equip people with skills necessary to improve ability to innovate.

Over the past few decades, the telecommunications sector in South Africa has witnessed several major trends: separation from postal service, corporatisation, privatisation, liberalisation, globalisation and technological convergence of telecommunications. The process of market opening can bring great benefits, in particular to the African continent by building infrastructure and information processing industries, linked to economic development strategies.

CHAPTER 7

7. Financing of the Telecommunications Industry in Sub-Saharan Africa

"The convergence of computer technology and telecommunications harbors the potential for the most exciting and progressive applications of our times."

Dietrich, 1998

7.1 Introduction

The Telecommunications Industry in Sub-Saharan Africa countries is quite substantially behind that in other regions of the world. It has only two per cent of the world's main telecommunications industry despite having 12 per cent of its population. Generally, Africa has had the lowest annual growth in teledensity (main telephone lines per 100 inhabitants) of any developing country region over the last ten years, partly due to rapid population growth, (35 of the 49 least telecommunications-developed countries are Sub-Saharan Africa countries). Several external economic factors as foreign debt, population growth and civil disturbances, in part explain the infrastructural problems of the telecommunications sector of Sub-Saharan Africa countries. This chapter will seek to give an overview of the economics of the telecommunications industry of Sub-Saharan Africa countries (ITU, 1995).

7.2 The paradoxes of African telecommunications

Foreign debt is seriously hampering the capability of Sub-Saharan Africa countries to import telecommunications equipment. Population growth is so high that network development never seems to catch up with demand. Civil disturbance in the Sub-Saharan African countries often damages the already fragile telecommunications infrastructure and creates an environment, which is hostile to investment confidence.

The first paradox is that the level of international telephone traffic per subscriber in Sub-Saharan Africa (213 minutes per year) is the highest of any region in the world, but the level of traffic per inhabitant (less than one minute) is the lowest in the world. This

suggests that there is considerable demand but insufficient supply for telecommunications within the region (*Minges, 1994*).

The second paradox is that the average level of pre-tax profitability of public telecommunications operators in Africa is among the highest of any region in the world. The level of revenue per inhabitant is less than in any other region, (just over US\$ 5 per year in Sub-Saharan Africa). Thus telecommunications is indeed profitable in the region, perhaps because access to telecommunications services is limited to the richest fraction of the population and to the foreign-owned, export-oriented sectors of the economy (*Minges, 1994*).

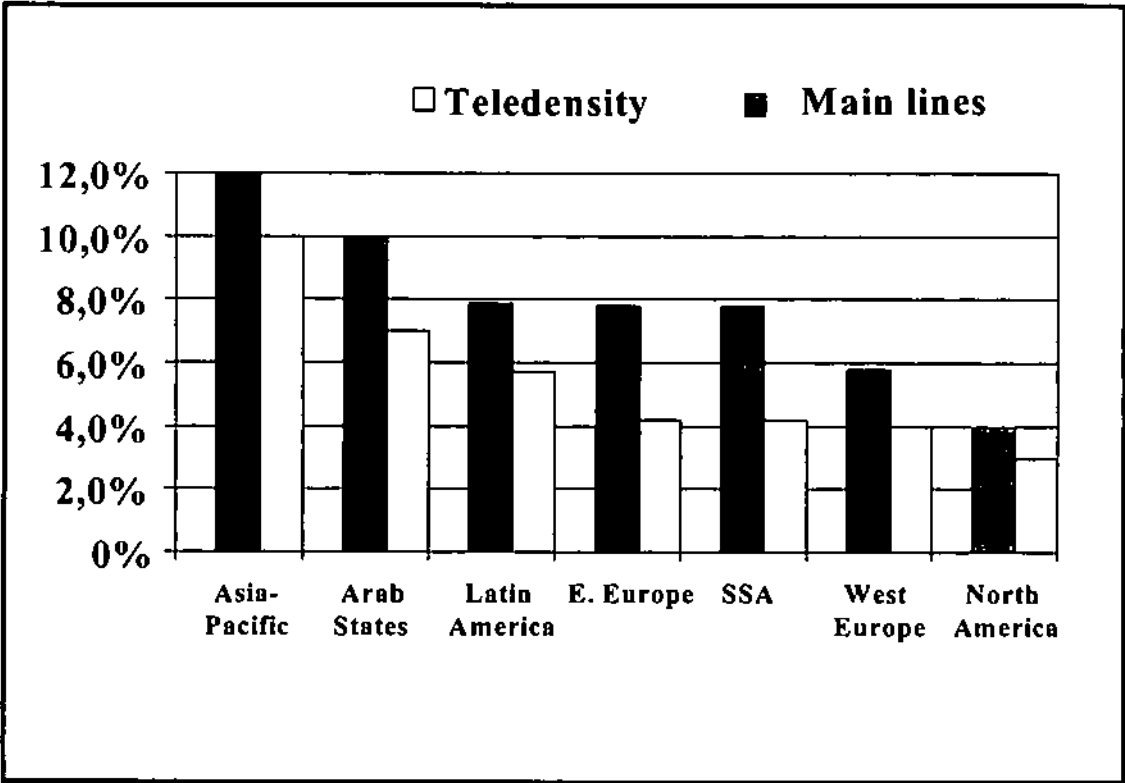
A third paradox is that, even though the average level of income in Sub-Saharan Africa is the lowest of any region in the world, the cost of installation of a telephone line, a somewhat labour-intensive activity, is nevertheless the highest of any region in the world. The average cost of each new line, calculated by dividing the value of investment in the public telecommunications sector by the number of new lines installed during the year, is more than US\$ 5,500 per line. This compares with a developing country average of just under US\$ 1,500 per year. If the Sub-Saharan Africa figure was closer to the world average, the region would be adding four times as many lines a year. This would translate into almost 600,000 extra lines per year that could potentially be created through a more efficient investment procurement strategy based on best-practice from elsewhere in the world (*Minges, 1994*).

What these paradoxes suggest is that problems associated with telecommunications development in Africa are not strictly caused by external factors or lack of money. Many problems could be considerably alleviated by structural reform within the rest of the economy. Some countries have already achieved this, notably Botswana and Gambia. These countries have consistently outperformed the regional average of GDP throughout the last decade. This shows that the problems of the telecommunications sector can be tackled providing there is sufficient political will.

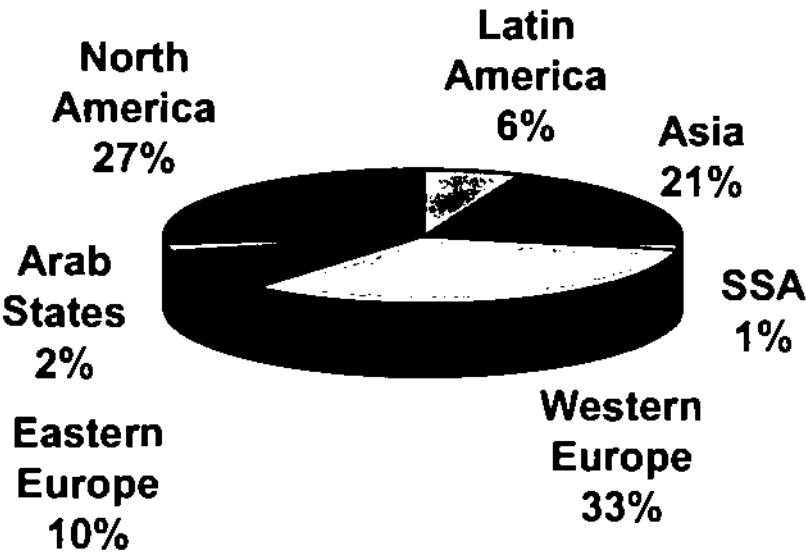
This has been carried out from an early date in each of these countries (*Kiplagat, 1994*).

Figures 7.1 shows annual growth rate in main lines and teledensity and main lines by various world regions between 1983 and 1996.

Figures 7.1: Annual growth rate in main lines and teledensity and main lines by various world regions between 1983 and 1996.



Source: BMI-T, 1996



Source: BMI-T, 1996

7.3 Constraints in financing telecommunications in Africa's least-developed countries

Although it is universally acknowledged that telecommunications is a profitable sector, most African countries are unable to mobilise the financial resources needed to develop it. The situation is very critical for the least developed countries whose weak economies considerably hinder their efforts to gain access to capital at market rates. Therefore, there is an urgent need to reflect on ways and means of developing telecommunications in Sub-Saharan Africa countries. Since telecommunications is a capital-intensive sector, no stone should be left unturned if an acceptable growth level is to be attained. Firstly an appropriate legal framework will have to be established, wherefore the private sector can be drawn in. Finally telecommunications infrastructure components should be integrated into social priority projects (*Bedoumra, 1995*).

In about 60 per cent of Sietel export tenders to Sub-Saharan Africa customers, requests are also made for financing of their telecommunications projects. Sietel is able to offer to them very advantageous financing that is mostly sourced from Kreditveranstalt Verwaltung (KfW) from Germany. All appropriate financial tools such as the special terms of payment, foreign currencies, customer cash flow problem analysis a special rates can be negotiated with the client and thereafter built into the special conditions of contracts (*Sietel, 1998*).

At present Africa according to *Bedoumra, (1995)* is beset by chronic macro-economic and financial imbalances essentially marked by:

- Adverse terms of trade engendering a drastic fall in prices of exported of the equipment;
- An ever-increasing debt burden; and
- A shrinking of the flow of capital.

Due to the above there seems to be very little hope of raising sufficient capital to increase the meager investment made in the telecommunications sector in Sub-Saharan Africa countries. Communications are at the heart of all economic activities and are prerequisite to the development and efficiency of all other sectors of the economy. The

technological evolution is opening up unsuspected vistas for new products and services capable of contributing towards economic growth.

The following section will consider the problem of mobilising resources for financing the telecommunications sector, particularly in the least developed Sub-Saharan Africa countries. It will commence by elaborating on the profitability of the telecommunications sector and then review the constraints on the future mobilisation of resources for this sector.

7.4 Profitability of telecommunications in Sub-Saharan Africa countries

According to certain African Development Bank statistics, the turnover per main line is two and half times higher in some Sub-Saharan Africa countries than in certain developed countries. Since the rates and traffic per line are relatively higher in relation to other regions of the world, telecommunications in Sub-Saharan Africa countries (Botswana, Zimbabwe, Mauritius and Namibia) are particularly attractive financially. In spite of the comparatively heavier investment unit costs, the operating fixed assets always show a profitability of more than 10 per cent, with a few exceptions due to poor management. The internal financial profitability rate of telecommunications projects often exceeds 20 per cent (*ADB, 1998*).

Although the development of the telecommunications industry in Sub-Saharan Africa countries is closely linked to the economy of the Africa continent, telecommunications can be managed profitably and efficiently even in low per-capita income countries. This is amply testified to by such countries as Malawi, Mozambique, Angola, Burkina Faso, or Senegal. The Senegalese telecommunications company SONATEL was able to make an advance repayment of some debts, ensure financing up to 64 per cent and reduce usage tariffs by 31,6 per cent for firms and 21,8 per cent for residential subscribers. Generally, the interest rates applied by bilateral and multilateral institutions on loans intended for telecommunications do not exceed 10 per cent and can therefore be carried by most telecommunications projects. However, the funds raised for financing telecommunications are still inadequate (*ADB, 1998*).

7.5 The role of the African Development Bank and the World Bank in developing countries

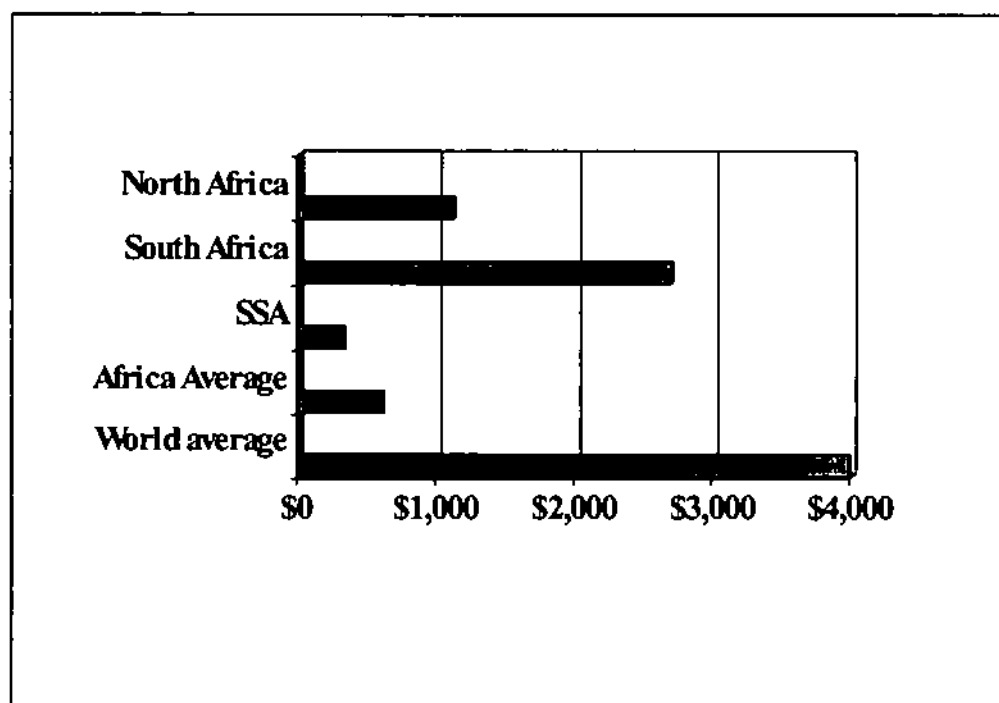
It can be seen from various data on the operations of the two main development financing institutions in Africa, i.e. the African Development Bank and the World Bank, that their involvement in telecommunications has been relatively modest in relation to the needs. Over the last three-year period (1995-1997), the World Bank invested approximately US\$ 250 million in this sector, i.e. about US\$ 83,3 million a year. During the same period, the African Development Bank Group granted loans amounting to about US\$ 324,5 million for telecommunications projects, i.e. an average US\$ 108,2 million per year. The third major multilateral source which provides finance for telecommunications in Africa is the European Development Fund. The other financial backers are mostly bilateral, comprising in particular German, Canadian, French, Italian, Swedish and Japanese co-operation programmes (*TFA, 1996*).

Investment in telecommunications in Sub-Saharan Africa countries is estimated to be less than US\$ 2 billion a year whereas, to attain a density of 3,11 main lines per 100 inhabitants by the year 2000, Africa requires an annual investment of US\$ 4.493 billion per annum, i.e. more than double the past investment level (*ADB, 1998*).

Multilateral development finance institutions have several financing windows, operating mainly on normal or soft terms. For instance, the African Development Bank has a relatively large quantity of funds provided on normal terms with an interest rate currently hovering around 7 per cent and soft loans from the African Development Fund (interest-free loans over 50 years) for the least-developed countries. One might be tempted to think therefore that with its high profitability rate, the telecommunications sector in Sub-Saharan Africa could have easy access to non-concessionary loans for its development. This, however, is not possible for many African countries (*ADB, 1998*).

Figure 7.2 shows the level of Gross Domestic Product per capita in Africa and the World as a paradox that even though the average level of income in Sub-Saharan Africa is lowest of any region in the world, nevertheless the cost of installing a telephone line, a somewhat labour-intensive activity, is the highest of any region in the world.

Figure 7.2: Level of Gross Domestic Product per capita in Africa and the World



Source: Bedoumra, 1995

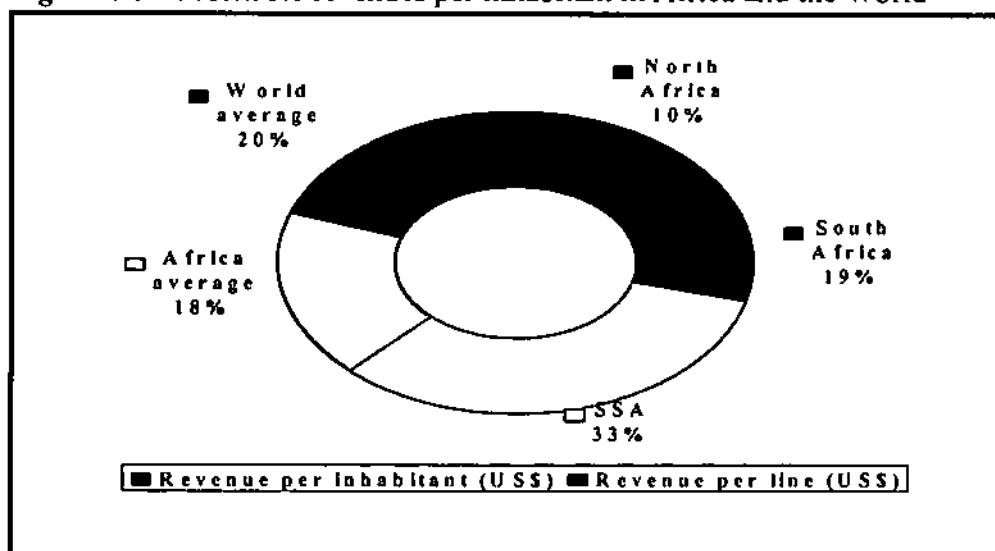
7.6 Constraints on obtaining finance

Multilateral Finance institutions only lend to governments or when the latter guarantee the loan. This implies that the debt situation of the country as a whole is taken into consideration, regardless of the viability of the telecommunications projects. The structural adjustment and debt-relief measures have failed to ease the debt burden, which continues to be unbearable for many countries. Furthermore, 33 low-income African countries, having a *per capita* annual income of less than US\$ 510, find impossible to obtain funds on non-concessionary terms from development finance institutions. As a result of the recent devaluation of the CFA franc, the number of countries concerned will probably increase from 33 to 37. They can only seek soft loans the size of which is restricted by the fact that they are made up of voluntary contributions provided by developed countries on the basis of their capacity and policies. The governments of these countries are devoting their meager resources primarily to the survival of their people and the development of human resources (ADB, 1998).

