

## **CHAPTER THREE**

# **RESEARCH DESIGN**

### **Introduction**

The literature review in Chapter Two provided background information useful to developing the research design used to study the impact of technology on democracy in South Africa. As indicated in Chapter One, the definitions of both democracy and technology as used in this study are political and responsive to the environment in a political system that values democratic prosperity. As the literature review indicated, and for the purpose of the study, this chapter is divided into six key concepts, namely: (i) description of the concepts of technology, (ii) description of the concept of national system of innovation, (iii) description of the democratic political system, (iv) description of information and communication technologies, (v) description of information divide, (vi) description of the concept of democratic politics of technology. An understanding of these concepts is necessary in order to study the impact of technology on democracy in South Africa. All methodology used for this study focuses on issues that relate to these six concepts. In order to validate the study, this chapter also justifies the methodological premise used in the study.

### **Description of key concept and variables**

The following key concepts and variables form part of the study.

### **Technology**

Technology is regarded as a prime determinant of a country's wealth; it determines its standard of living; it is a key resource of profound importance to profitability and growth. Its impact on society can be considered the prime driving force in the contextual environment of a political system because of its both direct and indirect impact through the shaping of changes in the social, economic, political and natural/

physical environments. Technology is said to be the systematic application of knowledge to resources to produce goods and services (Stilwell, 1994). Resources refer to physical resources like raw materials, labour human resources, and capital. Technology also consists of the physical technology, which includes artefacts, the skills of human resources to use such technologies, and also the organisation around the technology itself.

## **National system of innovation**

The South African White Paper on Science and Technology makes provision for the NSI (national system of innovation), which is primarily concerned with creating capacity for sufficient supply of new knowledge and new technologies, as well as supporting and promoting the achievement of national objectives. The white paper looks at the following six functions:

- Policy formulation and resource allocation at national level
- Regulatory policy-making
- Performance-level financing on innovation related activities
- Performance of innovation related activities
- Human resources development and capacity building
- The provision of infrastructure.

Policy initiatives proposed in the White Paper are:

- to create channels for capacity building, human resources development and inequity redress;
- to create channels to promote innovative solutions to some major problems of the country relating to science and technology;
- to establish a mechanism to re-allocate government spending according to new priorities, particularly the problems of the disadvantaged;
- to set in motion a process that will challenge research institutions to derive more support from competitive sources of funding;
- to introduce a longer-term perspective in thinking, planning and budgeting, which will be facilitated by the introduction of the Medium-Term Expenditure Framework; and
- to introduce institutional changes and new management approaches.

## **Democratic political system**

Political system is a pattern of political relationships. A democracy is a political system in which the opportunity to participate in decision-making is widely shared among all adults. Thus a democratic society is defined as a social system that has not only a democratic political (sub)system but also a number of other subsystems that operate to contribute directly or indirectly to the strength of the democratic political process. (Dahl, 1976)

## **Information and communication technologies**

Information and communication technology (ICT) describes the disciplines encompassing systems analysis, programming, telecommunications and multimedia applications. ICT is the concept which is generally used to refer to the use of computer, electronics, and telecommunications equipment for processing and distributing information in a digital form. ICT is deeply seated in computing, telecommunications and microelectronics technologies, and in its distribution from the Worldwide Web network and from individual to industry services, which includes television broadcast and electronic mail service. Martin (1988) describes it as the acquisition, processing, storage, dissemination and use of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunication. ICT, having undergone several stages, encompasses the capture, storing, processing, transporting and displaying of information. It encompasses all those technologies that enable the handling of information and facilitate different forms of communication among human actors, between human beings and electronic systems, and among electronic systems.

## **Information divide**

Commonly referred to as the information gap, usually prevalent between the haves and the have-nots. It is also understood as the concept of the digital divide, which makes it difficult to understand as the problem is mostly in the different approaches with multiple definitions. The information divide is exacerbated by disparities based

on location, such as urban versus rural area, gender equality, physical disability, age, income level, and between rich and poor communities.

