# 1. Introduction

This chapter is devoted to inform the reader on the problem facing telecommunication technology transfers into rural South Africa. This includes the research objective and the research approach.

## 1.1. Research Objective

The objective of this research attempt is to derive a telecommunication technology transfer model into rural areas that might supply advice and guidelines to the telecommunication industry of South Africa on how to improve the situation and conduct action in the future.

The need for a more effective telecommunication technology transfer model can be better understood when one takes a look at the current situation in South Africa and Africa. Aspects that need consideration are:

- The role of telecommunication in development
- Telecommunication Technology Transfer
- Universal Services in South Africa
- Churn Rate Problems in South Africa
- Problems of Sub-Saharan Africa telecommunication firms

### 1.1.1. Telecommunication and Development

Telecommunication is one of the keys to sustainable development in Africa and South Africa. The telecommunication sector is both a source of economic growth as well as a means to grow in other areas. The sector itself offers opportunities for indigenous innovation and it can assist national development. Access to a telecommunication medium not only serves critical sectors like education, safety and health, but also serves as a stimulant for creating new small businesses to sustain larger business productivity. It forms a backbone for development and the only way some development phases can be accelerated. Telecommunication can furthermore also play an important role in import-substitution through providing the needed infrastructure necessary to stimulate economic activity for the creation of businesses in all sectors.

Telephony also offers a communication channel for the support of participants in the process of democracy in communities on provincial, and national level. The products and services that are made possible through telecommunications can (with the necessary transfer of skills and technology) make a noticeable effort to empower former disadvantaged rural citizens in South Africa.

Usually the donor organizations don’t go through all the trouble to research the LDC’s (Less develop country) situation thoroughly before international financial aid is made available to accelerate the development process. An important factor is often neglected when development aid is made available namely that the development aid can destroy the indigenous market [1]. Telecommunication can improve the situation

through creating sustainable development in LDCs, which will then counteract the problem.

Mobile phones are fulfilling ordinary African's aspirations for voice, as well as a continents desire to bridge the technology gap that stranded it at the margins of the *"Information Age"*. In diamond-rich Botswana, more than one citizen in eight has a cellphone [2]. Mobile phone operators are able to reach people in places were roads, rails, or a stable power supply are absent and where other kinds of public infrastructure had collapsed.

### 1.1.2. Telecommunication Technology Transfer

Interaction and technology transfer between countries are becoming ever more important with the continuous developing nature of the international telecommunications environment. The successes that this co-operative effort might hold depends to a large extend on the effectiveness of the technology transfer process. Technologies are being transferred between countries at different levels of technological know-how and utilization, often to the advantage of only the technology source. Technology transfer is a complex subject where governmental regulations, social and cultural aspects, financial abilities, and technological capabilities play different major roles. Technology transfer models, which cause ineffective utilization of the technology, often neglect these aspects.

South Africa has a multi-cultural population that already has these problems nationally between the developed (industrialized cities) and the underdeveloped or developing (traditional and rural areas) sector (see Figure 1.1).