In order to develop telecommunications networks, the least-developed countries for the moment rely mainly on either bilateral aid or soft loans from multilateral institutions. This aid alone is inadequate for a rapid development of telecommunications as evidenced by the virtual absence of telecommunications. Many Sub-Saharan Africa countries will not be able to develop a self-sustaining sector, such as the telecommunications sector, capable of generating income (taxes, etc.) and indispensable to the economic growth of the country. In view of the difficulties African Governments are encountering in their efforts to borrow or guarantee further loans, they must seek other approaches to accelerate the mobilisation of capital required to finance telecommunications in the region (ADB, 1998).

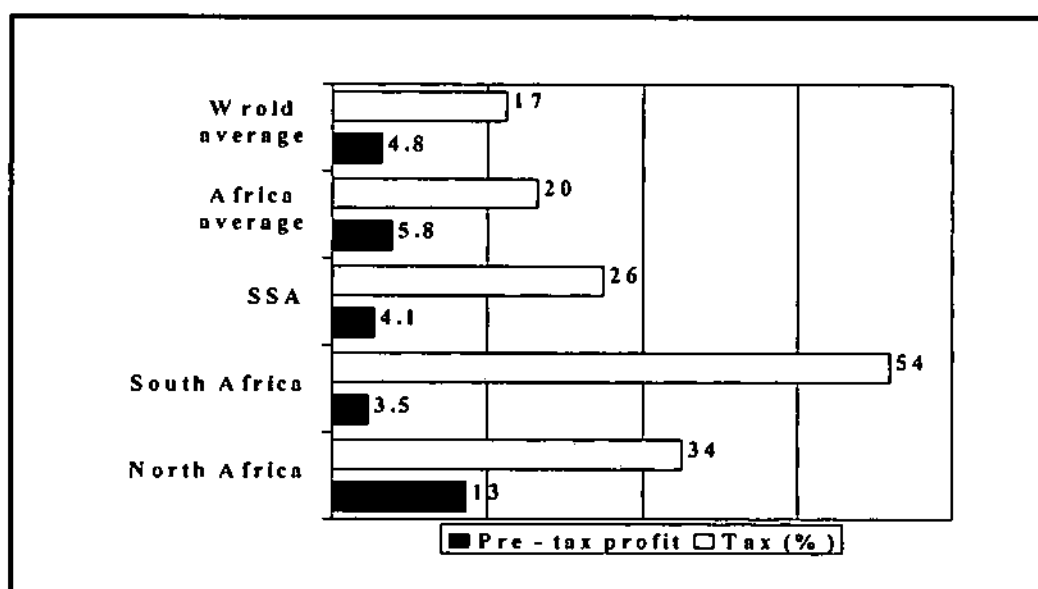
Figure 7.3 and Figure 7.4, show that the average level of pre-tax profitability of public telecommunications operators in Africa is among the highest of any region in the world, but on the other hand, the level of revenue per inhabitant is less than any other region, (just over US\$ 5 per year in Sub-Saharan Africa). Thus telecommunications is indeed profitable in the region, perhaps because access to telecommunications services is limited to the richest fraction of the population and to the foreign-owned, export-oriented sector of the economy.

Figure 7.3: Profitable revenues per inhabitant in Africa and the World



Source: WTO, 1996

Figure 7.4: Pre-tax profitability of public telecommunications operators and revenues per inhabitant in Africa and the World



Source: ITU, 1996

7.7 Prerequisites to the restructuring of telecommunications in Sub-Saharan Africa countries

A prerequisite to any mobilisation of resources is the sound management of the company, which can only be achieved, in a favorable macro-economic environment. There have been many documents and conferences on the restructuring of telecommunications, from which the following recommendations have emerged:

- ☐ The role of the State is to ensure that public services are provided, whether the network operation is public or private, and that the rules of competition are respected where necessary, The following seen to be the major requirements to be fulfilled:
 - a) That demand for the entire territory has to be met within a reasonable time;
 - b) That services must be sold on a least cost basis; and
 - c) That quality service must be provided.

The state should have appropriate mechanisms in place to ensure that these goals are met and the rules of the game are respected.

- ☐ Public telecommunications companies will have to be granted real financial and administrative autonomy necessary for running a private enterprise (*ADB, 1998*).

7.8 A few ways of financing of the telecommunications sector

The telecommunications company's financial autonomy should include the freedom to borrow free of state intervention. A state guarantee should only come into play where the donors demand such guarantees. However, the freedom to borrow should not imply operation of the telecommunications network without any state control. Indeed, the borrowing should be entered into within the framework of objectives laid down jointly with the state and within limits acceptable to the company. Moreover, such transactions should be submitted to the telecommunications company's board of directors on which the state would also be represented. It would therefore be useful for the legal personality granted to the telecommunications company to provide for the right to borrow, despite the constraints that this might entail for the quality of management (*ADB, 1998*).

Access to capital markets should be achieved freely even for public telecommunications companies. One could point to the experience of France Telecom with respect to the financing of its needs. Although it is a public company, France Telecom borrows under its own name. It finances its short-term loans through credit lines with banks as well as using the facilities offered by the French national telecommunications fund. The long-term loans are financed mainly on the financial market by borrowing in the international franc market. As for its international operations, France Telecom resorts to international markets in Euro-currencies (*Bedoumra, 1995*).

While it is true that many Sub-Saharan countries lack capital markets, it is equally true that the universalisation of the economy is opening new horizons and the creation of regional development poles should offer better prospects. There are cases where shares have been issued on the stock exchanges in the West African region: Côte d'Ivoire, Ghana and Nigeria (*ADB, 1998*). These are possibilities, which should be explored further.

Due to the considerable investment needs and the low volume of capital available, it is increasingly necessary to have access to private capital. Such access requires a legal and institutional framework that will enable the private sector to take part and thereby contribute to real long-term development of telecommunications.

In the context of the areas of jurisdiction laid down by the law, the regulating authority should assist and encourage the private sector and ensure that the interests of all parties are safeguarded equitably. The regulator should be able to effectively safeguard the public's interests, making sure that investments are made at the least cost, the techniques used are appropriate, the rates are financially and economically reasonable, the quality of service is acceptable and the users are treated fairly. It is therefore important that this body be endowed with the requisite professional personnel in the technical, financial, economic and legal areas. The personnel should be adequately remunerated and be granted terms of employment which guarantee them sufficient autonomy (*Kiplagat, 1994*).

Private sector participation should not just be to give the private sector access to the capital of the public telecommunications operator or to introduce competition for new services. The limited extension of the basic network calls for more imaginative efforts to attract private capital. Moreover, it has been noted in some Sub-Saharan Africa countries that some private or professional subscribers are willing to take part in the financing of the investments needed for acquiring telephone and other new services.

There are several issues such as the extension of the basic network in certain geographical areas or the use and maintenance of part of a network, which could be entrusted to the private sector, within a framework of agreements fair to all parties and satisfactory to users. It is therefore a question of getting the private sector involved at all levels without necessarily first privatising beforehand the public operator of the telecommunications network.

It has been observed from the experience of some African countries, that when a public telecommunications enterprise is privatised, the opening up of a public corporation to a private foreign partner does not of necessity lead to the mobilisation of resources.

Indeed sometimes the industrialised countries, or parties other than the private partner concerned, stop their contributions to the country's telecommunications sector. Furthermore, the partner in question does not provide substantial resources nor raise additional private capital. There is therefore a need to exercise much more caution when considering the offer of majority shares of a telecommunications company to a external private partner in order to attract more private capital (*Bedoumra, 1995*).

Success in mobilising private capital depends heavily on the country's economic and legal conditions: foreign exchange controls and facilities and the possibility of transferring capital abroad, bank regulations and access to credit, promotion of the private sector. These considerations have led multilateral financial backers to place the reform of the telecommunications sector in the context of macro-economic adjustment and restructuring of the whole parastatal sector. Telecommunications cannot develop on its own isolated from an environment which is unfavorable to business in general (*Kiplagat, 1994*).

7.9 Financing from international development institutions

Although finance from multilateral development sources will continue, given the limited capital available on soft terms, contributions will always be small in volume. This constraint does not in any way diminish the decisive role, which these institutions can play in the restructuring of the sector. The resources could be used first and foremost to support countries in their efforts to introduce and strengthen appropriate reforms. The accumulated experience of these institutions coupled with their mission, enables them to help countries more effectively find appropriate solutions to developing their telecommunications infrastructure (*Sietel, 1998*).

7.10 Integration of telecommunications in social projects

All development partners recognise the need to extend telephone services to the rural areas where the majority of the population resides. Most governments require telecommunications companies to include rural telecommunications in their investment programmes. However, this can only be done to a slow and limited extent, because the

unit costs in these areas are much higher for lighter traffic while the company must maintain a sound financial balance (*Sietel, 1998*).

It is mainly economic factors rather than the financial aspect, which justifies telecommunications in rural areas. Most of the rural population in the least-developed countries clearly lacks the means to subscribe to and pay for a telephone, but in order for development projects set up to assist them to succeed, there is a need to establish telecommunications networks.

The growing number of possibilities offered by modern communications technology and their ever decreasing cost makes it possible to conceive of and integrate them into agricultural, health or educational development projects and programmes in which their costs would be marginal.

It is therefore high time that the design of the above-mentioned type of projects starts to include the setting-up of telecommunications facilities, which are essential to these projects being effective. The design should include a component that will contribute to the agricultural, educational or health project for the rural population concerned. Such planning will allow soft loans to be earmarked for telecommunications. The role of the national telecommunications operating company will be to ensure that technical standards are respected and that sound interconnection with the public network is established. This operating company could then be given the responsibility of maintaining and operating such remote and small networks. It is mainly up to telecommunications companies to make management in the various sectors involved aware of, and convince them of, the technical possibilities offered to them by present day telecommunications (*WB, 1994*).

7.11 Some problems facing financing in Sub-Saharan Africa countries

The difficulties of financing network investment are a perennial problem for the public telecommunications operators in Sub-Saharan Africa countries. There are a number of reasons for this:

❖ **The lack of foreign exchange to purchase telecommunications equipment.**
Given the lack of local equipment manufacture, at least outside South Africa and some of the countries of North Africa, most equipment has to be imported and paid for in hard currency. Import duties increase the cost. The 50 per cent devaluation of the Free Carrier/Cost Insurance Paid (FCA/CIP) Munich will further disadvantage network investment in these countries by making imports more expensive;

❖ **Earnings retained by the State.**
Even though most of the operators of the region make an operational profit, sometimes quite substantial, and even though few of them pay tax, the government nevertheless retains a high share of earnings because it actually owns the operator in most Sub-Saharan countries. This problem is particularly severe for incoming settlement payments from foreign operators, which are often retained by the Ministry of Finance and are rarely earmarked for network development (*TFA, 1996*);

❖ **High cost of new lines.**
Line costs in Sub-Saharan Africa countries are generally higher than in other developing countries. This can partially be explained by the low volume of purchasing which raises unit costs, by lack of local manufacture and because line costs are usually higher in the early stages of network development. However, high line costs are also partially due to inefficient procurement practices and the lack of competitive tendering. A recent report analysing the telecommunications sector in a West African country states: "foreign loans were tied to foreign credits, hence the public telecommunications operator had little say in the choice or cost of equipment for development projects" (*TFA, 1996*); and

❖ **Inefficient tariffs structures**
Tariff structures in many Sub-Saharan Africa countries are inefficient as a means of raising revenues. International calls provide a much higher share of overall revenue in Africa than in other regions, but potential revenue is lost

because of high call failure rates, shortage of outgoing international circuits and because of high international tariffs.

Despite these funding problems, the available evidence seems to suggest that the fundamental difficulties are organisational, not financial. The level of television ownership in Africa, for instance, is more than double the level of telephone ownership (*TFA, 1996*). This disparity arises because television ownership is basically a private investment decision made by individuals, with no waiting list, whereas telephone ownership is a public investment decision, made by state-owned corporations, for which the waiting time is, on average, more than five years.

The solution, therefore, may be to make telecommunications more like a private investment decision and to leverage, as much as possible, private sources of funding. The introduction of mobile communications provides a good example of this. Once a basic national infrastructure is established, the decision on whether or not to buy a mobile phone rests with the user, not with the supplier. Furthermore, mobile communications has generally proved to be a source of revenue to the state rather than an added investment burden on the State.

7.12 Multilateral development assistance

It will be some time before the majority of African countries can fully implement reforms to attract sufficient private investment in the telecommunications sector. The development of African capital markets able to finance telecommunications development on the scale needed also take some time. The multi-lateral development banks could assist in the interim by providing financing and linking it to structural reform. The support of the multi-lateral agencies, which provide hard currency loans, is especially important in Africa where declining exchange rates and high foreign debt levels leave little resources to finance telecommunications equipment imports. Furthermore, they could enforce open tendering which should lead to lower equipment costs (*ADB, 1998*).

The African Development Bank is multilateral development bank. Based in Abidjan, Cote d'Ivoire, it has 51 regional members and 25 non-regional members. It has loaned over US\$ 25 billion since 1967 for economic development projects in the region (ADB, 1998). Its stated policy on infrastructure, including telecommunications is:

"Regional member countries have, since independence, attached an important priority to investments in infrastructure; and the Bank Group's loan portfolio indicates that infrastructural development projects have accounted for a significant portion of its lending in areas such as transport, water supply, energy and telecommunications. In view of inadequate communications in many parts of Africa, the Bank Group continued to support projects aimed at addressing these weaknesses" (ADB, 1998).

The record of African Development Bank (ADB) support for telecommunications is mixed. Over the ten years period from 1983-92, some US\$ 260 million was provided for 12 telecommunications projects. This amounted to 1,2 per cent of total lending which is less than the telecommunications sector's share of Sub-Saharan Africa GNP. ADB telecommunications lending declined from 1983-86, and there was no lending between 1987-89. Since then lending has see-sawed (ADB, 1998).

The ADB lending record on telecommunications is weak when compared to other multi-lateral lenders. The World Bank lent almost times more to the region for telecommunications while the European Investment Bank lent almost as much as the ADB for telecommunications to the region. The Asian Development Bank, similar to the African Development Bank in terms of size and total lending, spends twice as much on telecommunications as the ADB. The new European Bank for Reconstruction and Development, which has total loan portfolio one tenth the size of the ADB's, has nonetheless lent almost twice as much for telecommunications projects in two years as did the ADB in ten (ADB, 1998).

All of the multi-lateral development agencies might do more for Sub-Saharan Africa, even though the African region received the second largest share of multilateral financing for telecommunications from 1983-92 (around 25 per cent amounting to US\$ 1,3 billion), Eastern Europe was a close third of which most was advanced in the last

two years. Furthermore, over half the telecommunications loans to Africa went to just two non Sub-Saharan Africa countries Algeria, Morocco and to one Sub-Saharan Africa country Nigeria (*ADB, 1998*).

Table 7.1 summarised ADB lending for telecommunications industry in Sub-Saharan Africa from 1983 to 1992.

Table 7.1: ADB lending to telecommunications industry in Sub-Saharan Africa from 1983 to 1992.

Year	Country	Lending US\$	Description
1983	Angola	28,9	Improving the quality of international telephone and telex services through the extension and modernisation of the Cacuaco earth satellite station
1983	Malawi	8,8	Expansion of telex and telegraph and extending these services to the whole country
1983	Zimbabwe	6,7	Assist the Post and Telecommunications Corp. to improve telecommunication services including provision of underground cables, overhead wires and insulators, switching equipment, subscriber telephone apparatus and other equipment
1984	Ethiopia	2,5	Extending telecommunications service to semi-rural areas; expanding services in small urban centres, reducing the telephone service waiting list and strengthening maintenance
1984	Mozambique	26,4	Rehabilitation of the country's most important transmission system and providing adequate telephone services in and around the port city of Beira which also serves the landlocked countries Malawi, Zambia and Zimbabwe
1985	Zambia	30,8	Rehabilitation and expansion of the existing network. The major components of the project comprised provision and installation of local exchanges and expansion of cable distribution
1986	Senegal	9,1	Rehabilitation of existing telecommunications networks; provision of facilities for maintaining the network; and improving the quality of service

1990	Angola	31,6	Improve quality of service offered to users, opening up the provinces and contributing to the modernisation, extension and development of the telecommunications network
1990	Zaire	42,3	Set up efficient management in the Postal Services and Telecommunications sector as well as secure for the sector a minimum of reliable means of telecommunication to pursue the rehabilitation of the installations in the city of Kinshasa
1991	Malawi	10,5	Modernising the telecommunications network of the capital Lilongwe and the Municipality of Zomba including the peripheral areas of these two centers. The project provided for the supply and installation of digital exchanges
1992	Ethiopia	36,6	Expansion of telecommunications services in order to meet present and future demand by increasing the number of telephone subscribers and upgrading rural services
1992	Tanzania	23,6	Improve the quality of services of the network, as well as increase the telephone density

Source: ITU, 1996

7.13 Conclusion

Financing in the form of loans and grants will continue to play a critical role in the development of telecommunications industry. The Zimbabwean, Kenyan, Namibian and Zambian experiences have indicated the growing contribution of commercial sources such as banks, suppliers and export credit agencies in financing telecommunications development. Arising from this experience, however a number of critical issues have emerged which need to be addressed when formulating an appropriate borrowing strategy for telecommunications development. A comprehensive financial plan setting out the capital costs for infrastructural development with realistic financial projections of income and operating costs is an essential planning tool for sustainable telecommunications development. The choice of currencies, exchange rate fluctuations, maturity structure, grace period and balance between fixed and floating rates of interest are crucial considerations in the search for the least cost forms of borrowing.