## **Democratic politics of technology**

Democratic politics of technology is democratic if it has been designed and chosen with democratic participation or oversight and, considering its focal and no focal aspect, is structurally compatible with strong democracy and with citizens' other important common concerns. Within a democratic politics of technology, reflection on existing and proposed technologies plays a role in generating democratic design criteria. Use of these criteria then mediates between democratic procedures and the evolution of a substantively democratic technological order. Therefore, technologies are species of social structure. Thus it is morally vital that they, like other social structures, are generated and governed via democratic structuration, i.e. the democratic process for generating democratic structures. (Sclove, 1999.)

## **Methodological premises**

The methodological premises pertain to the approaches, methods of data gathering and interpretation, and level of analysis used in the study. The terms "approach" and "method" are often used interchangeably. (Van Dyke, 1960). In this study, the term "approach" implies the criteria used to propose research questions and select relevant data, while "method" refers to the activities that occur when data is gathered and interpreted. In this study both a descriptive and prescriptive approach are used. The method of data gathering is a literature study, and to analyse and interpret data the empirical method and deduction are used.

Description comprises the process of providing an objective rendering of what is being studied. It is evident that descriptive statements amount to 'alleged truths of reality'. (Van Dyke 1960). Prescription, on the other hand, involves making value statements about "the way the world should be ordered and the value choices decision makers should make" (Viotti and Kauppi 1993). In other words, description deals with 'what is', whereas prescription deals with what 'ought to be' or what 'should be'. (Dyer, 1997) However, the description-prescription dichotomy does not imply that

these approaches are necessarily incompatible. On the contrary, according to Dyer (1997) only when it is determined (descriptively) what is normal in a given context, may deviation or conformity be viewed as either a pejorative or commendatory basis for prescription. In this study the relationship between the two key concepts, namely technology and democracy, will be approached descriptively. The study will embark on the more normative exercise of prescribing ways to improve the plausibility, viability and feasibility of political stability as an approach to a democratic political system.

## **Research design**

The research necessarily followed a pre-planned strategy, partly due to the fact that the study is an empirical analysis. The theoretical framework was not established prior to undertaking the study. Although a fine mapping of the research design in a heuristic sense was not possible, several basic concepts guided the planning from the outset. These components were considered vital to meaningful results: relevance to the study questions; underlying propositions or assumptions; key constructs as categories or units of analysis; logic linking data to the propositions; and criteria for interpretation.

The design is guided by a definition of research as a process which, through the study, attempts to achieve systematically and with the support of related literature the answer to a question, the resolution of a problem, or a greater understanding of a phenomenon. The study also drew on the concepts for design and analysis set forth in Mouton (2001). The study follows a broad path, as the data continuously shaped each subsequent stage of the research. The principal research question queried the impact of technologies in a democratic political system. This expanded into a set of questions that differed slightly for each case study. In political science, the existing use of these technologies and the changes as in the modernisation process to both the political system and the appropriateness of technology approach, including the infrastructure, led to quite specific areas of investigation. The extent of technological progression was the symbolic reflection of the state of democracy in South Africa. The units of analysis were, therefore, sometimes aspects of the technology and political sciences. Each could be looked at in terms of the other. The evidence was then gathered and fitted together until a picture emerged of the shape and direction of that issue. The

links between the data and the propositions were complex, and required a broad view of strategic intent of the literary analysis.

More than 300 literature sources are quoted in the study. The researcher attended meetings, seminars, conferences and some exhibitions, shows organised by the Department of Communication, the Department of Arts, Culture, Science and Technology, the South African National Defence College, and other government departments, and also communicated by email and correspondence. Throughout 1998 to 2004, the researcher had access to the desktop and the Internet, which was helpful in accomplishing part of the study.

As this was an empirical analysis primarily consisting of literature reviews, the study did not involve any survey interviews. The study sought to document the impact of technology on democracy in South Africa. This has not been part of the formal discourse surrounding the democratisation process in South Africa.

### **Document analysis**

As many documents as possible were collected and used as a basis for discussion and analysis. These included, *inter alia*, the White Paper on Science and Technology, plans on strategic human development, industrial technology, democracy, information technology (IT) and information management, technology management, and less formal documents given to the researcher, including promotional material for technology campaigns, bulletins and postings. In addition, the National Research and Technology Foresight (NRTF), the South African National Research and Development Strategy and the national industrial technology audit report, as well as other external documents affecting policy processes, supplemented the data collection, which also included media reports on related matters. Most of these documents are included in the bibliography.