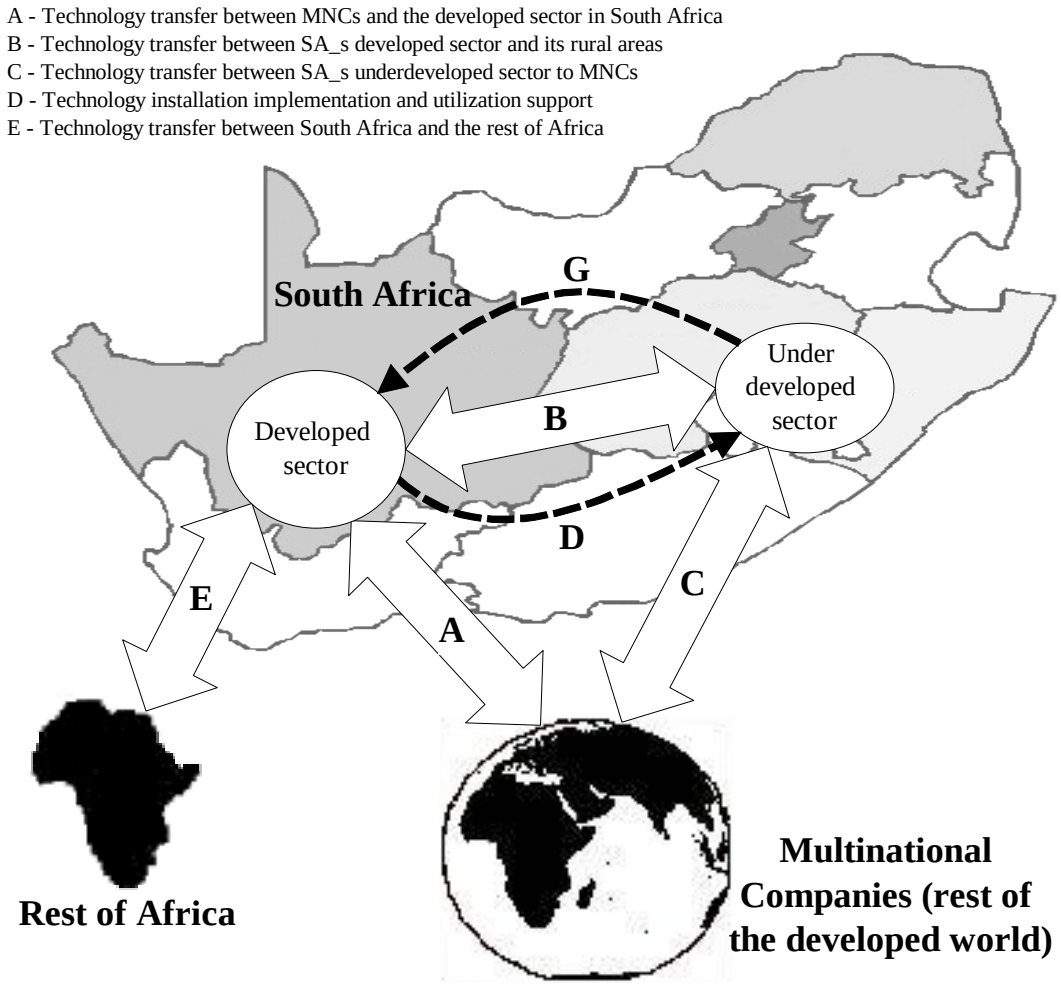


**Figure 1.1. The interfacing between South Africa's two sectors (developed and underdeveloped/developing) and international technology suppliers (MNCs-Multi-National Corporation)**

Most LDCs' developed sector is non-existing and effectively only has the underdeveloped sector that makes technology transfer very problematic and could easily worsen the independency status of the country. South Africa is in a unique and privileged situation were both the developed and underdeveloped (rural) sectors exists. Figure 1.1 shows the South African situation with interactions between the MNCs and between sectors.

Technology transfer currently occurs fairly successful between the developed sector and MNCs (Path A in Figure 1.1) Technology can then be diffused from the developed sector into the under developed sector (B) if the necessary precautions are taken. The problem with the South African rural areas is that technology cannot be successfully transferred from MNCs to rural regions (C) without the necessary support (D). If this is attempted the rural area will have to make use of foreign staff to implement and maintain the technology because of absent skilled manpower. Technology transfers from the underdeveloped sector outwards to the developed sector (B) and MNCs (C) are for all practical reasons inactive and very little prospects exist to change the situation in the near future. The developed sector should aim, in a

long-term development strategy, for a social and economic profitable diffusion channel (B) to uplift the rural areas and enable them to act as a technology source in paths B and C.