CHAPTER 8

8. Modelling Sietel's imports and exports in a fluctuating market

"It is easy to be critical of applied work, perhaps particularly on work which tries to be sophisticated in both model development and in application. The point of being critical is not merely to indicate real problems with current research but to provoke responses from those who believe that they have answers."

Granger, 1990
(as quoted by van Schalkwyk, 1995)

8.1 Introduction

To remain competitive in a changing marketing environment, Sietel will have to carefully monitor its export-import performance. It would therefore be in the company's interest to reduce import costs to the minimum and to maximise sales of its products in order to remain competitive.

In this chapter, the impact of changes in exchange rates on the telecommunications industry would be discussed and proposals would be made to combat import costs. Furthermore, the export (sales) performance of the company will be analysed to forecast future sales and growth in the market. A spreadsheet model will be developed to model Sietel's purchases and following sales in a changing market.

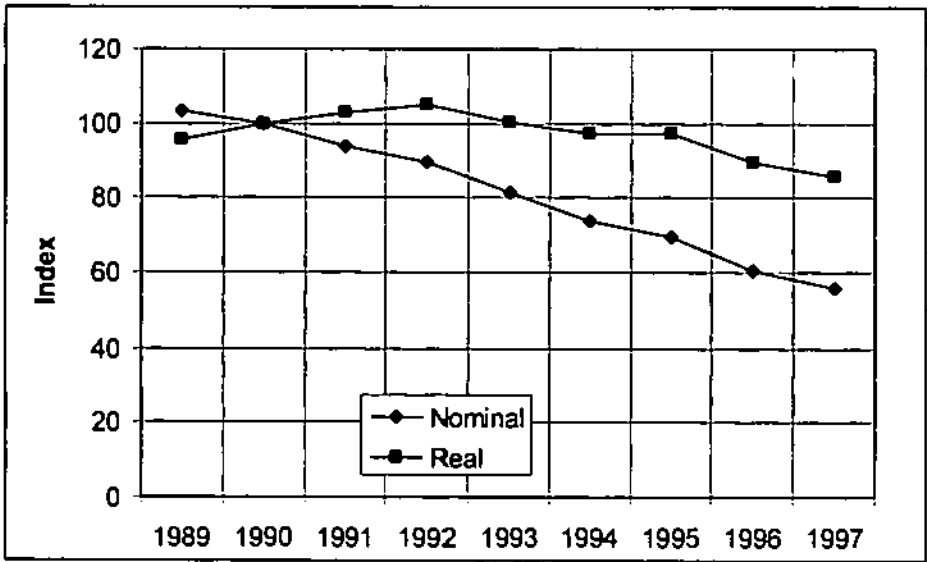
8.2 The impact of exchange rates on Sietel's operations

The macro-economic policies of governments have emerged as a major source of uncertainty and change for telecommunications in recent years. These policies often have a greater effect than sector-specific policies and have affected the telecommunications industry directly or indirectly in the last 20 years. In 1979, the South African government adopted a managed floating approach to the foreign exchange rate policy. The policy was based on inducing stability in monetary aggregates through monetary targeting, the principal instruments for achieving targets

being domestic interest rates and the foreign exchange rate. As in leading other countries, a major change to South Africa's exchange rate policy occurred in 1971 when fixed rates were abandoned in favour of floating rates; in South Africa this was again modified in 1979 with more active management of a target-determined rate.

A dual exchange rate was in effect up to May 1995. It comprised a commercial Rand, of which the value was determined by a managed floating system and applied to all current transactions, including telecommunications. The other instrument was the financial Rand, which was the exchange rate for all non-resident transactions.

Figure 8.1: Effective exchange rates of the Rand from 1989 to 1997 and trends in the weighted average exchange rates.



Source: SARB, 1997

The direct impact of the exchange rate variation on the economy and on the telecommunications sector depends on the degree to which:

- a) Inputs used are imported, or, if locally manufactured, have an import content; and
- b) Output is tradable or affected by the prices of tradable goods.

In the context of South African telecommunications industry, real currency depreciation will increase the relative profitability of producers of tradable goods, but tend to

exacerbate the cost (price squeeze) for producers of those commodities which are not generally tradable, or are only traded when there is a domestic surplus (*WB, 1994g*).

As from 1 April 1995, the weighted average exchange rate of the Rand has been calculated against the following four currencies: US dollar, British pound, Deutsche mark and Japanese yen.

There has been some debate about the effects of exchange rates on telecommunications exports and the role of monetary policy in exchange rates determination. Some argue that increases in domestic money supply will lower the value of the domestic currency and increase the volume of exports, while the impact on trade of a change in exchange rates would be large due to the elastic supply of telecommunications equipment and thus the major impact would be on price rather than quantity. Exchange rates have not only affected output prices, but also a significant proportion of inputs in the telecommunications sector is imported. Indeed exchange rates affect inflation due to the impact of imported goods in the producer price index.

In South Africa, significant proportions of telecommunications equipment inputs are imported, either as raw materials or finished goods. Depreciation of the Rand exchange rate means that more Rands must be paid for imported products. Thus, a depreciating Rand increases the cost of imported products relative to local prices. This is, however, offset by the positive impact of a lower Rand exchange rate upon the nominal gross proceeds of South African telecommunications exports since they become relatively cheaper on international markets.

The South African exchange rate has declined quite significantly against major world currencies since 1994. This increased prices of imported products which increased the competitiveness of the South African producers and which rendered it unnecessary to raise any tariffs on many of the locally produced products.

8.3 The South African Rand – possible future developments

The Rand's resilience in the face of the Asian crisis in April 1998 and nearly three months of subsequent stability against the dollar won valuable confidence with investors. In the process, the market became quite familiar with an R 4,9080/R 4.9875 dollar trading range. The Rand has once again weakened to new all-time lows against the dollar with the R 6,00 level (and the previous January low of R 4,9985) having been exceeded late in May (*FNB, 1998a*).

The foreign capital inflow is for the moment assisting in "normalising" what are still seen as very weak structural features (reserves, exchange control). It does nothing in the long term about the domestic savings rate (which remains too low), and the implied reliance on capital inflows as fixed investment starts growing. The ultimate outcome is evidence of an increase in direct foreign investment taking over from portfolio inflows in the critical support for the balance of payments (*Brocco, 1998*).

Three more years of benign global market conditions could well have this outcome, but the likelihood of global conditions remaining supportive for so long, with almost everyone internationally worrying where the next financial crisis will be coming from. South African economists would be wise not to treat any fortuitous inflows of foreign money as one more gold boom. There should be more large-scale privatisation and the reducing of government dissaving through much lower interest charges on the national debt.

8.4 Sietel and the rate of exchange fluctuation

Exchange rate fluctuations seriously affect the operations of Sietel in South Africa as a large percentage of its products are either imported or exported. In South Africa, the South African Reserve Bank (SARB) sets monetary targets, which implies a certain level of interest rates, and this in combination with international inflation and interest rate differentials, largely determines the exchange rate of the Rand.

An analysis of the inflation differential between the US dollar and the SA Rand from 1984 (US\$ 1,00 = 2,48 ZAR) to 1998 (US\$ 1,00 = 6,22 ZAR) (August 10, 1998) shows

a 38,87 per cent increase within 10 years (*Persi, 1998*). A solution to this problem is possible by Sietel (or any export-import company) protecting itself against these fluctuations and reducing the exchange rate risk by buying on the futures market.

There are three basic ways in which commodities can be traded:

- Namely on the spot market;
- By means of forward contracts;
- Future contracts; and
- A spot market is where a seller sells products at a negotiated price to a buyer.

The price is valid only on that day, for that product. A forward contract is like the spot market concept, except that the seller agrees to sell his commodity to a buyer for a set future date. Payment is made at the end of the period. A future contract on the other hand is not unlike a forward contract in that it is an agreement to buy or sell a specific quantity and amount of a product on a specific date or time.

Table 8.1 depicts exchange rate forecasts for the periods, viz. the spot rate, 3 months, 6 months, 9 months and 12 months for various currencies. According to import statistics held by Sietel, more than 50 per cent of the global turnover is imported content from overseas suppliers.

Table 8.1: Exchange Rate against US dollar

<i>Currency</i>	<i>Spot Rate</i>	<i>3 Months</i>	<i>6 Months</i>	<i>9 Months</i>	<i>12 Months</i>
DEM	1.77	1.7603	1.7513	1.7436	1.7361
GBP	1.6326	1.6251	1.6180	1.6114	1.6048
ITL	1746.95	1743.33	1736.81	1729.55	1722.33
CHF	148.93	147.50	146.16	144.90	145.34
FRF	5.937	5.9049	5.8756	5.8498	5.8754
ZAR	6.22	6.464	6.665	6.872	7.447
JPY	145.3	143.36	141.44	139.66	137.91

Source: FNB, 1998b, Operational information from 8.8.1998

The future market operates like a stock exchange, with commodities or financial instruments being traded instead of stocks and shares. It is important to remember that on the stock market buyers are buying an asset while on the futures market they are transferring risk. Prices on a futures market are determined in much the same way as they are at a local auction, by open bidding of buyers and sellers, thereby giving instant expression to the forces of supply and demand. In turn, future prices are quickly translated into local cash prices by buyers and sellers of the physical commodity around the country. The difference between the cash price and the price of the futures represents the cost of transport, storage, interest and other marketing charges.

Table 8.2 shows the possible savings when buying equipment at the spot rate on the futures market in anticipation of a decrease in the exchange rate. The futures market could possibly be used by Sietel to hedge against an increase in import prices.

Table 8.2: 50 % Imported content of Sietel turnover ^[1] (in million ZAR).

	Forecast FNB	Contract Value ^[1]	FWC Rate	FWC Contract Value ^[1]	Potential Saving
FWC 3 Months	6.464	142,2	6.428	141,4	0,07
FWC 6 Months	6.665	146,6	6.657	146,4	0,19
FWC 9 Months	6.872	151,1	6.857	150,8	0,33
FWC 12 Months	7.447	163,8	7.428	163,4	0,40

Source: FNB, 1998b, Operational information from 8.8.1998

[1] Hypothetical data were used to maintain confidentiality

Location quotients calculated (*Table 8.3*) clearly indicate comparative advantages in exports by country. A comparative advantage indicates whether a country has a relatively more competitive export function for a product or service than the aggregate economy of the regional economies (Sub-Saharan Africa) and thus renders it relatively more efficient. A country has a location quotient larger (smaller) than one or a comparative advantage (disadvantage) in exports when the share of exports in the regional economy is greater (less) than the share of exports in the total economy.

8.5 Forecasting sales

Table 8.3 summarises Sietel's export operations and performance in Sub-Saharan Africa.

Table 8.3: Sietel exports by Country and Material Groups product, from 1995 to 1998

Material Group	Export Turnover ^[1] (Rand)	Country	Per cent of Total	Location quotient
MN	F(A)	Zimbabwe	28.58	2.23
Cable	F(B)	Namibia	1.86	2.64
EWSD	F(C)	Namibia	35.37	1.97
EWSD	F(D)	Swaziland	2.74	2.11
EWSD	F(E)	Germany	0.59	1.11
EWSD	F(F)	Brazil	1.51	2.86
EWSD	F(G)	Mauritius	1.14	0.05
EWSD	F(H)	Belgium	0.50	0.67
EWSD	F(I)	South Africa	5.09	6.92
EWSD	F(J)	Malawi	0.45	0.12
Access network	F(K)	Namibia	17.21	0
Transmission	F(L)	Namibia	0.66	0.31
Transmission	F(M)	Germany	0.52	8.31
Transmission	F(N)	Brazil	0.04	0.48
Transmission	F(O)	Belgium	1.56	13.36
Transmission	F(P)	South Africa	2.47	5.58
Transmission	F(R)	Italy	0.42	17.61
Broad Band	F(S)	South Africa	0.23	12.82
Total	F(A;....S)			

Source: Siemens, 1998a,b,c,d,e,f,g

[1] Hypothetical data were used to maintain confidentiality.

Since its establishment in 1994, have been actively involved in promoting the exports of the company's products. Initial marketing was directed at the local market, viz. the former TBVC ^[1] (Transkei, Bophuthatswana, Venda and Ciskei) countries and local customers, but has since then expanded to Sub-Saharan countries.

8.6 Estimation of the telecommunications turnover model

It is a known fact that the business affairs of the firm that makes the best estimate of future trends will make the largest profit. It is thus in the company's interest to maintain a statistical base to perform forecasting in telecommunications.

The method used was to assemble data relating to the period just past (from 1994 when exist) for sales and to assume that any discernible trend will continue into the immediate future. In the absence of any other reliable information, this is quite a useful method, but it rests on the validity of the assumption that the conditions which determined the trends and pattern of sales during the period (above mentioned) just elapsed will continue to operate in the immediate future.

Time series data by equipment type and country were assembled. Exponential regression functions were fitted to this time series data to explain historic and future trends. Results shown in the statistical tables refer exclusively to the exponential regression function that relates the dependant variable turnover to time as an independent variable. Algebraically the function is as follows:

$$Y = A \text{ EXP } (bX)$$

- where
- Y = turnover (sales) (dependant variable)
- X = time as independent variable (1994=1)
- a = intercept
- b = slope of regression function

Regression coefficients as well as a test of statistical significance were calculated to test the level of significance of the trends. The results are shown in *Table 8.4*:

[1] TBVC - constitutionally does not exist since 1994.

The export demand and the amount of the products purchased by Sietel's customers are theoretically influenced by customer patterns of taste and preferences, the price of the product, the prices of other products, consumer income, and the size of the population and the distribution of income. In addition, it could also be argued that some of Sietel's main clients are governments requiring bulk telecommunications infrastructure and services. The telecommunications budgets of these governments reflect in a sense the telecommunications requirements of its population. This poses a problem to actually forecasting sales due to a lack of reliable time series information (Sietel only started its operations in 1994).

Table 8.4: Projected growth rates in export turnover, 1999

Product/ material type	Average annual growth rate ^[1]	Annual Forecast ^[2] 1999 (Rand)	Level of Significance p*
Total Turnover	6.3	F(Turnover)	0.07
Mobile network	-1.3	F(A)	0.86
Optical Fibre Cables	1.5	F(B)	0.82
EWSD	-4.8	F(C)	0.17
Transmission	-5.5	F(D)	0.38
Broad Band	3.2	F(E)	0.61

p: * significant ($p < 0,005$); significant ($p < 0,10$)

[1] Based on an exponential regression

[2] Hypothetical data were used to maintain confidentiality

Source: Siemens, 1998a,b,c,d,e,f,g

It was therefore evident that simple exponential regression would be utilised to model average historical behavior as a framework for projecting short-term future sales. This model is subject to many limitations: nonetheless it is helpful to establish trends. Trend analysis shows that Sietel's total exports into Africa would grow at a significant average annual rate of 6,3 per cent if the historic trend persists (see Figure 8.2 and Figure 8.3). Trend analysis by material type revealed no significant trend ($p < 0,10$).