## **Data collection and sources**

With regard to the data collection method, data and information were accumulated in various ways, for example by making use of direct observations, surveys, conducting interviews where necessary and studying documentary sources of other people's observations and ideas. Because this is a literature review study, Mouton (2001) recommends that the study should give full details of the data collection, including gaining access to the subject's data collection techniques and the procedures used. This study is confined to the latter; it relies on the secondary data, i.e. data collected by others. (Bernstein and Dyer 1979). In other words, it is based on a literature study of existing data, discourse analysis, content analysis, textual criticism, such as seminal philosophical works, access to Internet documents and also government and public reports that relate to the subject matter. As a literature study it focuses on the causalities and deductions found in texts regarding the relationship between democracy and technology and the impact on a political system. These causalities and deductions are indicated, explained, assessed and used to answer the research question, concerning the plausibility, viability and feasibility of the politics of technology as an approach to a world democratic political system.

## **Data interpretation and analysis**

The notes on documents were assembled through a process of pattern recognition, aided by the theory to both establish logical connections and determine the categories for analysis. Grouping under the broadest possible categories assisted this process. This was guided by advice that for qualitative work, the greatest challenge is not the collection but the refining of material to retain only the essence. (Dahl, 1976). The researcher decided to create the narrative and reconciled the factual flow with other similar literature in the same study interest before doing the final analysis. This is also one way to avoid confusion between analysis and correctness of description. (Dahl, 1996). Thus the final theoretical analysis was done. This was also a dialectic process that assisted in the final editing of the study. (Dahl, 1996). Once the hypotheses and communication protocols were established, it became possible to look back on the evidence and see if and how it was supported.

The study regarded the interpretation of data, where the analysis is applied, and the process by which the parts of a whole are identified. The study also involved an effort to find out how these parts are related or connected to form the whole. (Van Dyke 1960). The study adopted the qualitative method in this regard; this approach is confirmed by Van Dyke (1960) who emphasises that the qualitative method relies on the personal qualities of the scholar. These qualities include logic, judgement, insight, imagination, intuition and/or the ability to form accurate impressions and see relationships.

It is within this context that the research problem is identified as the interrelationship of political system, democracy and technology. This correlation is not quantified or measured; Van Dyke (1960) argues that "the pertinent fact is not the presence or absence of something in such and such quantity but rather the nature of the arrangement...". This study does to some extent, however, refer to quantitative studies correlating democracy and technology, but does not necessarily itself make use of the quantitative method to prove or make any deduction. The study can therefore be considered to be qualitative.

The deductive reasoning methodology of data interpretation is used. Deduction, according to Lin (1995), is "the process in which certain known propositions or premises make other unknown propositions and conclusions follow logically, empirically or both". Mouton concurs that "deductive inference or deduction involves drawing conclusions from premises (other statements) that necessarily follow from such premises". There are, subsequently, three types of deduction that can be used to explain social phenomena, namely logical deduction, the empirical deductive system, where propositions relate theoretical or abstract terms or concepts to empirical (observable) terms or variables, and a combination of the logical and empirical deductive system, where the two systems are integrated in order to explain certain phenomena.

The study opted for the use of the first type of deduction, that is, the logical deduction. Isaak (1975) explains the basic structure of the logical deductive explanatory model as follows. He maintains that the logical deduction is divided into that which explains, the *explanans*, and into that which is explained, the *explanandum*. The *explanans* consists of two statements or postulates. Postulates are



true statements from which other statements are deduced. (Bailey, 1994). Collectively these postulates imply the *explanandum*. The *explanans*, in other words, contains the premises from which the *explanandum* conclusion or deduction is deduced. Lin (1995) indicate that there are two variations of the logical deductive model, namely the definitional and the propositional logical deductive systems.