Better communication with African countries will strengthen South Africa's presence in the market by connecting institutions in both the public and private sectors. Many LDCs need basic standard technologies already viewed as old and unproductive by the developed sectors of South Africa. This situation creates an ideal opportunity for South Africa to appear as the *technology source* in the technology transfer process (E).

### 1.1.3. Universal Services in South Africa

Generally the term "universal service" is taken to mean a telephone in every home or at the office, while "universal access" refers to public access telephones (access to a telephone, but not necessarily one's own personal phone).

The International Telecommunications Union stated: "There is a need for policy-makers to review the objective of universal service. Emphasis would have to be shifted from providing service to everyone or even the majority of people to meeting demands for business customers, administrative needs, and access to telephone services to as many people as possible through pay phones and community phones in a way that allows operators to realize reasonable profit margins."

The Ministry of Communications said in a policy document released in 1997 [3], (entitled Partnership for the Future): "In order to set the initial targets, Telkom (South African telecommunications fixed-line service provider) has taken a monthly household income of R900 per month as the likely threshold for a phone-owning family. Those with incomes of below R900 will be served using an accelerated roll-out of public phones". Presently, unemployment in South Africa stands at 37,6%, and of those employed, 44,7% earn under R1000. The above figure is based on the assumption that people spend 2.9% of their incomes on telephony yet an international norm is that the service should cost no more than 0.7% of a household's total income. These figures demonstrate that private access to a telephone is becoming only a dream for more and more South Africans, unless something drastic is done to facilitate universal service.

Universal service involving a telephone in every home should remain very firmly on South Africa's long-term agenda, but universal access should be strived for as a temporary measure. Universal access should furthermore not be limited to the roll out of pay phones, as this will not facilitate public access to information and communications technologies. Rather, the provision of these services in the context of multi-purpose community communication centres should be encouraged

### 1.1.4. Churn Rate Problems in South Africa

A serious problem for Telkom, and for most companies in the telecommunications industry, is the problem of churning. Churning is the process of customer turnover. Anderson consulting recently estimated customer churn levels of 30% per year [4] in the cellular telephone markets. Because Telkom soon will no longer enjoy protection

from the state, this is a serious concern for them too. Competition will become fierce in the next years as new companies enter the South African market. Given the increase in customer choice, there has been and will be an increase in churn-rates.

In South Africa, nowadays the main focus is on extending the network into areas currently without any. However, there is a major issue of people who previously had telecommunication services but cancelled it due to high cost (this is referred to as "churn") [3], so affordability is also an important issue to be looked at. In South Africa a further churn related problem has been identified. Telkom, as requested by the South African Government, should install many phones in previously disadvantaged communities and homes. Because the clients in these areas are often not financially self-sufficient, the churn problem is aggravated [4].

Research is needed in churn analysis to perform two key tasks [4]**:**

- Predict whether a particular customer will churn and when it will happen;
- Understand why particular customers churn.

By predicting which customers are likely to churn, the company can reduce the rate of churn by offering customers new incentives to stay. By understanding why customers churn the company can also work on changing their service so as to satisfy these customers pro-actively [4].

In 1996 the churn rate was 16%. Telkom was required in terms of its license conditions to install 250 000 new lines. Instead it had to install 700 000 to reach its target [3]. Questions that might be asked are:

1. Would flexible billing and packages influence affordability, especially in low-income households?

2. Would this positively influence a household's ability to remain on the network?

Vodacom's (one of South Africa's mobile operators) churn rate is below 16%, one of the lowest in the world, and indicates exceptional customer loyalty [5].

Written into its license, Telkom was allowed "the exclusivity period" to have time to re-balance its tariffs. The rationale for re-balancing is that international calls (which have been above cost) have been cross-subsidizing local calls (which have been below cost), and this imbalance needs to be corrected so that services are provided, based on its real cost. The USA (Universal Service Agency) was set up partly to finance the difference between what the services actually cost, and what people could afford. This move will prepare Telkom for competition. Telkom cannot be allowed to use its market power derived from its former monopoly position to cross-subsidize services, as this would undercut the ability of competitors to enter these markets. The problem is that tariff rebalancing is resulting in services becoming more and more unaffordable to ordinary people who make mainly local calls.