Figure 8.2: Sietel export turnover^[1] by material group, actual from 1995 to estimated until 1999. (Axis depicts years/quarters)

Figure 8.2a: Forecast of mobile network equip. turnover for 1999

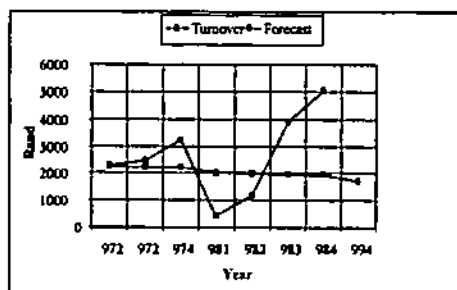


Figure 8.2b: Forecast of cable turnover for 1999

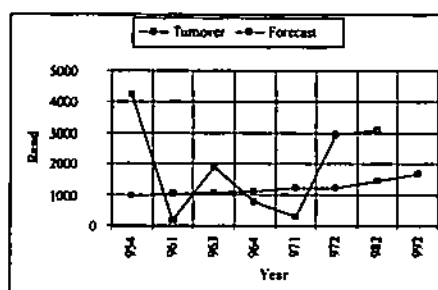


Figure 8.2c: Forecast of EWSD turnover for 1999

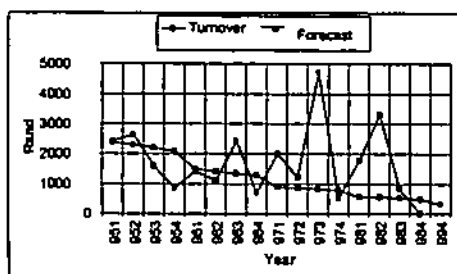


Figure 8.2d: Forecast of transmission equip. turnover for 1999

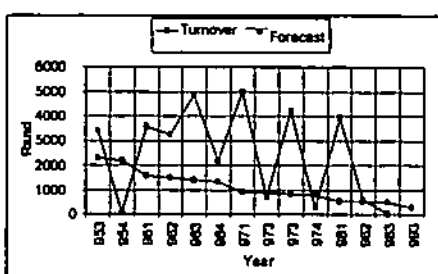
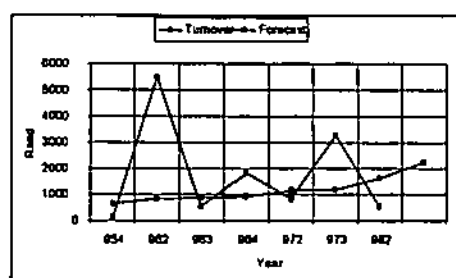


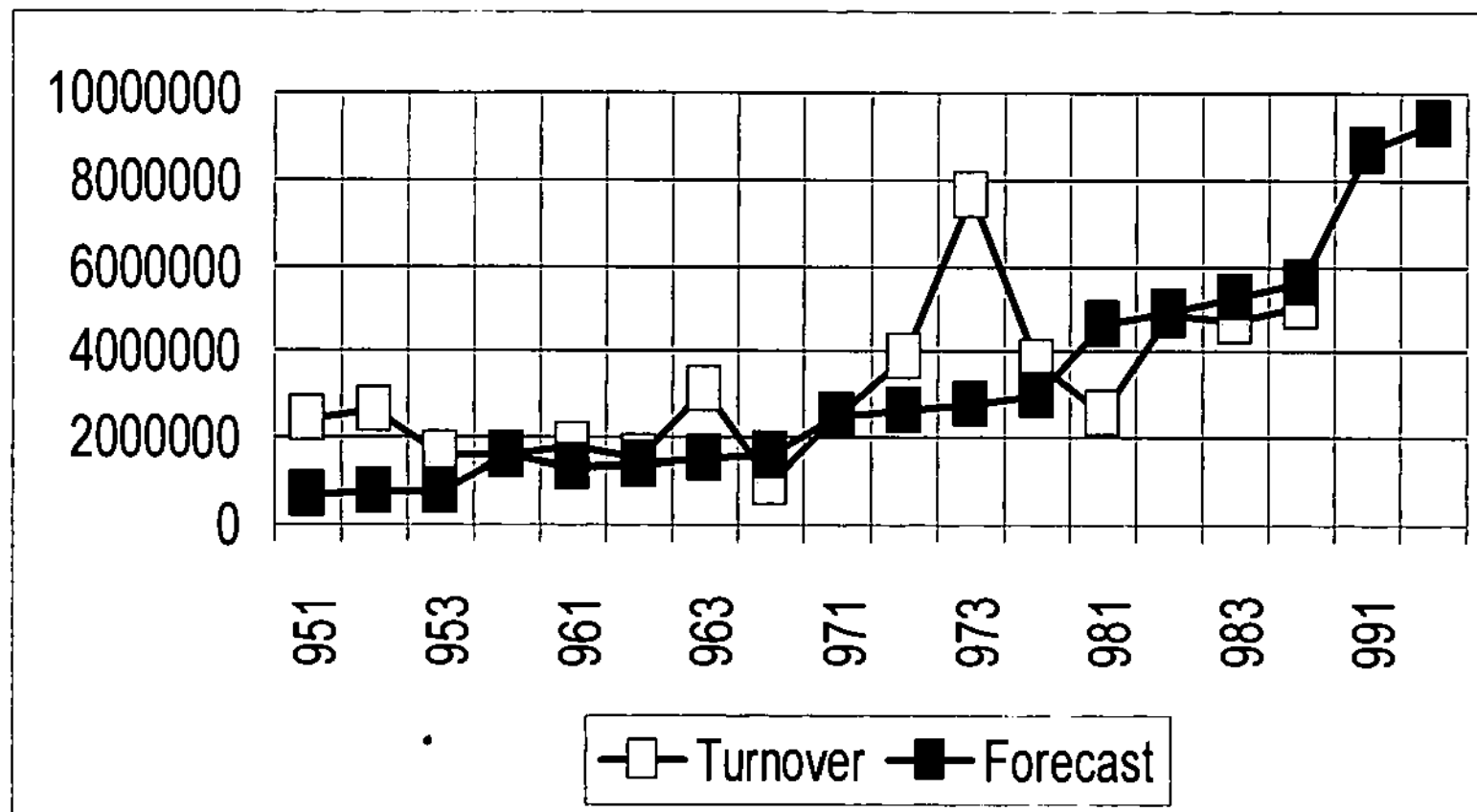
Figure 8.2e: Forecast of broad band turnover for 1999



Source: Siemens, 1998a,b,c,d,e,f,g

[1] Hypothetical data were used to maintain confidentiality

Figure 8.3: Sietel export turnover^[1] and forecast, 1995 - 1999 (in million Rand).[Years/Quarter]



[1] Hypothetical data were used to maintain confidentiality

Source: Siemens, 1998a,b,c,d,e,f,g

8.7 Modelling for purchase in a fluctuating market – application of a time-based optimisation model

The possible effects of alternative import and purchasing plans of the various products and various countries are specifically incorporated because they will have an influence on the inter-relationships for exports of telecommunications equipment into Sub-Saharan Africa. Because of the inter-relationship in the markets, and especially in the telecommunications industry in Sub-Saharan Africa, a successful export programme will have definite economic and structural consequences for manufacturers and users in all industrialised and developing countries.

This model examines the effects of a successful export programme on structural aspects of various telecommunications products in Sub-Saharan Africa, namely timing and business figures. A macro-view is taken. This is done by assembling a time-based spreadsheet model of several products of Sietel exports into several Sub-Saharan Africa countries and the South African market.

This section describes how the spreadsheet model was assembled in order to model the Sietel export-import position in the telecommunications industry. The emphasis is on the inclusion of supply (purchases) and demand (sales). Sietel in South Africa purchases more than 50 per cent of its stock from Germany, Italy, UK, USA and other suppliers countries. Exchange rates fluctuate from month to month in a rather unpredictable manner. It is in the Sietel's interest to minimise cost of imports and try to minimise its purchase costs.

8.7.1 Model development ^[1]

The model created was especially developed to assist in development of a purchasing plan that will minimise the costs of purchase and storage for 12 months. It is possible to establish some effective rules for deciding how much of a product the company needs to purchase each month, based on the purchase cost and site storage cost.

[1] The model specifications was based on the research done by Plane, (1994) in his book entitled "Management Science: A spreadsheet approach".

It is the company's policy not to store telecommunications hardware in South Africa but to import the hardware direct to the site (in foreign country as well). The spreadsheet model developed was based on the principles of linear programming formulation and the problem was solved using the solver program known as Quatro Pro-Solver.

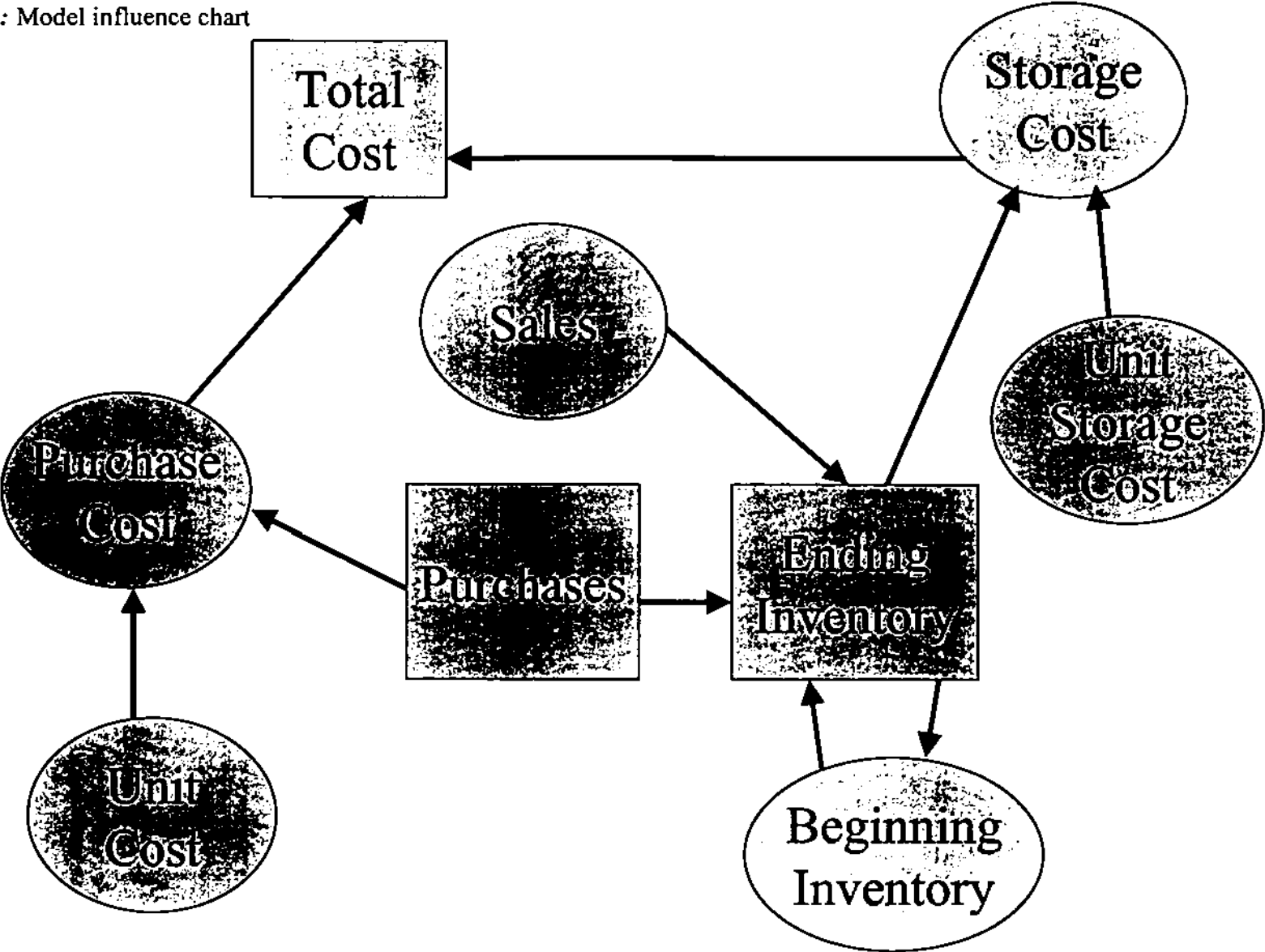
Figure 8.4 depicts an influence chart of the model and its components. The objective for optimisation is total costs comprising the sum of purchase cost and storage cost. Purchase is a function of the number of purchases at a certain unit cost. The unit cost used in these examples is derived from changes in exchange rates from month to month. Storage cost is a function of unit storage cost and the ending inventory of the product stored.

8.7.2 The basic model

In a perfect model, each country should be modelled independently. However, this is not a viable option due to a lack of reliable data. The model was therefore applied to aggregate figures representing Sietel's total exports into Sub-Saharan countries from 1994 to 1998 and forecast sales for 1999.

Detailed data was obtained from Sietel PCN-Africa section and Marketing Department. Sales forecasts database on time series data were based on data from 1994-1998 (from beginning of the existing activities), five years in all. Data on turnover, costs, products, time of bookings, invoices and countries were obtained from reports YCCP0011 and YCCP0019 from SAP (R/3) programme, as well as from the Executive Report (PA STATS) Income Statement in SAP (R/3) and the Balance Sheet. Business figures were obtained from the Sietel's Sales Operation Plan (SOP) August 1998.

Figure 8.4: Model influence chart



Source: Plane, 1994

8.7.3 Model specifications

An objective function is introduced to drive the model’s solution to a market-equilibrium outcome, viz. to minimise total cost, which could be disaggregated as follows:

Total cost [A+B]

Purchase cost.....[A]
Purchases
Unit Cost
Storage cost.....[B]
Unit Storage Cost
Ending Inventory
Begin Inventory
Last months ending inventory
Purchases
Sales

The following formulas were used in the spreadsheet model:

- End Inventory = Begin Inventory + Purchases – Sales.....(1)
- Purchase Cost = Purchases x Unit cost.....(2)
- Unit cost = Unit cost x change in exchange rate.....(3)
- Storage cost = End Inventory x Unit Storage cost.....(4)

The model was developed to optimise purchases per month by minimising total cost. Variables and constraints introduced in the model *inter alia* includes the following:

- Decision variables (adjustable cells): Purchases (January to December). Decision variables are variables that are under the control of the decision-maker. These are

the worksheet cells that the company would change in performing “What If” analysis on the spreadsheet.

- Constraints: Ending Inventory (Jan – Nov) $\leq$ Ending Inventory Limit
Ending Inventory (Jan – Nov) ≥ 0
Ending Inventory (Dec) = December Inventory Target (Dec)

A basic concept in this model is the one involving time i.e. the division of time into distinct and equal units, namely months. Nothing is allowed to change during a month; all changes occur either at the beginning or the end of the month. The end of one month is the same point in time as the beginning of the next month. Purchases and sales within a month were treated as being flexible, so that current purchases could be also used for current sales.

Some of the general assumptions applying to this model include:

- That the initial conditions (beginning inventory) are known;
- That the closing (end inventory) are constrained;
- That cost (or profit) is accumulated within one time period (purchase cost plus storage cost) and again over the planning horizon (total cost for 12 months); and
- That there are linkages from one period to the next (one period’s beginning inventory is the next period’s ending inventory).

8.7.4 Application of the model

Tables 8.5 to 8.6 and 8.7 is self-explanatory and provide systematic a exposition of the practical application of the model to minimise the cost of purchasing equipment, e.g. optical fibre cable, cellular network and transmission equipment. The model is flexible enough to model and demonstrate various types of scenarios viz.:

- Changes in unit costs of purchasing and at site storage costs;
- Selling prices; and
- Purchasing equipment on the futures market.

Table 8.5: Aggregate sales plan: Optical fibre cable for African countries, 1999^{III}

	Unit	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Begin Inventory	km	100	200	200	200	200	200	200	200	200	200	200	200	1200
Purchases	km	200	45	120	111	85	145	100	50	100	75	169	0	
Sales	km	100	45	120	111	85	145	100	50	100	75	169	100	
End Inventory	km	200	200	200	200	200	200	200	200	200	200	200	100	
End Inventory Constraint	km	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	
End Inventory Limit	km	200	200	200	200	200	200	200	200	200	200	200		
Low Limit Constraint		>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=		
Dec Invty Constraint													=	
Dec Invty Target													100	
Sales	Rand	68 800	33 437	98 298	98 202	79 561	146 580	109 177	58 956	127 344	103 149	251 023	160 417	1 005 757
Purchase cost (R'million)	Rand	127 400	29 704	82 307	78 999	62 688	111 074	79 455	41 222	85 567	66 620	155 856	0	
Storage cost at site	Rand	6 400	6 601	6 859	7 117	7 375	7 660	7 946	8 244	8 557	8 883	9 222	0	
Total cost	Rand	133 800	36 305	89 166	86 116	70 063	118 735	87 401	49 466	94 124	75 503	165 078	0	
Selling price	Rand/km	688	743	802	867	936	1 011	1 092	1 179	1 273	1 375	1 485	1 604	
Unit cost (Rand/m)	Rand/km	637	660	686	712	738	766	795	824	856	888	922	956	
Export statutory cost	Rand/km	32	33	34	36	37	38	40	41	43	44	46	48	
Exchange rate (R/\$)	Rand/\$	4.69	4.86	5.05	5.24	5.43	5.64	5.85	6.07	6.3	6.54	6.79	7.04	
Spot rate = (R 5.05/\$)		4.69	4.86	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05	
Unit cost	Rand/km	637	660	686	686	686	686	686	686	686	686	686	686	
Purchase cost	Rand	127 400	29 704	82 307	76 134	58 301	99 455	68 590	34 295	68 590	51 442	115 916	0	
Potential saving	Rand	0	0	0	9 981	11 762	19 280	18 811	15 171	25 534	24 061	49 162	0	173 762

Formulas:

End Inventory = Begin Inventory + Purchases - Sales

Begin Inventory (Feb) = End Inventory (Jan) etc

[1] Hypothetical data were used to maintain confidentiality

Source: Siemens, 1998a,b,c,d,e,f,g

Table 8.6: Aggregate sales plan: Transmission equipment (SDH Radio) for African countries, 1999^[1]