In the definitional logical deductive system, both postulates as well as the deduction (in other words the *explanans* and the *explanandum*) contain definitions. The deduction (*explanandum*) connects the definitions. Since both postulates are by definition true statements, it follows that by deduction the *explanandum* is also true. A typical definitional logical deductive system looks as follows:

*Explanans* (postulates):

1. Humans are mortal.
2. Socrates is human.

*Explanandum* (deduction):

3. Thus, Socrates is mortal.

The postulates are stated in an either-or manner. Humans are either mortal or they are not and Socrates is either human or he is not. Thus, Socrates is either mortal or he is not.

The propositional logical deductive system, on the other hand, contains propositions. In this model the relationship between concepts are probabilistic rather than definitive as in the definitional logical deductive model. Hence the postulates and the deduction merely describe the likelihood of the occurrence of a relationship rather than an unquestionable truth. A typical prepositional logical deductive system looks as follows:

*Explanans* (postulates):

1. The more educated a person is, the more likely it is that he/she will get a high-ranking job.
2. The higher the rank of the job a person can secure, the more likely it is that he/she

will amass wealth.

*Explanandum* (deduction):

3. Thus, the more educated a person is, the more likely it is that he/she will amass wealth.

In the example, it is only stated that a person with greater education is likely to secure a higher-ranking job. It is not stated that all people with greater education will do so, as the definitional logical deductive system would have read (Pretorius, 2001).

The nature of deduction in this study is such that it subscribes to the latter variation of the logical deductive model, in other words, the propositional logical deductive system. The first postulate is based on the hypothesis that technology is likely to enhance democracy. Subsequently, advances in technology may enhance democratic participation, which is likely to lead to political stability in South Africa. The second postulate is that the information revolution is likely to enhance socio-economic development in South Africa. From this postulates can be deduced that, as a result of the advancement in technology, democracy is likely to be enhanced.

It is evident that these two statements are propositional and not definitional in as much as they only state the likelihood of a relationship between political stability, technology and democracy. In subsequent chapters the nature of these propositions is explored. In terms of the postulates contained in the *explanans*, the focus is on the conditions that will increase and decrease the likelihood of a relationship between technology and democracy on one hand and technology and political system on the other hand. In terms of the deduced proposition, the study explores its soundness and usefulness to answer the research question.

Concerning the third methodological premise, namely the level of analysis, the study is not limited to a single level of analysis. Although democracy is usually linked to state level as it involves regime types, the political system obscures the traditional distinction between substate and suprastate or global level analysis. For example, individuals and groups traditionally operating at the substate level are empowered to use benefits offered by technology on the suprastate level. This necessitates an

approach to analysis that is not only flexible enough to concentrate on actors and processes on different levels of analysis, but also on actors and processes that cross the level of analysis with increasing frequency.

### **The study in relation to the existing literature**

To the student's knowledge, no other long-term studies in the field of political sciences and technology in South Africa have overtly linked these to a democratisation processes. There is, however, an existing, not so closely related MA study by Pretorius (2001), who looked at "The democratic peace as an approach to world peace in the information era". She has found that information technology contributes to the spread and institutionalisation of democratic norms by providing access to abundant information through channels difficult to bring under government control, facilitating the mobilisation and organisation of pro-democracy movements and creating unprecedented opportunities for civil participation in the political process.

This study could, therefore, be considered to be new, breaking fresh ground in the field of political policy analysis in South Africa.

### **Shortcomings and main sources of error**

Given the complexity of this study and the unavailability of relevant literature in some instances, there was selectivity in the sources used. The student could have treated some authors unfairly because of his preconceived ideas and expectations.

Misunderstanding the source and selective interpretation to suit one's own viewpoint could also have been encountered. Owing to the vast scope of the study area, it is possible that there may be some paucity in the integration of the literature reviewed.

Other limitations and constraints are that the study of the democratisation process, using South Africa to determine the impact of technology, was largely limited to a picture of a democratic political system. Limited resource material and stakeholders in the technology environment might have provided different views, but this was beyond the scope of the study. As mentioned already, access of information was a problem in that it is not easily available to conduct this nature of the study. The study was

constrained by other requirements of the thesis, including time and other costs involved in accessing information from the Internet, telephone calls and trips to libraries and visiting institutions and organisations.