Poor churn-rates are a well-recognized problem in developing countries. Even when liberalization may have led to more people coming onto the network, many

discontinued their services shortly after as it proved to be unaffordable. This problem is one of the key challenges facing the USA (Universal Service Agency) at the moment. It is in the public's interest for Telkom to be allowed to cross-subsidize local calls.

### 1.1.5. Problems for Sub-Saharan Africa Telecommunication Firms

The performance of Sub-Saharan Africa institutions in the telecommunications sector has been disappointing because of poor processes and inadequate human resource management. Problems, the telecommunication organizations face include [6]:

- Interface from government and the political institutions.
- Unjustified pressure of suppliers of telecommunication equipment and donor agencies to use technology which is new or even emerging when priority should be to supply basic telephone services.
- Inadequate organizational structure including: management and motivation of human resources, financial management, strategic planning and technology management.

Part of the solution lies in the recognition of the fact that it is people who will bring about improvements [6]. Furthermore, developing and training human resources together with dedication of sufficient resources towards this goal is crucially important. It is thus clear that the need exists for a more effective telecommunication technology transfer/diffusion model to deal with these problems.

## 1.2. Research Approach

### 1.2.1. Problem statement

Telecommunication technology transfers between two parties at different hierarchical levels of technology know-how/utilization (between MNCs and LDCs) often occur with limited or no advantages to the LDC. A transfer model is needed to improve the situation and make technology transfers a process from which both parties can benefit simultaneously. To develop such a model the research problem holds the following aspects that need investigation:

1. The determination on available transfer models, ideas and suggestions for effective technology transfer between countries at different hierarchical levels of technology know-how and evaluation to determine their applicability.

2. The determination on the current situation in South Africa's ability to transfer/diffuse technology from the developed sector to the underdeveloped sector and a search for existing technology transfer problems in the South African telecommunication industry (fixed-line & mobile), with suggestions on how the situation can be improved in the future.

3. The development of a telecommunication technology transfer/diffusion model for the South African situation with mutual advantages to the underdeveloped sectors as well as the developed sectors.

4. Identify strengths and weaknesses in the technology triangle "technical aspects" (Appendix A) for both the developed and the developing sectors to find aspects that might first have to be uplifted before interaction can be successful.

### 1.2.2. Problem Solving Approach

The approach to a solution for this problem involves a background study on the current problem, literature study, research and an analysis conducted on the basis thereof. The problem solving approach is discussed below.

#### *1.2.2.1. Background*

The background section (Chapter 2) tries to answer three basic problem-solving questions to clearly understand the problem. They include:

1. ***What?*** What is technology transfer?
   What technologies to transfer?

2. ***Why?*** Why transfer technology?

3. ***With whom?*** Who are involved in the technology transfer problem?

#### *1.2.2.2. Literature Study*

A literature study will be needed to determine aspects that will influence the creation of a new technology transfer model. It has the purpose of answering the question on how technology should be transferred (existing thoughts). This include:

- Critical needed factors
- Malfunctions in the technology transfer
- A definition on appropriate technology
- Existing technology transfer methods (models)

#### *1.2.2.3. Field Research/Survey*

The research attempt has the purpose of collecting the necessary data that will enable the author to supply useful inputs into the technology transfer process' problem solving techniques. The survey will be done in two parts:

- Interviews with corporate personnel from the telecommunication service providers in South Africa to determine their technology transfer practice and problems.
- A field research will be conducted to determine the magnitude of the problem and to acknowledge the need for drastic improvements in rural South Africa.

Research is useless if an analysis on the gathered data isn't done. Chapter 6 provides the data analysis on the basis of the technology transfer model described in Chapter 4.