	Unit	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Begin Inventory	Unit	1	40	40	40	40	40	30	20	20	20	20	10	120
Purchases	Unit	49	8	12	10	9	1	0	8	12	10	0	10	
Sales	Unit	10	8	12	10	9	11	10	8	12	10	10	10	
End Inventory	Unit	40	40	40	40	40	30	20	20	20	20	10	10	
End Inventory Constraint		<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=		
End Inventory Limit	Unit	40	40	40	40	40	40	20	20	20	20	10		
Low Limit Constraint		>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=		
Dec Invty Constraint													=	
Dec Invty Target													10	
Sales	Rand	33 600	34 944	68 141	73 819	86 368	137 230	162 181	168 668	328 903	356 311	463 205	602 166	2 515 535
Purchase cost (R'million)	Rand	156 800	26 528	41 348	35 753	33 344	3 848	0	33 133	51 582	44 623	0	48 034	474 992
Storage cost at site	Rand	1 280	1 326	1 378	1 430	1 482	1 154	798	828	860	892	483	480	12 374
Total cost	Rand	156 080	27 854	42 726	37 183	34 826	5 003	798	33 961	52 442	45 515	463	48 514	487 365
Selling price	Rand	3 360	4 368	5 678	7 382	9 596	12 475	16 218	21 084	27 409	35 631	46 320	60 217	
Unit cost (R/m)	Rand	3 200	3 316	3 446	3 575	3 705	3 848	3 991	4 142	4 299	4 462	4 633	4 803	
Unit storage cost		32	33	34	36	37	38	40	41	43	45	46	48	
Exchange rate (R/\$)		4.69	4.86	5.05	5.24	5.43	5.64	5.85	6.07	6.3	6.54	6.79	7.04	
Spot rate = R 5.05														
Unit cost	Rand	3 200	3 316	3 446	3 446	3 446	3 446	3 446	3 446	3 446	3 446	3 446	3 446	
Purchase cost	Rand	156 800	26 528	41 348	34 456	31 011	3 446	0	27 565	41 348	34 456	0	34 456	
Potential saving	Rand	0	0	0	1 296	2 333	403	0	5 568	10 235	10 166	0	13 578	43 579

Formulas:

End Inventory = Begin Inventory + Purchases - Sales

Begin Inventory (Feb) = End Inventory (Jan) etc

[1] Hypothetical data were used to maintain confidentiality

Source: Siemens, 1998a,b,c,d,e,f,g

Table & 7: Aggregate sales plan: Cellular network (base stations) for African countries, 1999 ¹¹⁾

	Unit	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Begin Inventory	Unit	10	25	25	25	25	25	25	25	20	20	20	10	150
Purchases	Unit	24	11	7	15	12	13	15	7	10	14	6	16	
Sales	Unit	9	11	7	15	12	13	15	12	10	14	16	16	
End Inventory	Unit	25	25	25	25	25	25	25	20	20	20	10	10	
End Inventory Constraint		<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	<=	
End Inventory Limit	Unit	25	25	25	25	25	25	25	20	20	20	10		
Low Limit Constraint		>=	>=	>=	>=	>=	>=	>=	>=	>=	>=	>=		
Dec Invty Constraint													=	
Dec Invty Target													10	
Sales	Rand	443 430	704 561	582 864	1 623 693	1 688 641	2 378 169	3 567 253	3 709 943	4 019 105	7 314 772	10 867 661	14 127 959	51 028 050
Purchase cost [R*million]	Rand	909 600	432 012	285 664	635 168	526 559	592 501	709 110	343 363	509 104	739 899	329 221	910 246	6 922 447
Storage cost at site	Rand	9 475	9 818	10 202	10 588	10 970	11 394	11 818	9 810	10 182	10 570	5 487	5 689	116 003
Total cost	Rand	919 075	441 830	295 866	645 755	537 529	603 895	720 928	353 173	519 287	750 468	334 708	915 936	7 038 450
Selling price	Rand	49 270	64 051	83 266	108 248	140 720	182 936	237 817	309 162	401 911	522 484	679 229	882 997	
Unit cost (R/m)	Rand	37 900	39 274	40 809	42 345	43 880	45 577	47 274	49 052	50 910	52 850	54 870	56 890	
Unit storage cost	Rand	379	393	408	423	439	456	473	491	509	528	549	569	
Exchange rate (R/\$)		4.69	4.86	5.05	5.24	5.43	5.64	5.85	6.07	6.3	6.54	6.79	7.04	
Spot rate = R 5.05														
Unit cost	Rand	37 900	39 274	40 809	40 809	40 809	40 809	40 809	40 809	40 809	40 809	40 809	40 809	
Purchase cost	Rand	909 600	432 012	285 664	612 138	489 710	530 519	612 138	285 664	408 092	571 328	244 855	652 947	
Potential Saving	Rand	0	0	0	23 031	36 849	61 981	98 972	57 699	101 013	168 570	84 366	257 300	887 781

Formulas:

End Inventory = Begin Inventory + Purchases - Sales

Begin Inventory (Feb) = End Inventory (Jan) etc

[1] Hypothetical data were used to maintain confidentiality

Source: Siemens, 1998a,b,c,d,e,f,g

8.8 Conclusion

A futures market for telecommunications equipment may largely eliminate the price risk, which the company experiences when importing equipment with a changing exchange rate.

The model developed was used to optimise purchases per month by minimising total cost. Because of its flexibility it can be used for a variety of other applications and products. Simple regression analysis can be applied to forecast sales over the short term (1 year) by equipment type and country but this will depend on the availability of reliable time series information. The spreadsheet model developed can be applied to optimise its export programme in Sub-Saharan Africa. Results must, however, always be interpreted against the shortcomings and assumption imposed on the mode. The general interactions demonstrated by the results are thus more important than the magnitude of specific changes.

CHAPTER 9

9. Summary and Conclusions

9.1 Summary

In a dynamic economic situation, decisions concerning, price, promotion, trade, production and product policy must be made almost continually. Ample knowledge and information of, amongst, others the Sub-Saharan marketing environment, are necessary for the composition and maintenance of an efficient marketing strategy for the telecommunications industry. Only then does a thorough base exist for business planning, strategic planning and forecasting (*Naresh & Malhotra, 1991*).

The recent socio-economic changes in South Africa, as well as the drive towards democratisation and liberalisation of the Sub-continent, however painful, opened up new horizons in economic and industrial opportunities and foreign trade. The gradually changing foreign and domestic trade environment and the conclusion of the Uruguay Round of GATT negotiations further emphasise this aspect.

9.1.1 The telecommunications sector in South Africa in context

The telecommunications industry has become increasingly prominent in the last 10 years, not only in South Africa but also in Sub-Saharan African countries as well as in the rest of the continent. South Africa has completed a process of fundamental political change through negotiation that had a profound effect on the economic and social fabric of the country. The democratisation of South Africa has paved the way for the formalisation of the integration that has long existed between the constituent economies of the region. The formalisation process, however, requires strong regional institutions and the integration of the regional economy also places restrictions on the economic policy options that a country can exercise.

In 1993, the South African economy emerged from its longest recession since the Second World War. The Gross National Product (GNP) peaked at a high of 3,3 per cent

in 1995, the highest since 1988, but then faltered somewhat to only 1,5 per cent in 1997. Economic growth remained weak in 1998 as the Gross Domestic Product (GDP) increased for the fourth consecutive quarter at a seasonally adjusted and annualised rate of 0,5 per cent.

South Africa has a modern sophisticated economy, albeit concentrated in a few urban areas. Physical infrastructure, transport and telecommunications are well developed, with a financial service industry and a stable retail sector. South Africa is also listed as among the Top 10 emerging markets from an investment point of view, but impediments such as the crime epidemic, remaining restrictions on the free flow of capital, and the high and inelastic cost of labour all need to be addressed. Skilled labour remains in short supply. Job creation remains slow and growing youth unemployment is a powerful determinant of current crime trends.

The empowerment of previously disadvantaged communities and restructuring of state assets through privatisation is high on the political agenda. Access to services, including telecommunications, is identified as a key to the government achieving its economic and social goals.

Real output growth in the tertiary sectors maintained a steady rate of 1,5 per cent in the first two quarters of 1998. The successful establishment of the cellular telephone network in South Africa has boosted communications services. The principal force propelling growth in output in the transport and telecommunications sectors was the expansion of the telecommunications network, especially into areas that had previously been inadequately serviced. The period from 1991 to 1998 saw the largest expansion of telecommunications services and related industries of telecommunications services and related industries in the sector in South Africa. Telecommunications contributes to economic growth and stimulates growth in other sectors.

An analysis of the market structure shows that Telkom SA Ltd. is the sole provider of fixed wire telephones. Within the framework of the free market policy adopted by the government, Telkom SA Ltd. needs to move from its monopolistic position to an open competition environment where competition will be encouraged. The major players in

the telecommunications supply sector in South Africa are all established companies with substantial investment facilities and an outstanding skill base that is unrivalled in Africa.

9.1.2 Telecommunications institutional arrangements in South Africa

With the enactment of the 1996 Telecommunications Act (103), South Africa has embarked on a new dispensation in its telecommunications sector. Organisations, industries, regulators, consumers and governments are all affected by these changes. Chapter 3 identified the major players in the telecommunications sector in South Africa, highlighting their role and activities. Furthermore, it showed the interdependence between the private and public sector enterprises. The telecommunications sector cannot function as a sector unless the functional components of the institutional framework are integrated. This implies there must be integration between individuals and the institutions, which execute these functions. The traditional view of the telecommunications function is that the commercial function (products and services) is undertaken by the private sector, that commercial support activities are seen as the responsibility of the private sector or the parastatal institutions (semi-state) and that non-commercial support (i.e. bulk infrastructure, fixed networks and research) and the creation of an optimum environment, are seen as the functions of the state.

Telkom SA Ltd., as a public telecommunications company, is a leader in this sector and operates the largest and most modern telecommunications network on the African continent. It became the first state-owned enterprise in South Africa to acquire a strategic equity partner in the form of the SBC and Telecom Malaysia consortium and has set aside a 10 per cent equity stake earmarked for the economic empowerment of disadvantaged communities. Telkom SA Ltd. has also acquired a share in private sector cellular companies, viz. MTN and Vodacom.

It was stated in *Chapter 1* that it is an important objective of this thesis to determine Sietel's future strategic market planning model and therefore many aspects of the company's operations were addressed. The chapter highlighted Sietel's role as a private sector manufacturer and supplier of telecommunications equipment and gave an historic

perspective of the company, its experience, achievement, products and expected changes in its market structure and environment.

Private sector companies have introduced new products and technologies to provide local solutions. In doing so, they have lowered the cost of providing a unit of service to meet the demand for these services. Licenses have been awarded to two new companies that will enhance this trend. The nature and extent of institutional reform and restructuring will ultimately be determined by the pace of political reform in South Africa.

9.1.3 Performance of the South African telecommunications industry

The performance of the telecommunications sector in South Africa will depend on its ability to remain competitive, to attract investment, to generate employment and greater economic activity and to increase the general standard of living. It has the potential to make a substantial contribution to the South African economy, through regional development, as earner of foreign exchange, through its contribution towards the GDP and by developing people as an employer should.

Regional integration promotes regional development: the sector cannot operate in isolation but forms part of a global universal network in a global economy. As a significant stakeholder, the local industry has transformed itself into export-led companies with distinctive niche markets.

Most of the companies are internationalised and have demonstrated their capability by securing significant export business in the face of fierce competition.

In an industry where equipment prices are decreasing at approximately 15 percent per annum in real terms, the local supply industry has contributed meaningfully to the national economy through increased locally added value.

The local industry is a significant employer and investor in human resource development. Both international and national trends among the large

telecommunications operators undergoing restructuring show that thousands of jobs are being lost in the process. These reductions can be ascribed to the drive towards greater competitiveness while the introduction of new technology on the other hand creates new jobs.

9.1.4 Human resources in the South African telecommunications industry

The telecommunications technology has a vital role to play in South Africa's process of change. Accelerating changes in global telecommunications technology and international relations have had a large impact on the communications industry and the people involved in it. The process of change has catapulted the industry into global competition and has in turn raised the profile of human resource issues within the industry.

The peripheral communities of South Africa were severely neglected in the past in terms of access to technologies and resources. These inequalities will need to be addressed creating new opportunities for the telecommunications industry. However, the demand for a rapid rollout of affordable services to disadvantaged communities is perceived by many companies to contradict the need to be profitable in a global market.

The telecommunications sector offers more opportunities for skilled people and the changing technology now demands thorough training and retraining and so the industry is therefore both a catalyst and a facilitator of human resource development. The sector has also lost or transferred skills to other sectors.

Many companies implement Affirmative Action (AA) in compliance with legislation, although many question its impact on efficiency. AA "poaching" and job-hopping remains a problem associated with this process.

Human resource issues are among the industry's most critical issues and will continue to be a determining factor of success. Whether one measures that success in terms of penetrating ever-increasing levels of disadvantaged communities with some form telecommunications technology in terms of successful global competitiveness, or in

terms of job creation and transformation in society, it is the human resource issues which are critical.

9.1.5 Telecommunications industry in Sub-Saharan countries

The telecommunications industry in Sub-Saharan countries is quite substantially behind that of other regions in the world. It has only 2 per cent of the world's main telecommunications industry despite having 12 per cent of its population. Country perspectives provided a comparison between the countries in terms of economic and political development, market structure and the status of the telecommunications infrastructure. This provided a baseline information base of the telecommunications indicators to analyse the future demand and supply of the telecommunications products.

9.1.6 Financing of the Telecommunications industry in Sub-Saharan Africa

Foreign debt seriously hampers the capability of Sub-Saharan African countries to import telecommunications equipment. In addition, other factors such as population growth and civil disturbances in part explain the infrastructural problems of the telecommunications sector. Some of the major paradoxes in African telecommunications are :

- The level of international telephone traffic per subscriber is the highest in the world; there is a considerable demand but insufficient supply of the telecommunications equipment in the region.
- The average level of pre-tax profitability of public telecommunications operators in Africa is among the highest in the world; and
- Although income is high, the cost of installation of a telephone line is the highest in the world.

These paradoxes suggest that these problems are not only caused by external factors and could be alleviated by structural reform within the rest of the economy. It also illustrates

the value of separation between telecommunications and postal functions and between the operator and the state as a first step towards reform.

Solutions to the problem financing include special terms of payment, foreign currencies, customer cash flow problem analysis and special interest rates. Although the development of the industry in Sub-Saharan African countries is closely linked to the economy of Africa continent, it can be managed profitably and efficiently, even in low per-capita income countries. Multilateral development finance institutions have several financing “windows”, operating mainly on normal or soft terms. These institutions only lend to governments or, when the latter guarantees the loan, implying that only the debt situation of the country is taken into consideration and not the viability of the project. In order to develop their telecommunications networks, the least-developed countries for the moment rely on either bilateral aid or soft loans from multilateral institutions.

Possible solutions to the problem include the recognition of the financial autonomy of the telecommunications company to borrow free of state intervention and the promotion of access to capital markets. Involvement of the private sector at all levels should take place without necessarily first privatising the public operator of the telecommunications network.

It is mainly economic factors, rather than financial aspects, that justifies telecommunications in rural areas. Those telecommunications infrastructures which are not financially profitable, but which are economically indispensable to the success of programmes, can be integrated into “vital sector’s” projects.

9.1.7 Modelling telecommunications profitability in the import-export market

To remain competitive in a changing marketing environment, the company must monitor its import-export performance. Import costs are a major cost item to many of the multi-national telecommunications companies operating in this country. Exchange rate changes have a direct impact on these costs. The direct impact of the exchange rate variation on the economy and on the telecommunications sector depends on the degree to which inputs are imported, or, if locally manufactured, to the extent that they have an

import content and output is tradable or affected by the prices of tradable goods. A solution to this problem is possible if the company protects itself against these fluctuations and reduces the exchange rate risk by buying on the futures market.

It is a known fact that the firm that makes the best estimate of future trends will make the largest profit. Simple regression analysis was applied in this thesis to forecast sales over the short term (i.e. 1 year) by equipment type. This analysis can be expanded to different countries and years depending on the availability of reliable data.

The spreadsheet model developed for this thesis was specially assembled to assist in developing a purchasing plan that will minimise the cost of purchase and storage for 12 months. This exercise, if combined with a forecasting model, can be a useful tool in predicting actual purchases in a fluctuating market, as well as to saving costs and maximising profit. Results obtained must, however, always be interpreted against the shortcomings and assumptions imposed on the model. **The general interaction demonstrated by the results is thus more important than the magnitude of specific changes.**

9.2 Conclusions

The proposal for enhancing telecom performance will now be explained by performing a SWOT analysis to identify elements of a market strategy model.

9.2.1 SWOT analysis

“SWOT analysis” is an acronym for the analysis of the specific Strengths and Weaknesses of the company, as well as the Opportunities and Threats that are expected to develop in future. The eventual purpose is to develop a strategy to maximise strengths and opportunities and to minimise weakness and threats.

9.2.1.1 Strengths

The company's strengths lie in its resources, skills and comparative advantages. These strengths, *inter alia* include:

- The provision of telecommunications infrastructure and telephony products to rural and under-served areas through the provision of appropriate and cost-effective technologies and innovative empowerment projects;
- This solution has competence for existing and new customers;
- The provision of services to its customers in a professional, entrepreneurial, flexible, action-oriented, creative and self-critical manner;
- Innovative business methods for its customers that will increasingly become an integral part of services offered, for the benefit of the customers, partially on own initiative and partially with strategic partners;
- Human resources that will be directed towards developing and promoting its own people resources. In addition, the Sietel focus on Affirmative Action policies and Black Business Empowerment; and
- The company's past track record and performance.

9.2.1.2 Weaknesses

Weaknesses could develop as limitations or deficiencies in resources, skills or capabilities that impede effective performance. Some of these weaknesses include:

- High installation costs: The average cost of installing a line in Sub-Saharan Africa is almost three times the world average. These high installation costs have resulted in sluggish investment rates. Both factors together could very well foil teledensity goals for several countries in the region;
- Marketing performance and skill development;
- Price policy, pricing and competitiveness;
- Quality of local manufacturing and local content and labour cost;
- Services and deliveries to customers;
- Local cost of factors of production and quality control;

- Training of local staff;
- Professionalism and general management;
- Financial resources and financing; and
- Level of company infrastructure (e.g. marketing, procurement etc.).

9.2.1.3 Opportunities

Opportunities include favourable situations foreseen in the market or the broad environment, including:

- Expansion into new markets, with special emphasis on rural areas, through the introduction of new technologies in telecommunications, power generation, and transmission of new technology in addition to growing existing markets;
- Subcontracting of services and opportunities for franchise agents and entrepreneurs;
- Addressing the backlog in the provision of telecommunications infrastructure, especially in rural areas;
- To be involved directly in the implementation, training and support processes;
- To ensure the transfer of high level skills;
- Help increase local self-sufficiency in the maintenance of advanced technology and infrastructure;
- To promote the upliftment of previously disadvantaged communities; and
- To be involved directly in the implementation, training and support processes, to ensure the transfer of high level skills and to increase local self-sufficiency in the maintenance of advanced technology and infrastructure.

9.2.1.4 Threats

Threats include the following:

- The declining trend of the economies of Africa that affects the willingness to pay for services;
- Comparative disadvantages; and
- Competitors in the market place.

9.3 Key Success Factors (KSF's) and the strategy formulation process

A Key Success Factor (KSF) places the focus on an area in which superior performance is essential. A company must perform well and meet these KSF's in order to ensure success in relation to certain products and services. The main emphasis in doing a SWOT and KSF analysis is to identify those aspects that really matter and not to draw up long lists of strengths and opportunities. Some of these KSF's include the following:

- Focus on products and services in which it has a comparative advantage and expand its exports into new markets;
- Step up research and development and technological innovations to meet the needs of clients;
- Monitor the cost efficiency of the company on a daily basis. Correct and timely information is of crucial importance to study the impact of macro-economic variables on the sector. Decision making should be based on full and timely information and the model developed could be a useful tool to analyse these impacts;
- Implementation of improved quality control measures; and
- Establish an exhibition centre.

Table 9.1 encompasses a proposed framework for a strategic market planning model for a communications company depicting the market and research tasks, viz. that of market identification, implementation and management.

In terms of the market task, an effort was made in this thesis to perform a SWOT analysis and identify critical (key) success factors. Furthermore in terms of the research task, simple forecasting was performed and a model was developed to minimise purchasing cost to demonstrate the usefulness of these tools.

Recent developments internationally and in South Africa point towards a shift away from centralised control systems and a closed economy towards a market orientated global economy that implies more competition. These developments require a rethink of the collation of strategic information and the strategy formulation process.

Figure 9.1: Proposed framework for a strategic market planning model

Phase I	Phase II	Phase III
MARKET TASK		
Market Identification	Market Implementation	Market Management
Define opportunities	Develop product specifications	Assess market share
Determine extent of opportunity	Establish competitive pricing	Track competitor strategy
Understand customer profile	Develop distribution channels	Monitor emerging technologies
Assess competition	Plan service and support	Support sales channels
Develop product parameters	Launch marketing plan	Measure customer satisfaction
Identify critical success factors		Identify new opportunities
RESEARCH TASK		
Market segmentation studies	Technology/product assessment	Market share assessments
Market sizing and forecasting studies	Pricing analysis	Competitive analysis databases
Market share analysis/modelling	Channel recruitment and organisation studies	Technology future research
Customer surveys and databases	Reseller requirements surveys	Sales documentation, support and training
Competitive analysis	Product support solution analysis	Customer satisfaction surveys
Technology assessments	Serviced industry model	Market opportunity studies
	Marketing support services	

Source: Survey, 1998

9.4 Proposal for further research

If the above is accepted as an accurate assessment of the conditions, problems and requirements of the telecommunications industry, then a number of potential proposals flow logically therefrom.

It is recommended that:

- ⇒ Goal-orientated and economic-scientifically justifiable marketing strategies should be developed for marketing in the Sub-Saharan countries;
- ⇒ Financing of the telecommunications projects in the Sub-Saharan Africa countries could be a separate research issue. At the present, companies representing Far-East countries dominate the Sub-Saharan telecommunications market. The market potential and involvement of South African private and public companies should be investigated;
- ⇒ In a changing environment any company should make a special effort to establish an information centre. The information should include management information, financial information, market information and technical information;
- ⇒ The use of a futures market should be encouraged to hedge the company against unfavourable market force movement; and
- ⇒ To support public, private telecommunications infrastructure and investment programmes, it is proposed that an African Telecommunications Foundation should be established.

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CONVENTIONS AND ABBREVIATIONS

AA	Affirmative Action
ACD	Automatic call distribution
ADB/AFDB	African Development Bank
ADSL	Asymmetric digital subscriber loop
AG	Aktiengesellschaft
AISI	African Information Society Initiative
ANI	Automatic Number Identification
ANI	African Network Initiative
AMS	Analysis, Management, System
AOR	Atlantic Ocean Region (Intelsat)
ATM	Asynchronous transfer mode
AT&T	American Telephone and Telegraph
BEA	Business Equipment Associations
B-ISDN	Broadband ISDN
BLS	Botswana, Lesotho, Swaziland
BME	Bandwidth management equipment
BP	Botswana Pula
BRI	Basic Rate Interface
BT	British Telecom
BTC	Botswana Telecommunications Corporation
CAS	Central African States
CDITP	Centre for Development and Information and Telecomm. Policy
CDME	Code division multiple access
CIP	Cost Insurance Paid
COMESA	Common Market for Eastern and Southern Africa
CSO	Central Statistical Office
CTI	Computer telephony integration
DAMA	Demand assigned multiple access
DBSA	Development Bank of Southern Africa
DCS	Digital cellular system
DDS	Digital data service
DECT	Digital Enhanced Cordless Telephony
DELS	Direct exchange lines
DHT	Direct to home (satellite broadcast)
DIBU	Development Information Business Unit at the Development Bank of Southern Africa
Domsat	Domestic satellite
DPT	Department of Post and Telecommunications
DTI	Digital Telephone Interface
EAPTU	East African Posts and Telecommunications Union
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
ECU	European currency units

EDI	Electronic Data Interchange
EIF	Electronic Industries Federation
ETSI	European Telecommunications Standards Institute
EU	European Union
EWSD	Electronic Digital Public Switching System
FNB	First National Bank
FCA	Free Carrier
FDM	Frequency division multiplexing
FR	X.25 packet switching without error correction
F.W.C	Forward Cover
GATT	General Agreement Taxes and Tariff
GDP	Gross Domestic Product
GEO	Geostationary earth orbit (36,000 km)
GHz	Gigahertz
GMPCS	Global mobile personal communications service
GNU	Government of National Unity
GPS	Global Positioning System
GSM	Group System Mobile
GTCL	Ghana Telecommunications Company Limited
GT	Ghana Telecom
GNP	Gross National Product
HDSL	High data rate digital subscriber loop
HR	Human Resource
IBA	Independent Broadcasting Authority
ICT	Information and communications technology
IDR	International digital route
IDRS	International Development Research Centre
IIA	Internet initiative for Africa
IMF	Internal Monetary Fund
IN	Intelligent Network
INCOTERMS	International Terms and Conditions
ISDN	Integrated Services Digital Network
ISP	Internet service provider
ITU	International Telecommunication Union
Kbps	kilobits per second
kHz	kilohertz
kW	kilowatt
KfW	Kreditveranstalt Verwaltung
KPTC	Kenya Posts & Telecommunications Corporation
LAN	Local area network
L/C	Letter of Credit
LEO	Low earth orbit
LMRA	Land and Mobile Radio Associations
LTC	Lesotho Telecommunications Corporation
LTD	Limited
MARS	Multiple access radio system
MBS	Mauritius Broadcasting Corporation

MDNS	Managed Data Network Services
MDPR	Multi-point Digital Radio Access System and the Phone-shop
MHz	Megahertz
MITT	Minutes of Telecommunication Traffic
MPTC	Malawi Post and Telecommunication Corporation
MT	Mauritius Telecom
MTN	Mobile Telecommunications Network
NBVUA	The National Business Voice Users Association
N-ISDN	Narrowband ISDN
NTF	National Telecommunications Forum
NTUG	National Telecommunications User Group
OAU	Organization of African Unity
OECD	Organisation for Economic Co-operation and Development
OFDC	Optical Fibre Distributed Concentrator
OPIC	Overseas Private Investment Corporation
P/A	Payment in Advance
PANAFTTEL	Pan-African Telecommunications Network
PCN	Public communication network
PCS	Personal communication system
PDH	Plesiosynchronous digital hierarchy
PHS	Personal Handyphone System
PLC	Power line carrier
PMP	Point to Multi Point
PMR	Private mobile radio
PSDN	Public-switched data network
PSTN	Public Switched Telephone Network
PTO	Public telecommunications operator
PTY	Proprietary
RASCOM	Regional African Satellite Communication System
RDP	Research Development Programme
RDP	Reconstruction and Development Programme
R&D	Research and Development
ROE	Rate of Exchange
R.S.A.	Republic of South Africa
\$	US dollars
SA	South Africa
SABC	South African Broadcasting Corporation
SABS	South African Bureau of Standards
SACOI	South African Chamber of Commerce and Industry
SACOB	South African Chamber of Business
SADC	South Africa Development Community
SAF	Structural Adjustment Facilities
SAFE	South Africa Far East
SAFTO	South African Foreign Trade Organisation
SAIF	SA ISDN Forum
SAIX	SA Internet Exchange
SAPO	South African Post Office

SARB	South African Reserve Bank
SATRA	South African Telecommunications Regulatory Authority
SATS	SA Transport Services
SBS	Small Business Sector
SDE	Small Digital Exchange
SDH	Synchronous Digital Hierarchy
SMDS	Switched multi-megabit data service
SMS	Short Message Service
SSA	Sub-Saharan Africa
SSA	Statistics South Africa
STM	Synchronous Transmission Mode
SWAPO	South West Africa Peoples Organization
SWOT	Strengths , weaknesses, opportunities, threats
TBVC	Transkei, Bopothutswana, Venda, Ciskei
TCC	Tanzania Communications Commission
TCP/IP	Transmission Communications Protocol/Internet Protocol
TDB	Telecommunication Development Bureau
TDM	Time division multiplexing
TDM	Telecomunicaques de Mozambique
TDMA	Time division multiple access
TFA	Telecommunications Foundation of Africa
TID	Telecommunication Indicator Database
TMA	Telecommunications Manufacturers Associations
TN	Telecom Namibia
TTCL	Tanzania Telecommunications Company Limited
TSI	Telecommunications Standard Institute
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UPTC	Uganda Posts & Telecommunications Corporation
USA	United States of America
USDC	US Department of Commerce
VANS	Value Added Network Services
VSAT	Very small aperture terminals
ZPTC	Zimbabwe Post and Telecommunication Corporation
WAN	Wide area network
WAS	West African States
WB	World Bank
WDB	World Development Bank
WHO	World Health Organisation
WTD	World Telecommunication Development
WTO	World Trade Organisation
WWW	World Wide Web
X.25	Packet switching transmission equipment

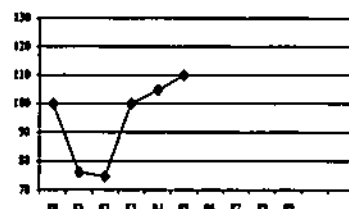
ANNEXES

Annex A	GNP of the Sub-Saharan Africa countries
Annex B	GNP per head with PPPS 1992
Annex C	Cash flows
Annex D	Exchange rate against the US\$
Annex E	% growth in GNP
Annex F	Nominal GNP by region
Annex G	Competitor's annual sales growth
Annex H	South Africa demographics and economic indicators from 1994 to 1998

GNP of the Sub-Saharan Africa countries

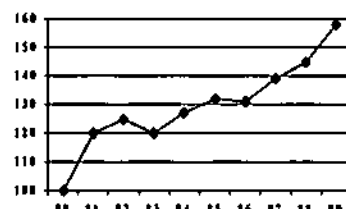
GUINEA

- Population 5.5 m
- Population Growth +2,5%
- GNP \$ 2,372m
- GNP per head \$ 430
- GNP growth(1980=100)



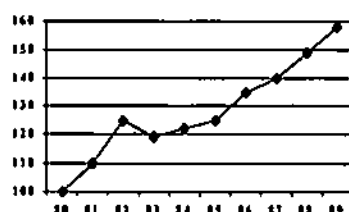
GUINEA - BISSAU

- Population 1.0 m
- Population Growth +1,9%
- GNP \$ 173m
- GNP per head \$ 180
- GNP growth(1980=100)



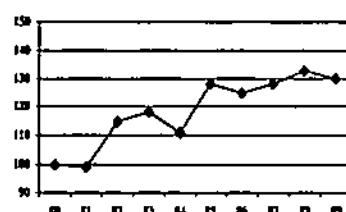
GAMBIA

- Population 0.8 m
- Population Growth +3,3%
- GNP \$ 196m
- GNP per head \$ 230
- GNP growth(1980=100)



SENEGAL

- Population 7.2 m
- Population Growth +3,0%
- GNP \$ 4,716m
- GNP per head \$ 650
- GNP growth(1980=100)



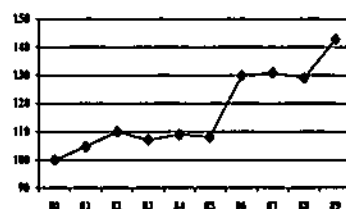
MAURETANIA

- Population 2.0 m
- Population Growth +2,6%
- GNP \$ 953m
- GNP per head \$ 490
- GNP growth(1980=100)



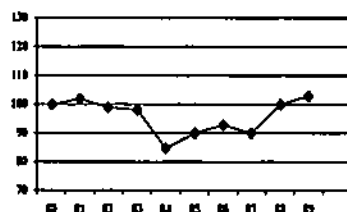
MALI

- Population 8.2 m
- Population Growth +2,5%
- GNP \$ 2,109m
- GNP per head \$ 260
- GNP growth(1980=100)



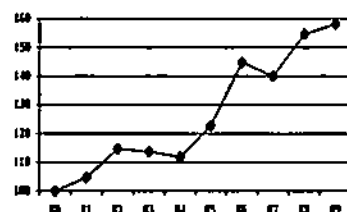
NIGER

- Population 7.5 m
- Population Growth +3,5%
- GNP \$ 2,195m
- GNP per head \$ 290
- GNP growth(1980=100)



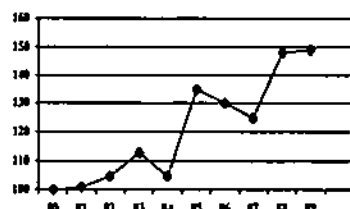
BURKINA FASO

- Population 8.8 m
- Population Growth +2,6%
- GNP \$ 2,716m
- GNP per head \$ 310
- GNP growth(1980=100)



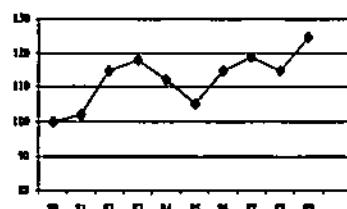
CHAD

- Population 5.5 m
- Population Growth +2,4%
- GNP \$ 1,038m
- GNP per head \$ 190
- GNP growth(1980=100)



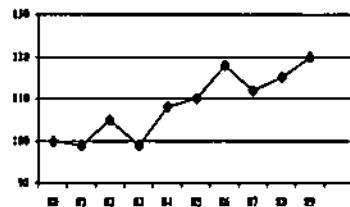
SUDAN

- Population 24.4 m
- Population Growth +3,0%
- GNP \$ 16,347m
- GNP per head \$ 670
- GNP growth(1980=100)



CENTRAL AFRICAN REP.

- Population 3.0 m
- Population Growth +2,7%
- GNP \$ 1,144m
- GNP per head \$ 390
- GNP growth(1980=100)



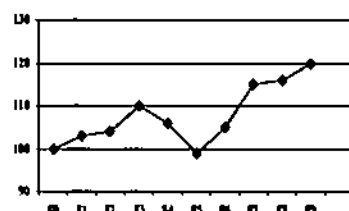
UGANDA

- Population 16.7 m
- Population Growth +3,2%
- GNP \$ 4,254m
- GNP per head \$ 250
- GNP growth(1980=100)



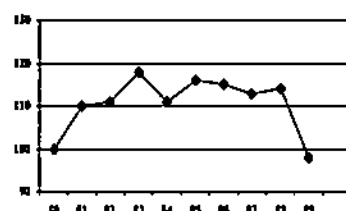
ETHIOPIA

- Population 48.9 m
- Population Growth +5,953%
- GNP \$ 5,953m
- GNP per head \$ 120
- GNP growth(1980=100)



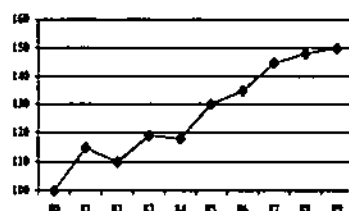
RWANDA

- Population 6.9 m
- Population Growth +3,3%
- GNP \$ 2137m
- GNP per head \$ 310
- GNP growth(1980=100)



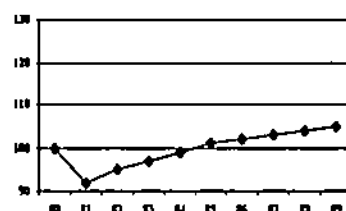
BURUNDI

- Population 5.3 m
- Population Growth +2,9%
- GNP \$ 1,149m
- GNP per head \$ 220
- GNP growth(1980=100)



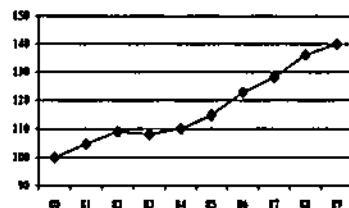
DJIBOUTI

- Population 0.4 m
- Population Growth +3,5%
- GNP \$ 340m
- GNP per head \$ 790
- GNP growth(1980=100)



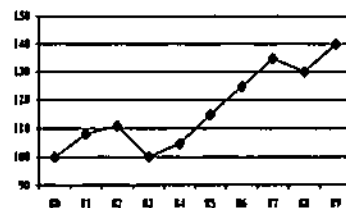
KENYA

- Population 23.3 m
- Population Growth +3,8%
- GNP \$ 8,875m
- GNP per head \$ 380
- GNP growth(1980=100)



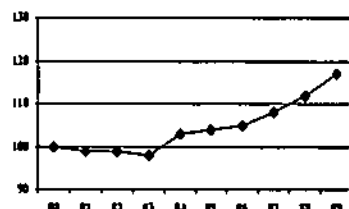
SOMALIA

- Population 6.1 m
- Population Growth +3,0%
- GNP \$ 1,035m
- GNP per head \$ 170
- GNP growth(1980=100)



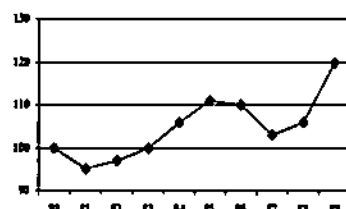
TANZANIA

- Population 25.6 m
- Population Growth +3,5%
- GNP \$ 3,079m
- GNP per head \$ 120
- GNP growth(1980=100)



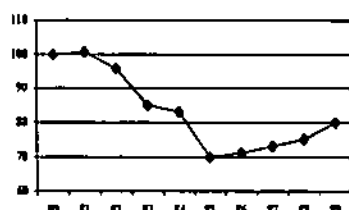
MALAWI

- Population 8.2 m
- Population Growth +3,4%
- GNP \$ 1,475m
- GNP per head \$ 180
- GNP growth(1980=100)



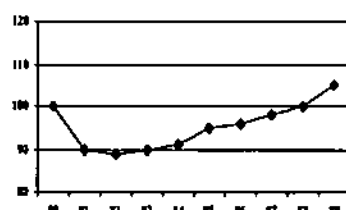
MOZAMBIQUE

- Population 15.4 m
- Population Growth +2,7%
- GNP \$ 1,193m
- GNP per head \$ 80
- GNP growth(1980=100)



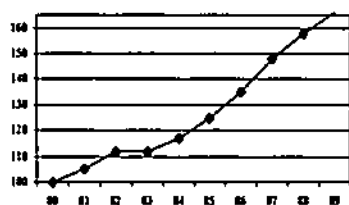
MADAGASCAR

- Population 10.9 m
- Population Growth +2,8%
- GNP \$ 2,543m
- GNP per head \$ 230
- GNP growth(1980=100)



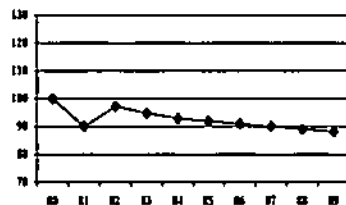
MAURITIUS

- Population 1.1 m
- Population Growth +1,0%
- GNP \$ 2,068m
- GNP per head \$ 1,950
- GNP growth(1980=100)



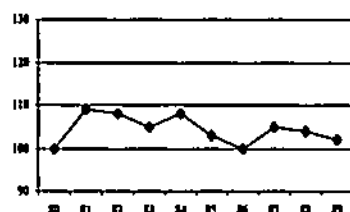
LIBERIA

- Population 2.5 m
- Population Growth +3,1%
- GNP \$ 1,139m
- GNP per head \$ 485
- GNP growth(1980=100)



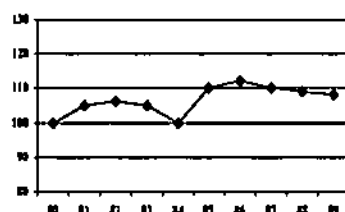
SIERRA LEONE

- Population 4.0 m
- Population Growth +2,4%
- GNP \$ 813m
- GNP per head \$ 200
- GNP growth(1980=100)



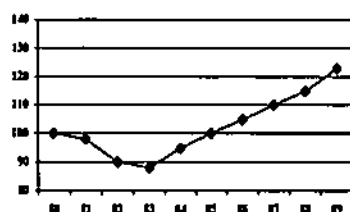
COTE D'IVOIRE

- Population 14.5 m
- Population Growth +4,0%
- GNP \$ 9,305m
- GNP per head \$ 790
- GNP growth(1980=100)



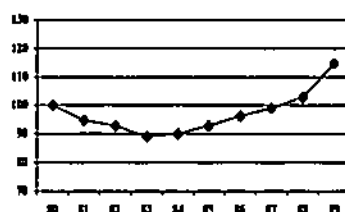
GHANA

- Population 14.4 m
- Population Growth +3,4%
- GNP \$ 5,503m
- GNP per head \$ 380
- GNP growth(1980=100)



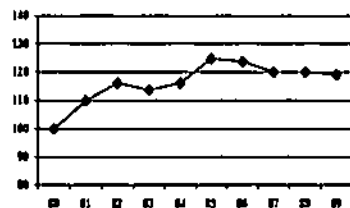
TOGO

- Population 3.5 m
- Population Growth +3,5%
- GNP \$ 1,364m
- GNP per head \$ 390
- GNP growth(1980=100)



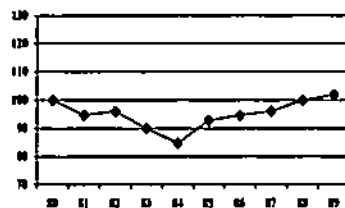
BENIN

- Population 4.6 m
- Population Growth +3,2%
- GNP \$ 1,753m
- GNP per head \$ 380
- GNP growth(1980=100)



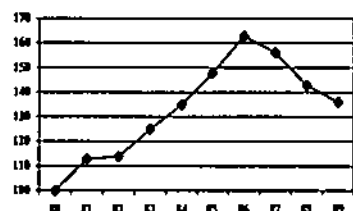
NIGERIA

- Population 113.7 m
- Population Growth +3,3%
- GNP \$ 28,314m
- GNP per head \$ 250
- GNP growth(1980=100)



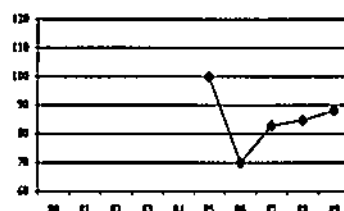
CAMEROON

- Population 11.5 m
- Population Growth +3,2%
- GNP \$ 11,661m
- GNP per head \$ 1,010
- GNP growth(1980=100)



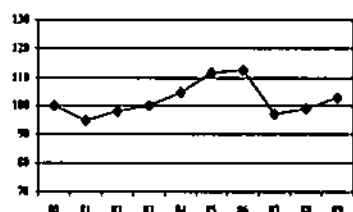
EQUATORIAL GUINEA

- Population 0.3 m
- Population Growth +5,1%
- GNP \$ 149m
- GNP per head \$ 430
- GNP growth(1980=100)



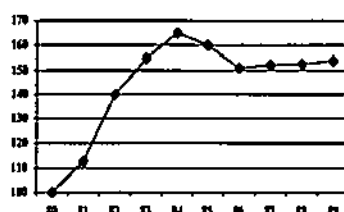
GABON

- Population 1.1 m
- Population Growth +3,7%
- GNP \$ 3,060m
- GNP per head \$ 2,770
- GNP growth(1980=100)



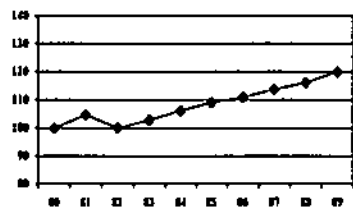
CONGO

- Population 2.2 m
- Population Growth +3,4%
- GNP \$ 2,045m
- GNP per head \$ 930
- GNP growth(1980=100)



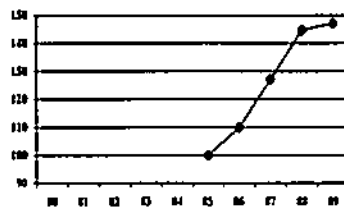
ZAIRE

- Population 34.4 m
- Population Growth +3,1%
- GNP \$ 8,841m
- GNP per head \$ 260
- GNP growth(1980=100)



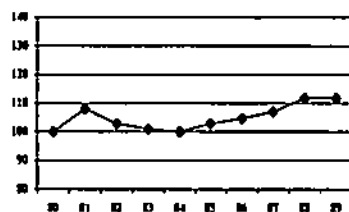
ANGOLA

- Population 9.7 m
- Population Growth +2,5%
- GNP \$ 6,010m
- GNP per head \$ 620
- GNP growth(1980=100)



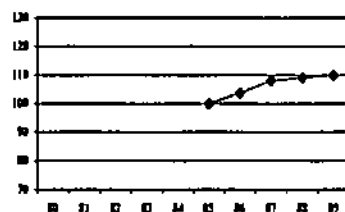
ZAMBIA

- Population 7.8 m
- Population Growth +3,7%
- GNP \$ 3,060m
- GNP per head \$ 390
- GNP growth(1980=100)



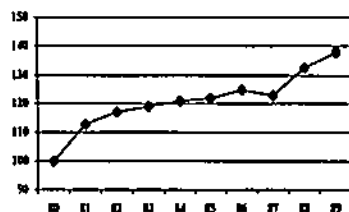
NAMIBIA

- Population 1.3 m
- Population Growth +3,2%
- GNP \$ 1,653m
- GNP per head \$ 390
- GNP growth(1980=100)



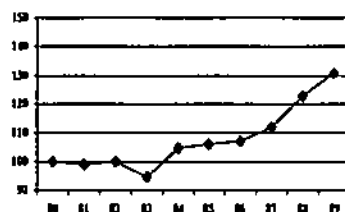
ZIMBABWE

- Population 9.6 m
- Population Growth +3,6%
- GNP \$ 6,076m
- GNP per head \$ 640
- GNP growth(1980=100)



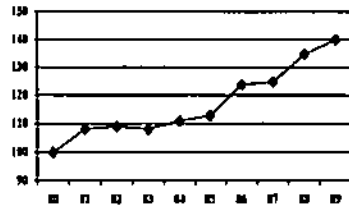
LESOTHO

- Population 1.7 m
- Population Growth +2,7%
- GNP \$ 816m
- GNP per head \$ 470
- GNP growth(1980=100)



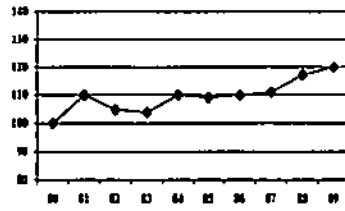
SWAZILAND

- Population 0.8 m
- Population Growth +3,4%
- GNP \$ 683m
- GNP per head \$ 900
- GNP growth(1980=100)



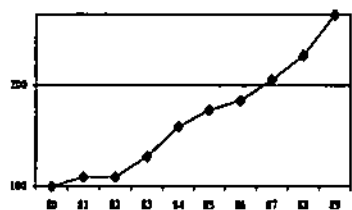
SOUTH AFRICA

- Population 34.9 m
- Population Growth +2,4%
- GNP \$ 86,029m
- GNP per head \$ 2,460
- GNP growth(1980=100)



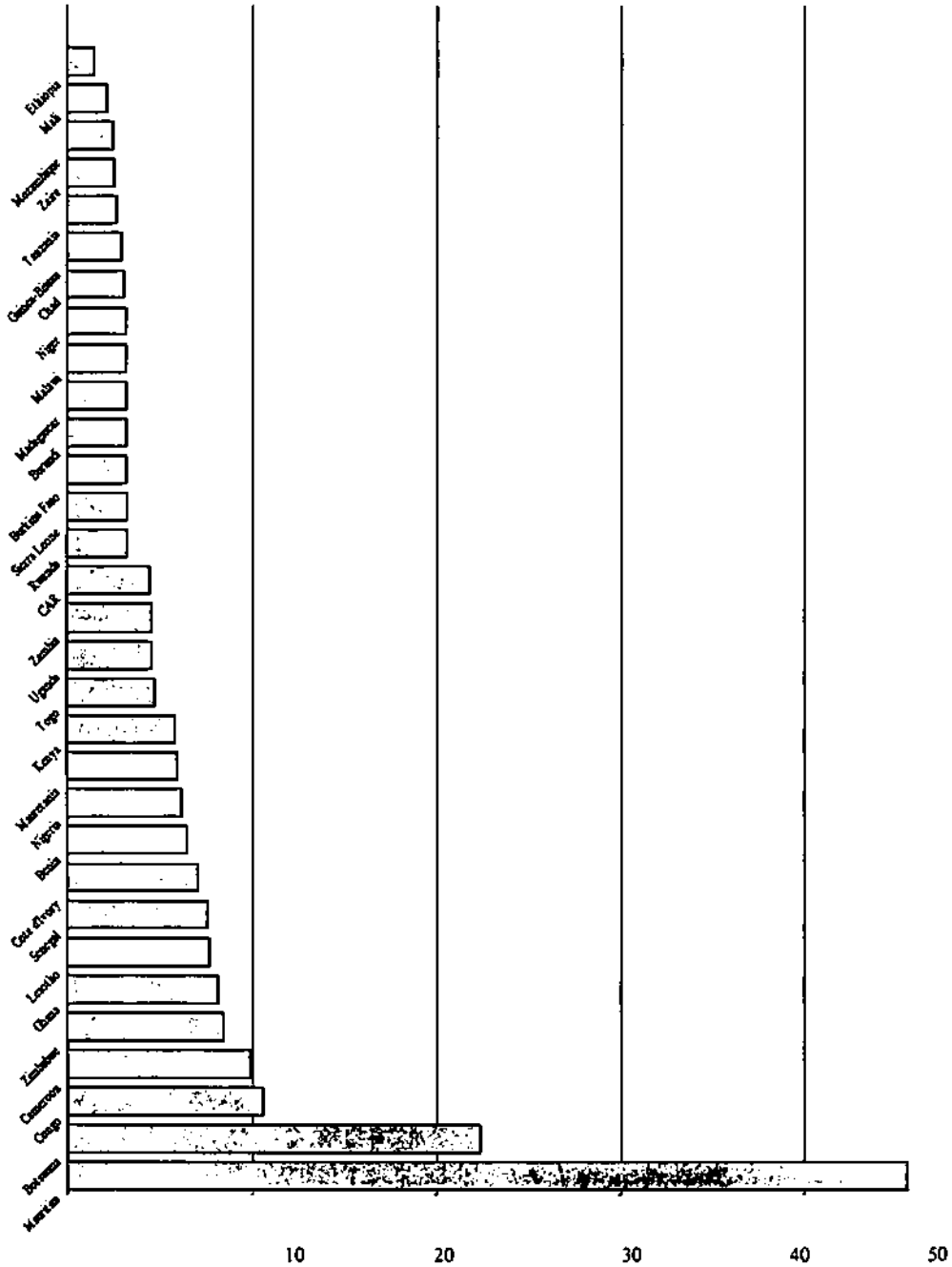
BOTSWANA

- Population 1.2 m
- Population Growth +3,4%
- GNP \$ 1,900m
- GNP per head \$ 1,600
- GNP growth(1980=100)



Source : The Economist Intelligence Unit, (1991)

GNP per head with PPPS* 1992



* Purchasing power parity

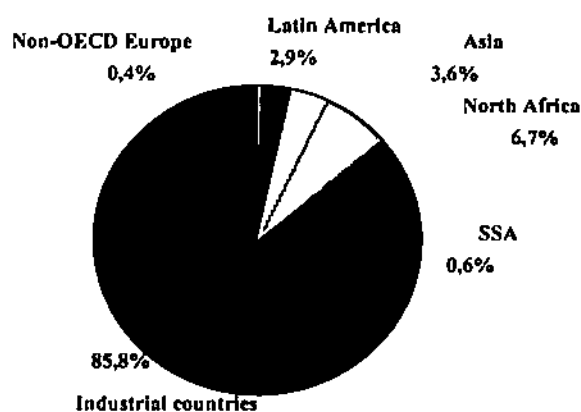
Source: Economist Intelligence Unit, (1996)

Cash flows

Interest, profits & dividends inflows

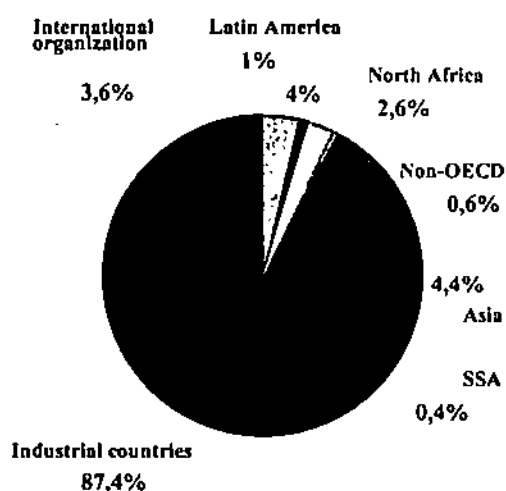
1985

Total: US\$ 385,7 bn



1992

Total: US\$ 914,4 bn



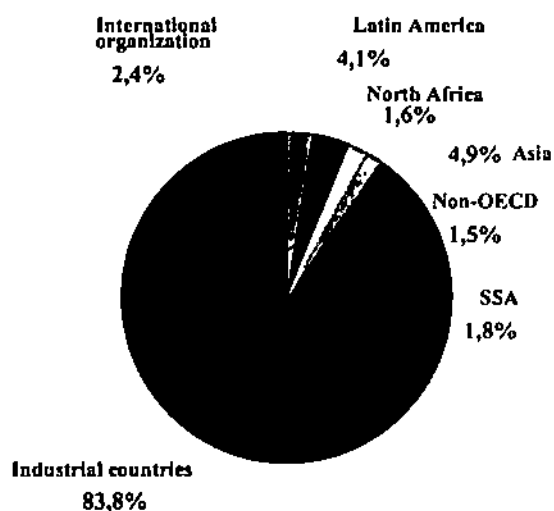
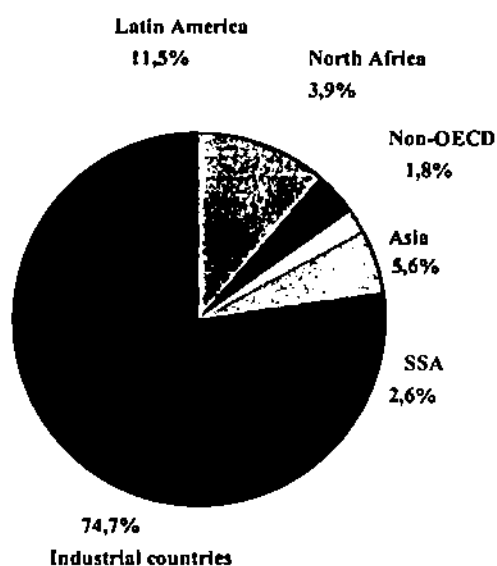
1985

Total: US\$ 407,3 bn

Interest, profits & dividends outflows

1992

Total: US\$ 985,6 bn



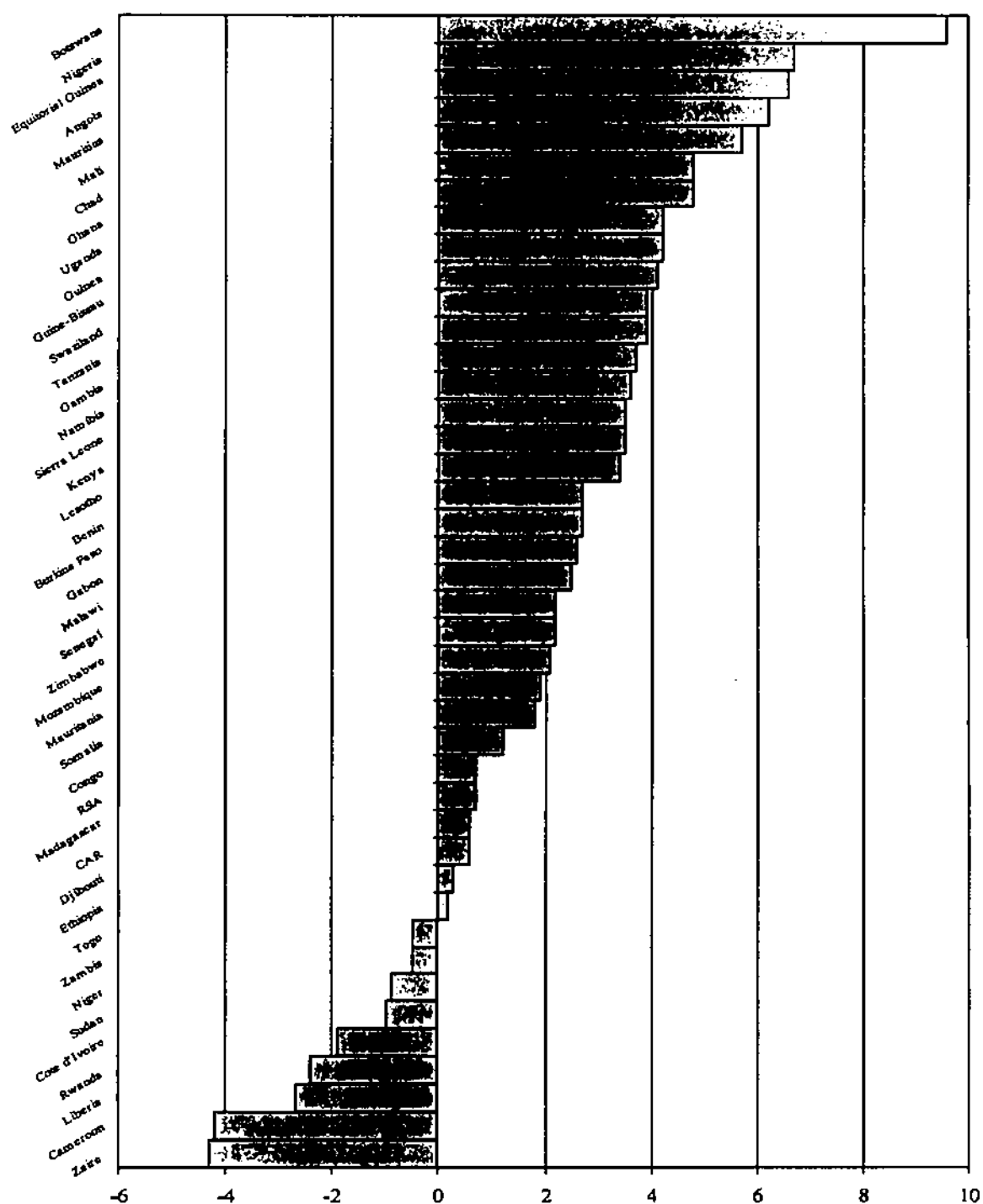
Source: Economist Intelligence Unit, (1996)

Exchange rate against the US \$

	1983	1984	1985	1986	1987
Angola	29.92	29.92	29.92	29.92	29.92
Cameroon	417.38	479.6	378.05	322.75	267
Cote d'Ivoire	417.38	479.6	378.05	322.75	267
Ghana	30	50	59.99	90.01	176.06
Kenya	13.8	15.78	16.28	16.04	16.52
Mozambique	N/A	N/A	N/A	43.95	451.36
Nigeria	0.7486	0.8083	0.9996	3.317	4.141
Senegal	417.38	479.6	378.05	322.75	267
RSA	1.222	1.985	2.558	2.183	1.93
Tanzania	12.46	18.11	16.5	51.72	83.72
Zaire	30.12	40.45	55.793	71.1	131.5
Zambia	1.511	2.201	5.701	7.305	8.889
Zimbabwe	1.105	1.502	1.641	1.678	1.663

	1988	1989	1990	1991	1992
Angola	29.92	29.92	29.92	58	442.84
Cameroon	302.95	289.4	256.45	259	275.33
Cote d'Ivoire	302.95	289.4	256.45	259	275.33
Ghana	229.89	303.03	344.83	390.63	520.83
Kenya	18.6	21.6	24.08	28.074	36.216
Mozambique	699.61	1027.52	1159.85	2033	2951.4
Nigeria	5.353	7.651	9.001	9.862	19.646
Senegal	302.95	289.4	256.45	259	275.33
RSA	2.378	2.536	2.563	2.743	3.053
Tanzania	125	192.3	196.6	233.9	335
Zaire	274	455	2000	63673	1990
Zambia	8.224	12.903	28.986	61.728	156.25
Zimbabwe	1.943	2.27	2.636	5.051	5.482

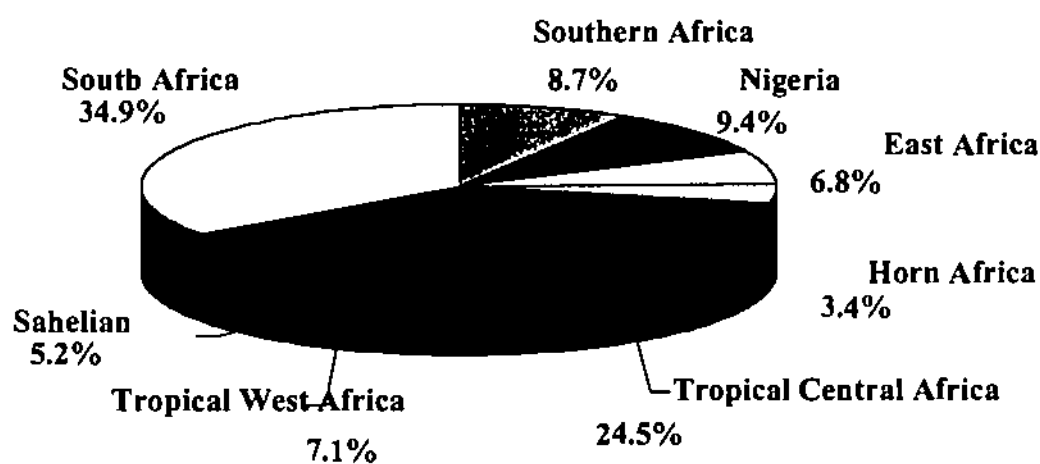
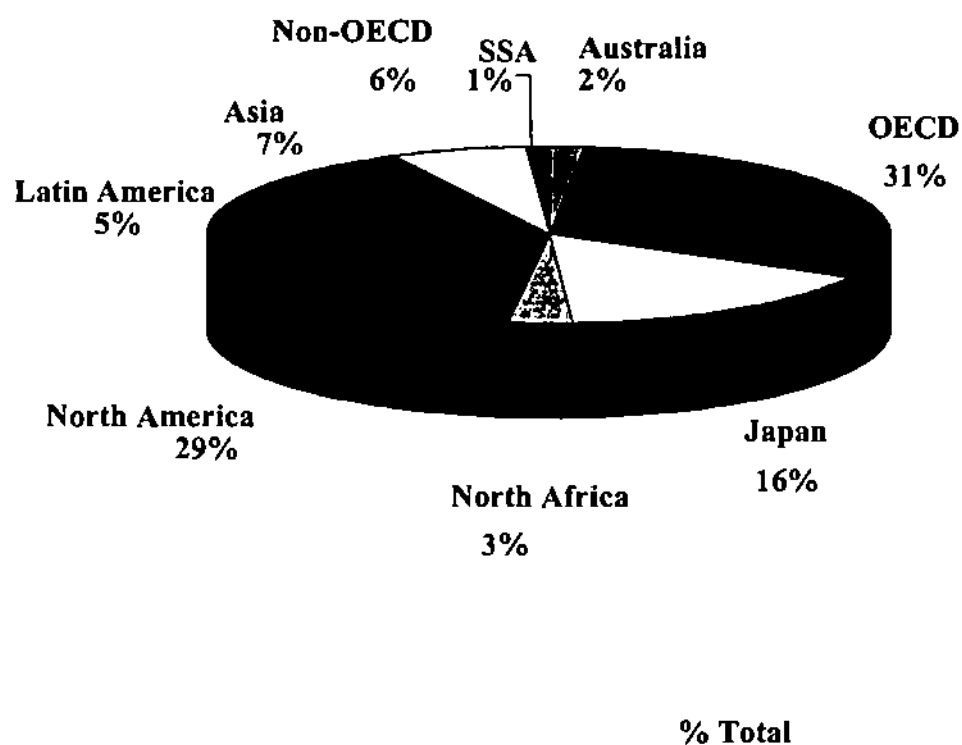
% growth in GNP**



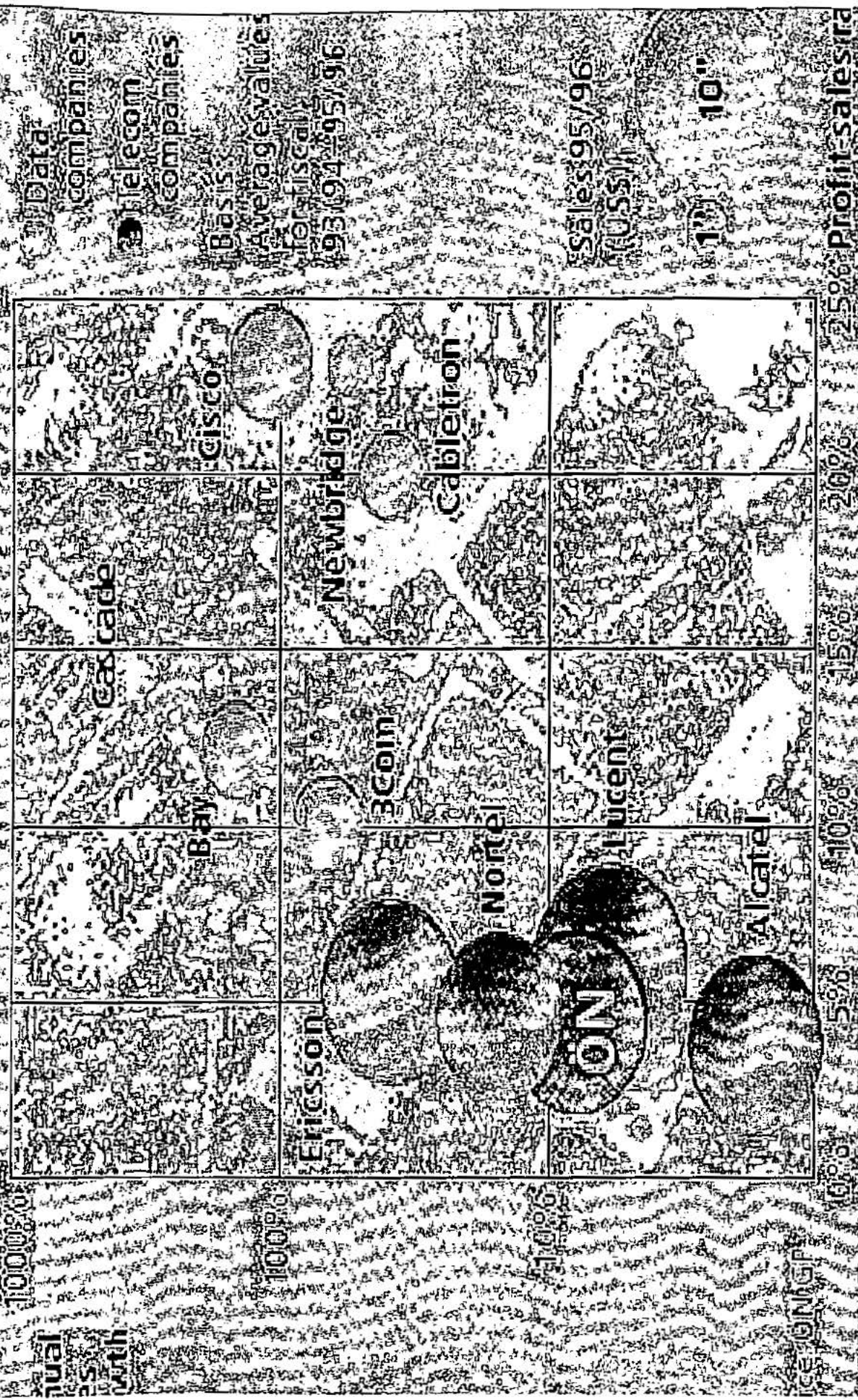
** Time period 1987-1992

Source: Economist Intelligence Unit, (1996)

Nominal GDP by region
Total 1991: US\$ 23,333.5 bn



Source: Economist Intelligence Unit, (1996)



petitors from the world of data processing
growing at breathtaking speed
I have overwhelming profit-sales ratios

Source: Sietel, 1998
* ÖN - (Siemens)

South Africa demographics and economic indicators from 1994 to 1998

	1994	1995	1996	1997	1998
Country area (km2) 1,2 mil.					
Total population (m)	42,5	43,5	44,4	45,5	46,4
Populations growth%	2,26	2,2	2,2	2,2	2,2
Urban population %	51	56	61,6	62,8	65
GDP (US\$ bn)	78,4	79,2	69,1	64,4	63,2
GDP growth/y %	2,8	3,4	2,8	1,9	2,8
GDP indexed to 1993	102,7	106,2	109,2	111,3	114,4
Inflation rate%	9,0	8,7	7,5	10,3	8,9
Unemployment	32,6	29,3	30,0	30,0	30,0
Balance of trade current (US\$ bn)	-0,6	-2,8	-2,6	-1,2	-1,1
Balance of trade capital (US\$bn)	1,4	5,3	0,9	1,8	N/A
Exchange rate US\$ 1=	3,55	3,63	4,29	4,73	6,70

Source: DBSA, 1998